AOML’s Hurricane Researchers Gather Critical Data in September Storms

During September, scientists with AOML’s Hurricane Research Division (HRD) sampled two long-lived tropical systems—Karl and Matthew—that formed in the Atlantic. Flying aboard NOAA’s Hurricane Hunter aircraft, the data they gathered were assimilated into computer models and used by the National Hurricane Center (NHC) to keep government officials, emergency managers, the media, and the public informed with up-to-date forecasts.

Tropical Storm Karl formed on September 16 and traveled westward for several days, hampered by a combination of dry air and wind shear. As Karl made a turn to the northwest on September 21, moving into a more favorable environment for development and forecast to strengthen into a hurricane, AOML’s hurricane researchers deployed to St. Croix, U.S. Virgin Islands to begin missions.

From September 21-24, they sampled Karl’s inner core, as well as the atmosphere around and above Karl, to better understand how tropical systems interact with and are impacted by their surrounding environment. They also used Doppler radar to measure the strength of Karl’s winds and GPS dropwindsondes for vertical profiles of pressure, temperature, and humidity. Although Karl slowly intensified into a robust tropical storm, the system never attained hurricane strength. On September 24, Karl passed to the east of Bermuda, generating rough surf, squalls, and blustery conditions but causing only minimal damage before dissipating at sea.

In contrast, Hurricane Matthew caused massive destruction and a devastating number of fatalities on its path through the Caribbean.

The system became a tropical storm east of the Windward Islands on September 28 and strengthened into a Category-1 hurricane the next day. Matthew then rapidly intensified, doubling in strength in 24 hours. From September 30 to October 1, Matthew’s top winds reached 160 mph, making it the first Category-5 hurricane in the Atlantic since Hurricane Felix in 2007.

Matthew struck Haiti, Cuba, and the Bahamas as a dangerous Category-4 hurricane with powerful, pounding winds, heavy rain, and flooding due to storm surge. In Haiti alone, more than 800 individuals perished. Matthew then approached Florida’s Atlantic coast as a Category-3 hurricane with 120 mph winds.

For almost 36 hours, Matthew paralleled the eastern seaboard as it moved northward, remaining just offshore and gradually weakening. Nevertheless, the storm caused widespread damage, record-breaking floods, and extensive power outages from Florida to the Carolinas. On October 9, Matthew finally dissipated off the coast of Cape Hatteras, North Carolina.

AOML’s hurricane researchers began sampling Matthew on October 5 as the storm crossed over the Bahamas. For the next several days they flew back-to-back missions (continued on page 2)
aboard NOAA’s Hurricane Hunter aircraft, observing Matthew with an array of instruments to keep forecasters abreast of Matthew’s constantly changing, dynamic environment. Tail Doppler radar missions provided NHC forecasters and HRD researchers with complete three-dimensional depictions of Matthew’s formidable winds and the regions of heaviest precipitation in real time.

NASA’s Global Hawk unmanned aerial vehicle also flew missions into Matthew, as well as Karl, in support of the joint NOAA-NASA Sensing Hazards with Operational Unmanned Technology (SHOUT) program. SHOUT researchers are assessing the value of using the Global Hawk as an autonomous observing platform to improve forecasts and provide data coverage should an interruption occur in the service of polar-orbiting satellites.

The Global Hawk can fly for longer periods and farther distances than conventional manned aircraft. It carries a suite of high-resolution instruments that include GPS dropwindsondes, a dual-frequency Doppler radar, and a multi-spectral microwave sounder. These instruments were used to gather data from the convective center and surrounding environment of both Karl and Matthew from heights of 60,000 feet down to the ocean’s surface that were assimilated into forecast models in real time.

All of HRD’s missions into Karl and Matthew were undertaken in support of its annual Hurricane Field Program, a major focus being the Intensity Forecasting Experiment (IFEX). IFEX aims to improve understanding of the physical processes related to intensity change by collecting observations from all stages of the tropical cyclone life cycle in a variety of environments. For example, Karl marked the first time HRD researchers were able to gather data in a system from the time before it became a tropical storm to the time it moved over cold water and had its structure change to something more similar to storms in the middle latitudes.

