



# AOML Keynotes

ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY

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

## Dr. Kathryn D. Sullivan Confirmed as New NOAA Administrator

The United States Senate confirmed Dr. Kathryn D. Sullivan as the Under Secretary of Commerce for Oceans and Atmosphere on March 6th. With her confirmation, Sullivan becomes the new administrator of NOAA, one of only ten individuals appointed to lead the agency since its inception in 1970. Previously, Sullivan had served as the acting Under Secretary and NOAA Administrator since February 2013.



Sullivan brings a wealth of experience and capabilities to her role as NOAA Administrator. Among her many accomplishments, she was one of six women selected to join the NASA astronaut corps in 1978 and holds the distinction of being the first American woman to walk in space. During her 15-year tenure with NASA, Sullivan flew aboard three shuttle missions, most notably the mission that deployed the Hubble Space telescope.

Sullivan has held an array of academic and federal leadership positions including directorship of the Battelle Center for Mathematics and Science Education Policy of the John Glenn School of Public Affairs at Ohio State University, and service as NOAA's chief scientist and deputy NOAA administrator.

"NOAA provides the environmental intelligence that helps citizens, businesses, and governments make smart choices. Mission first, people always—this is my commitment to the American people and to the NOAA workforce," said Sullivan. "I'm incredibly proud of our people, and it's an honor to be at the helm."

She holds a B.S. from the University of California at Santa Cruz and a Ph.D. from Dalhousie University in Canada.

## AOML Undergoes Five-Year Review of Science Program

AOML welcomed a distinguished panel of guests in March to participate in a comprehensive review of the laboratory's science program. The three-day event from March 4-6th included seven reviewers, representatives from all of NOAA's line offices, and representatives from NOAA's Office of Oceanic and Atmospheric Research (OAR).

Scientific reviews are conducted every five years to evaluate the quality, relevance, and effectiveness of research performed in OAR laboratories to both internal and external interests and to help strategically position the laboratories in planning their future science. The reviews are also intended to ensure that OAR laboratory research is linked to NOAA's Strategic Plan, remains relevant to the NOAA Research mission and its priorities, and is consistent with NOAA planning, programming, and budgeting processes.

The proceedings began with Dr. Steven Fine, OAR Deputy Assistant Administrator for Laboratories and Cooperative Institutes, providing a broad overview of the scope of research performed by NOAA and OAR. AOML Director Dr. Bob Atlas then presented an overview of the laboratory's key research activities and indicators of pre-eminence, followed by more in-depth presentations by Drs. Jim Hendee, Gustavo Goni, Frank Marks, and other researchers with AOML's three science divisions.

Reviewers were tasked with evaluating AOML's science as organized under three research themes: coastal oceans and ecosystems, oceans and climate (including observations), and hurricanes and tropical meteorology. The science presentations

for each theme were tailored to address a series of key questions aimed at demonstrating the quality of the research performed, its relevance to NOAA and the nation, and its overall effectiveness in terms of advancing scientific understanding, leadership, planning, and transition into operational application. Poster sessions, as well as question and answer periods with the reviewers, augmented the formal presentations for each research theme. The reviewers commented that they particularly enjoyed opportunities to informally meet with scientists and support staff from across the laboratory to assess the people and processes that drive the laboratory's research efforts.

Preparations for the review were organized and coordinated by Erica Rule of AOML's Office of the Director with support from AOML's scientific, technical, administrative, and maintenance staff.

The time, attention, and efforts of AOML's 2014 review team—Drs. Richard Dodge (Nova Southeastern University), Rana Fine (University of Miami), T.N. Krishnamurti (Florida State University), William Lau (NASA-Goddard Space Flight Center), Douglas Luther (University of Hawaii), Michael Montgomery (Naval Postgraduate School), and Paul Sandifer (NOAA-National Ocean Service)—are gratefully acknowledged and appreciated. Dr. Atlas also thanks every member of the AOML community for their time and efforts in helping to prepare for and conduct this review.