In the case of Karl, the observations will help to answer the question of why Karl failed to develop into a hurricane, while a similar storm earlier in the season, Hermine, did reach hurricane strength just prior to landfall in Florida. For Matthew, questions about what prevented the storm from reintensifying significantly as it approached the Florida coast can be addressed.

Although the impacts from Tropical Storm Karl and Hurricane Matthew varied considerably, both storms provided opportunities to gather invaluable data to better understand the complex processes of how and why tropical cyclones form, strengthen (or fail to strengthen), and dissipate. Between the two storms, AOML’s hurricane researchers conducted a total of 16 missions aboard NOAA’s P-3 aircraft and 7 missions aboard its Gulfstream-IV jet that were critical to protecting both life and property.

Tail Doppler Radar Paints Pictures of the Wind in Tropical Cyclones

Each of NOAA’s Hurricane Hunter aircraft carries a sophisticated radar that measures the wind in tropical systems where there is rain. Located in the tail of the aircraft and known as Tail Doppler Radar, these instruments produce detailed images that scientists use to study a system’s storm structure and wind field. As Hurricane Hunter aircraft pass back and forth through the eye from different approaches, they can eventually paint a complete picture of the winds around the storm. The winds are estimated every 500 meters, starting at altitudes from 0.5 kilometers above the ocean surface to heights of 17.5 kilometers. These radar images identify where the strongest winds are located in a storm and how far they extend outward from the storm’s center. The colors in the images represent the wind speed measured in knots (kt). To convert knots to miles per hour (mph), simply add 15%. For example, bright red orange represents an average wind speed of 100 kt, which amounts to approximately 115 mph.
There aren’t many people who can say they have flown directly into a hurricane but, on October 5, 2016, I had a very unique opportunity to fly into Hurricane Matthew with NOAA’s Hurricane Hunters. Matthew was quickly moving across the Atlantic Ocean, and each new forecast moved it closer to the east coast of Florida. With the high potential for hurricane watches and warnings, NOAA started preparations for routine flight operations.

I was informed on Friday, September 30th, that they had a seat for me on a flight, and 4 days later I was on my way to NOAA’s Aircraft Operations Center (AOC) at MacDill Air Force Base in Tampa, Florida. Along with the Hurricane Research Division crew from the AOML, we settled in and got ourselves ready for the next morning. Takeoff was at 2:00 am.

Leading up to the flight I could feel a sense of unease—I wasn’t sure whether to feel nervous or excited. On the one hand, flying into a hurricane sounds very dangerous, especially one as powerful as Matthew, but I kept reminding myself that the crew piloting the aircraft was trained and fully prepared so I became excited at the thought of flying. Nadine Schittko, a visiting AOML intern from Germany was also very excited for the opportunity. “Since 2007, when I was 13 years old, I’ve wanted to fly into a hurricane. I was really excited, I was getting the opportunity to fly on a P-3 aircraft into Hurricane Matthew” she said. Nadine was able to take advantage of this unique opportunity through NOAA’s dedication to providing opportunities and grooming the next generation of scientists.

We arrived at MacDill Air Force Base a couple hours before our scheduled flight. We would be a crew of 20 with some of us penetrating a hurricane eye for the first time. Paul Hoffman, an Aviation Medical Officer at AOC, reflected on how he felt leading up to his first hurricane flight, “Emotionally, I was excited and thankful to finally have the opportunity to participate in a hurricane flight. Professionally, very few medical officers have ever flown through the eye of a hurricane as part of their medical practice, so that was very rewarding to be able to take advantage of that opportunity.”

Before getting on the plane, I reported to a conference room to complete the required release paperwork and prepare for the mission briefing. We were tasked by NOAA’s Environmental Modeling Center to collect Tail Doppler Radar data describing Matthew’s core structure that would be used in the Hurricane Weather Research and Forecasting model (HWRF). These data, unique to the NOAA P-3 aircraft, would provide detailed measurements of Matthew’s structure for HWRF to help better forecast intensity.

After the briefing, we walked out to the P-3 aircraft, and I immediately noticed in the dark of the night it was the only aircraft on the runway. This evoked an odd sense of reality. I kept thinking to myself “we’re really going to do this, we’re really going to fly into a hurricane.” Once on board the aircraft, the first thing I noticed was the technology. There were computers on board for nearly everybody, and they all had a purpose. Everybody on the aircraft had a defined role; mine was to cover social media for the flight, to share with our Twitter followers the insights we were learning about Matthew by taking pictures, videos, and speaking with the crew (twitter.com/NOAA_AOML).

Before we took off, all the newcomers had to go through safety training on the aircraft. This involved going over nearly every situation we might encounter and how to best prepare ourselves if that time should come. The NOAA Corps crew is thoroughly prepared for any situation, and they take safety very seriously.

(continued on page 4)
As everybody settled into their seat and the fasten seatbelt sign turned on, we geared up for takeoff. It happened almost in the blink of an eye; one second we were on the ground, safe and sound, the next we were on our way into Hurricane Matthew, a Category-3 hurricane. Matthew was a very well-formed hurricane and, like most mature hurricanes, it had a ring of clouds, the eyewall, that completely surrounded the clear eye in the center. The most turbulent part of most flights is when the aircraft penetrates the eyewall into the eye, and our flight was no different.

When we started our first penetration, there was a very significant change in tone as we hit the eyewall. The aircraft started to bounce from turbulence, but it was still dark so we couldn’t see anything outside the windows. Even though we were unable to see, there was no doubt in my mind that we were inside a hurricane.

The highlight of the flight came about 4 hours later, when the sun started to rise and we were making another pass through the eyewall and into the eye. Looking out the window we saw thick fogs of gray, streaks of rain, and the turbulence in the aircraft started to pick up. We started bouncing up and down at a much faster rate, much like a very intense wooden roller coaster, as I tried to contain my stomach from getting too upset.

As we pounded through the eyewall and made it into the eye, what I saw and experienced was truly breathtaking: thick white clouds above and below as far as the eye could see as blue skies and ocean attempted to pierce through. The turbulence we experienced just moments prior was quickly winding down, and a sense of calmness surrounded us as we entered the eye of Hurricane Matthew. I was so taken aback by the magnitude of what I was seeing that I almost forgot to do my job and immediately started taking pictures and videos of the eye.

Nicholas Underwood, an aerospace engineer at AOC on his first hurricane eye penetration flight, said “The most exciting parts were the eyewall penetrations. I was told that it could get bumpy, but it was beyond anything I had imagined. Being in the eye itself was also incredible, that’s not a sight that many people get to see.”

A couple penetrations later we were returning to Tampa. On our way back, I noticed myself going in and out of sleep. The adrenaline rush experienced through the first few hours of the flight was over, and the lack of sleep was catching up. We got off the plane, ate some breakfast, then got ready to do it all over again the next day.

Coming out of the flight I gained a new appreciation for the crew that does this regularly. Every crew member that morning truly was professional, prepared, and made me feel safe in a situation that would otherwise have been very fearful. My hat goes off to NOAA’s Hurricane Hunters; they truly excel at one of the toughest jobs in the world.

AOML Hosts Hurricane Hunting “Ask Me Anything” Segment on Reddit

On September 22nd, AOML hosted an Ask Me Anything (AMA) segment on Reddit’s online science portal. Dr. Frank Marks, the director of AOML’s Hurricane Research Division, and NOAA Corps Officer CDR Justin Kibbey, a Hurricane Hunter P-3 pilot and AOML’s Associate Director, went “live” for almost 2.5 hours to answer questions about flying into hurricanes to improve forecasts.

Reddit’s AMA series was created by the Reddit social media community as an opportunity for interesting and qualified individuals to answer questions from Reddit users about their profession. The science community of Reddit (reddit.com/r/science) decided to create an independent AMA series, known as the Science AMA Series. Their goal is to encourage discussion and facilitate outreach while generating an improved conversation between scientists and the general public. AOML’s hurricane hunting AMA segment can be found at https://www.reddit.com/r/science/comments/53ydgr/science_ama_series_hi_reddit_we_are_dr_frank/

A video taken from inside the eye of Matthew can be viewed at https://twitter.com/NOAA_AOML/status/78373948692967424
Study Focuses on Contaminants Lurking in Urban Tidal Flooding

Tidal flooding from events such as the so-called “King Tides” and “Super Tides” are flooding urban coastal communities with increasing frequency as sea levels rise. These tidal flood waters can acquire a wide range of contaminants and toxins as a result of soaking in the built environment of urbanized coastlines. A multi-institutional, interdisciplinary research team, including scientists from AOML, is examining the types of contamination picked up from the urbanized coastal landscape and transported into coastal waters through tidal flooding.

For the past 3 years, a team of microbiologists at AOML has been investigating the types of bacterial contaminants, including fecal-indicating bacteria and disease-causing pathogens, carried back to the marine environment from tidal flood waters, causing potential exposure to both human populations and marine habitats such as coral reefs, beaches, and estuaries.

The AOML team once again investigated contamination from tidal flooding in southeast Florida communities during the recent King Tides of October 17-18, 2016. They were joined by investigators from Florida International University, the University of Miami, and Nova Southeastern University in measuring bacterial levels, nutrient levels, and selected chemical contaminants found in the tidal flood waters and receiving environmental waters from urbanized South Florida communities such as Miami, Miami Beach, Fort Lauderdale, and selected sites in the Florida Keys.

These coastal communities face increasing challenges in how to cope with the impacts of ever-more frequent tidal flooding due to sea level rise. For example, the City of Miami Beach recently implemented state-of-the-art pumping systems to collect flood waters and pump them out of the city. However, as these communities learn to adapt to the “new normal” of sea-level rise, they must find ways to not only deal with the problem of physical flooding but also the impacts upon regional water quality that such flooding can cause as it acquires contaminants from the built environment.

This research project by NOAA and its academic partners seeks to understand the patterns and mechanisms of flood water contamination to help vulnerable communities find solutions to become more resilient. The research will also enable scientists to better understand and predict the future impacts of such coastal tidal flooding events on human and environmental health in an era of increasing sea level and climate change.

Exercise Caution when Confronted with Tidal Flood Waters

Although contaminants in flood waters have been shown to dilute rapidly with distance from the shore when returned to the environmental receiving waters, the level of microbial contamination can be quite high in the actual flood waters (particularly those lying in streets and yards). From a public safety perspective, it is best to consider all tidal flood water as being contaminated. Exposure poses a potential health risk to individuals with open sores or wounds, the elderly, young children, and those with compromised immune systems. Therefore, flood waters on streets, sidewalks, yards, and other urban infrastructure should be avoided as much as possible. If contact is unavoidable, wash after exposure. The use of clean water and soap can kill or remove many bacterial contaminants. In addition to potential disease organisms, flood waters can also conceal hazards such as broken glass and other sharp objects, uneven surfaces, holes, and open manhole covers.
In October, AOML coral researchers Drs. Ian Enochs and Derek Manzello joined colleagues with the Australian Institute of Marine Science on a research cruise to explore and describe newly discovered volcanic carbon dioxide vent sites in northeastern Papua, New Guinea. The research team explored seeps around three islands, but primarily focused its efforts on gathering data from a new island called Tulumon, which formed about 60 years ago. The coral reef communities around Tulumon have grown up since then, and some of the sites are strongly impacted by high carbon dioxide vents.

The vents produce continuous streams of carbon dioxide bubbles (see image at right) that seep into the reef environment, making the water more acidic. Coral reefs at these sites have been exposed to elevated levels of carbon dioxide over their entire lives, providing a natural laboratory for researchers to observe how marine organisms and coral ecosystems have coped with and adapted to the less-than-ideal conditions. Coral reefs live and thrive by maintaining a careful balance between their rates of growth and erosion; ocean acidification negatively impacts their ability to create and maintain the skeletal structures that form the foundation of their habitat.

Globally, coral reefs are increasingly challenged by ocean acidification as greater amounts of atmospheric carbon dioxide are absorbed into the oceans, lowering pH levels. By documenting the effects of ocean acidification on coral ecosystems at sites such as Papua, New Guinea, researchers hope to gain a better understanding of how the rest of the ocean’s coral reefs will react to global increases in carbon dioxide and acidification. They also hope to better understand the types of coral species that are more sensitive to elevated carbon dioxide levels, as well as the coral species that are more resilient and able to acclimate to changing environmental conditions.

Ian and Derek gathered water chemistry measurements, as well as reef rock and skeletal samples, which are currently being analyzed. The findings from these new sites will be compared with other elevated carbon dioxide sites in Papua, New Guinea, Japan, and recent work at Maug Island in the Northern Mariana Islands to better understand the ecosystem impacts of ocean acidification on coral reefs.

CHAMP Researchers at AOML to Install New Coral Monitoring Stations in the Caribbean

Coral Health and Monitoring Program (CHAMP) researchers at AOML have worked cooperatively with the Caribbean Community Climate Change Centre (CCCCC), headquartered in Belize, over the past several years to install Coral Reef Early Warning System (CREWS) stations at key coral reef sites in countries throughout the Caribbean. CREWS stations monitor an array of atmospheric and oceanographic parameters to assess the health and integrity of coral reefs. The stations are part of the CCCCC’s efforts to strengthen the Caribbean region’s ability to respond to climate variability, extreme weather conditions, pollution, and habitat change.

In collaboration with the CCCCC, CHAMP researchers have already installed CREWS stations in Belize (2 stations), the Dominican Republic (2 stations), Barbados, and Trinidad and Tobago (2 stations). In October, the CCCCC received $1.4 M to maintain the existing CREWS network of stations, plus establish new stations in at least the following countries: St. Lucia, Antigua, Dominica, and either Saint Vincent and the Grenadines or Grenada. CHAMP researchers will continue to work with the CCCCC to maintain the existing CREWS network and install the new stations, enabling the CCCCC to more efficiently monitor threats posed to coral reefs throughout the Caribbean.
Crash Site of Malaysian Airlines Flight MH370 Likely Falls Within Official Search Area

On March 8, 2014, Malaysian Airlines flight MH370 from Kuala Lumpur, the capital city of Malaysia, to Beijing, China went missing with 239 people aboard. The circumstances surrounding the aircraft’s disappearance led to various hypotheses to explain the event and to suggest the location of where the plane entered the water.

Satellite communications between flight MH370 and the Inmarsat satellite communication network were initially used to provide information about the approximate region where the aircraft might have entered the water. The last ping from flight MH370 to the Inmarsat satellite network delineated a part of the arc in the south-eastern Indian Ocean where search activities have been conducted to date (without results).

A significant event occurred at the end of July 2015 when a wing flaperon was discovered along the coast of Reunion Island in the western Indian Ocean. It was later confirmed that the flaperon was from flight MH370. The discovery of this piece of debris represented the first solid evidence that the aircraft might have crashed in the Indian Ocean. Other debris linked to the missing aircraft have also since been found in the western Indian Ocean.

In a paper to be published in the Journal of Operational Oceanography, a team of scientists with the Physical Oceanography Division at AOML, the University of Santiago de Compostela in Spain, the University of Miami, the University of Hawaii, and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) of Australia analyzed possible pathways to link the location of the found debris in the southwestern Indian Ocean with potential crash sites, probably in the eastern Indian Ocean.

In this study, the research team used the aircraft debris that washed ashore along Reunion Island as a means of identifying potential sites for where flight MH370 could have crashed into the ocean. To accomplish this, they relied upon two main datasets routinely used to investigate the strength and variability of surface ocean currents.

The first dataset was of satellite-tracked surface drifter observations from NOAA’s Global Drifter Array, a component of the in situ global ocean observing system that relies on surface drifting buoys with a sea anchor (a drogue) centered at 15 m depth.

For the Indian Ocean, surface drifter observations began in 1985 and, on average, at any given time approximately 400 drifters provide surface current data on a continuous basis in this region. For the purposes of this study, however, only drifters that lost their drogue (undrogued drifters) were used, as they better simulated the characteristics and behavior of real debris.

The second critical dataset used in the study was the University of Hawaii’s Surface Currents from Diagnostic (SCUD) model of ocean currents, which incorporates hydrographic, satellite altimetry, and wind data. In this model, thousands of synthetic particle drifters were deployed to analyze ocean currents, which was particularly important given the limited spatial and temporal coverage of the undrogued surface drifters.

The research team used both datasets to track the various pieces of aircraft debris backward in time. This allowed them to identify areas with a higher and lower probability of being the crash site. Similarly, a study of buoy trajectories forward in time revealed how the real and synthetic drifters moved away from the official search area, providing important information about the spatial and temporal distribution of potential debris.

Individual drifters with trajectories that traveled close to Reunion Island revealed that the official search area in the south-eastern Indian Ocean lies within an area of high probability as being the crash site. An analysis of the locations where aircraft debris was found, and from an analysis of surface currents derived from numerical model output and wind fields, also indicate that a large extension in the southeastern Indian Ocean south of 30ºS and along the east coast of Australia is potentially the most probable site of the crash of flight MH370 (see image above).

Recent discoveries of new debris linked to Malaysian Airlines flight MH370 that have washed ashore along the coasts of Mozambique, South Africa, Mauritius, and Tanzania are consistent with the results presented in the study and confirm the general westward drift and travel time of the debris from the search area. Results of this study also include the development and implementation of a new methodology that can be used to assess the source of marine debris, both for research and operational purposes.

AOML Researchers Attend Workshops Focused on XBT Observations

A group of scientists with AOML’s Physical Oceanography Division—Gustavo Goni, Molly Baringer, Shenfu Dong, Francis Bringas, and Marlos Goes—attended the 4th International Quality Controlled Ocean Database Workshop and the 5th XBT Science Workshop in Tokyo, Japan on October 3-7. Between the two meetings, they made more than 10 presentations, as well as participated in roundtable discussions focused on the operational aspects of XBT observations and the scientific use of XBT data. Their operational presentations addressed topics that included automated quality control, the development and implementation of intelligent metadata, and uncertainty estimates; their scientific presentations addressed a range of topics that included global ocean heat content, the meridional overturning circulation, western boundary currents, recent improvements in XBT measurements, and the synergy of XBT data with data from other observational platforms such as Argo floats, satellite altimetry, and surface drifters. The goals of workshops were to: (1) share state-of-the-art expertise on the archival, quality-control, and bias correction of historical records of XBTs and other temperature instruments in the global ocean database; and (2) present current research based on XBT observations and discussions for future work, collaborations, and funding within the global XBT network.

Meeting Strengthens Bond Between AOML and ANAMAR

AOML oceanographer Dr. Gustavo Goni attended the second International Maritime Conference (Conferencia Internacional Marítima Oceanográfica or CIMO) in Santo Domingo, the Dominican Republic, on September 13-14. Organized and hosted by ANAMAR, the Maritime Authority in the Dominican Republic, the meeting provided a chance to strengthen the collaboration and partnership activities between AOML and ANAMAR. Dr. Goni made a presentation on the use of underwater gliders in the Caribbean Sea and tropical North Atlantic Ocean for tropical cyclone intensification studies and intensity forecast improvements. Discussions included the potential set up of a glider port in Punta Cana on the southeastern side of the Dominican Republic in support of the NOAA-CARICOOS underwater glider operations project. ANAMAR is currently a collaborator in other AOML research efforts, including two Coral Reef Early Warning System (CREWS) stations installed and maintained by coral researchers with the Coral Health and Monitoring Program at AOML.

Hurricane Researcher Attends WMO Meeting in Shanghai, China

AOML hurricane researcher Dr. Robert Rogers attended the 16th Annual Meeting of the World Meteorological Organization’s (WMO) Working Group on Tropical Meteorology, of which he is a member, at the Shanghai Typhoon Institute (STI) in Shanghai, China on October 17-21. During the annual meeting, Rob also attended workshops on the Joint Typhoon Landfall Forecast Demonstration Project (TLFDP) and the Understanding and Prediction of Rainfall Associated with LandFalling Tropical Cyclones (UPDRAFT) project. Under the WMO Working Group, Rob chairs the Expert Team on Tropical Cyclone Landfall Processes that is coordinating the TLFDP and UPDRAFT projects. TLFDP is a multi-year project led by STI intended to develop new forecasting tools and techniques for improved forecasts of track, intensity, and rainfall for typhoon landfalls in China, while UPDRAFT is an effort led by Nanjing University to improve the understanding and prediction of rainfall from landfalling tropical cyclones in China. AOML was invited to participate in the project through its Implementation Agreement with the STI under the NOAA-National Weather Service/Chinese Meteorological Agency Memorandum of Understanding.
Farewell

Nina Liebig, a senior budget analyst with the Office of the Director’s Administrative Group, retired on October 31st after 29 years of federal service. Nina began her federal career with the U.S. Army in 1987 before joining AOML in 2001. During her 15 years with the lab, she supported the Administrative Group in several capacities. In addition to her role as a senior budget analyst, Nina also served as a purchase card holder and an acting Administrative Officer. Her efforts were invaluable to the Administrative Group and were only superseded by her commitment to ensure that fiscal year after fiscal year AOML met and exceeded standing organizational budgetary benchmarks.

Shawana Roach, a management support specialist with the Office of the Director’s Administrative Group, departed from AOML in October to accept a position with NOAA's National Marine Fisheries Laboratory in Galveston, Texas. During Shawana’s 6 years at AOML, she served as a point of contact for all acquisition and procurement actions. She also served as the lab’s sole Contracting Officer, obligating, awarding, and managing contracts worth an aggregated total of more than 10 million dollars in support of AOML’s mission. Shawana’s willingness to learn and ability to execute led to numerous accolades for the Administrative Group.

Welcome Aboard

Dr. Heather Holbach began a 2-year postdoctoral fellowship with AOML’s Hurricane Research Division (HRD) in September through the Northern Gulf Institute of Mississippi State University. During her time with HRD, Heather will focus on improving the algorithm of the Stepped-Frequency Microwave Radiometer, an instrument flown on Hurricane Hunter aircraft to measure surface level wind speeds and the rain rate in hurricanes and tropical storms. She recently earned a PhD in meteorology from Florida State University.

Patrick Mears joined AOML’s Ocean Chemistry and Ecosystems Division in October as a research associate with the University of Miami’s Cooperative Institute for Marine and Atmospheric Studies. Patrick is currently completing a Master’s program at Carolina Coastal University and has served as a data analyst on several GO-SHIP repeat hydrography cruises. He will work with AOML’s Ocean Carbon Group as an ocean-going and laboratory technician, focusing on analyses of inorganic carbon parameters to study changes in ocean carbon uptake and ocean acidification.

Dr. Luke Thompson, a bioinformatician, joined AOML’s ‘omics effort in October. Luke will work with AOML microbiologist Dr. Kelly Goodwin at NOAA’s Southwest Fisheries Science Center in La Jolla, California on a variety of projects, starting with an analysis of data from the global Ocean Sampling Day effort. He joins NOAA from the renowned Knight Laboratory of the University of California-San Diego and is the lead on producing the first manuscript from the Earth Microbiome Project. He holds a PhD in microbiology from the Massachusetts Institute of Technology.

Congratulations

Ricardo Domingues, a University of Miami Cooperative Institute researcher with AOML’s Physical Oceanography Division, earned a Master of Science degree in September from the Meteorology and Physical Oceanography program of the University of Miami’s Rosenstiel School. Ricardo’s thesis, Eddy-Driven Seasonal Variability of the Florida Current Transport, demonstrated that westward propagating signals originating in the open North Atlantic Ocean can cause stochastic seasonal changes in the transport of the Florida Current.

Erica Rule, a communications specialist with AOML’s Office of the Director, was recently accepted into NOAA’s Leadership Competencies Development Program (LCDP). LCDP is an 18-month program focused on broadening participants’ understanding of NOAA’s strategic vision, mission, and goals, as well as the agency’s business processes, to develop and expand core executive qualifications. Erica will be part of a cadre of 31 individuals from line offices throughout NOAA that will learn through training and developmental assignments to lead a NOAA culture that strives for results, serves customers, and builds successful teams and coalitions within and outside the organization.

Xaymara Serrano, a University of Miami Cooperative Institute coral researcher with AOML’s Ocean Chemistry and Ecosystems Division, and her husband are the proud parents of their first child, a daughter. Valeria Isabel Torres Serrano was born in Miami on September 23rd and weighed in at 6 pounds, 12 ounces. Valeria and her parents are all healthy, happy, resting, and doing well.

Thank You! AOML collected 145 pounds of food this past summer in support of the 2016 Feds Feed Families food drive sponsored by the South Florida Federal Executive Board. AOML's food donations have been distributed to needy families in our community through the Miami Rescue Mission.
Recent Publications (AOML authors are denoted by bolded capital letters)