**Leadership Change at OAR:** Dr. Robert Detrick, Assistant Administrator of NOAA's Office of Oceanic and Atmospheric Research (OAR) since 2012, resigned in April to accept a position as President and Chief Executive Officer of the Incorporated Research Institutions for Seismology. In his absence, Mr. Craig McLean, currently OAR's Deputy Assistant Administrator for Programs and Administration, will serve as OAR's Acting Assistant Administrator.

## News Briefs

Coral researchers Ian Enochs and Derek Manzello of AOML's Ocean Chemistry and Ecosystems Division traveled to American Samoa in February to perform a site survey for a planned climate and ocean acidification monitoring site in support of the Coral Reef Conservation Program's new National Coral Reef Monitoring Plan (NCRMP). A candidate site was identified in Fagatele Bay National Marine Sanctuary, and Ian and Derek met with local coral reef managers to discuss the local support required to establish the site. The ocean acidification monitoring effort under NCRMP is jointly funded with NOAA's Ocean Acidification Program and will establish six climate monitoring sites in the Atlantic and Pacific. Two sites are already operational in the Atlantic (Puerto Rico and the Florida Keys), and one site is running in the Pacific in Kaneohe Bay as part of a collaborative project between NOAA's Pacific Marine Environmental Laboratory, the University of Hawaii, and Sea Grant. A second climate site in the Pacific is currently slated for either Saipan or American Samoa.

**Corals in Fagatele Bay National Marine Sanctuary, American Samoa.**



**The icebreaker R/V *Nathaniel B. Palmer*.**

Charles Featherstone of AOML's Ocean Chemistry and Ecosystems Division is participating in the GO-SHIP repeat hydrography P16S cruise aboard the icebreaker R/V *Nathaniel B. Palmer* as an analyst for total dissolved inorganic carbon. The *Palmer* left Hobart, Australia on March 20th for a two-week transit to its first station at 67°S, 150°W in the Southern Ocean. From there, top to bottom measurements of biogeochemical and physical parameters will be made at 0.5 degree intervals to determine decadal changes in the ocean's heat, salt, nutrient, oxygen, and carbon content from a previous transect in 2005. Researchers will deploy 12 Argo profiling floats to observe the Southern Ocean's uptake of excess carbon dioxide from the atmosphere and directly observe its acidification resulting from global change. The cruise will conclude in early May when the *Palmer* makes port in Tahiti.

Scientists with AOML's Hurricane Research Division (HRD), some shown to the right with colleagues from various federal agencies and academic institutions, attended the American Meteorological Society's (AMS) 31st Conference on Hurricanes and Tropical Meteorology in San Diego, California on March 31-April 4. The AMS conference proved to be a very productive meeting for hurricane research in general, with 750 abstracts sorted into 442 presentations in 70 sessions and 308 posters in two poster sessions. Of the 70 sessions, 45 dealt with aspects related to tropical cyclone forecasting and research issues, and 25 dealt with non-hurricane related research. Roughly two-thirds—290 of the 442 presentations and 206 of the 308 posters—were tropical cyclone related. HRD scientists were co-authors on 43 presentations (~10%) and 10 posters, and served as chairs for five of the 45 tropical cyclone sessions. More than 130 of the 496 tropical cyclone posters and presentations mentioned the use of HRD-generated data sets or analyses (26%).



**Krishna Kishore, Chanh Kieu, Subashini Subramanian, Xuejin Zhang (AOML), Hua Chen (AOML), Vijay Tallapragada, Sundararaman Gopalakrishnan (AOML), Richard Pasch, James Franklin, Edward Rappaport, David Zelinsky, and Michael Fiorino.**



An updated Mandatory Ship Reporting (MSR) system developed by researchers with AOML's Physical Oceanography Division in collaboration with NOAA's National Marine Fisheries Service and the U.S. Coast Guard became operational in March to monitor and protect North Atlantic right whales along the U.S. eastern seaboard. Hunted to near extinction in the early 20th century, North Atlantic right whales are a critically endangered species, with an estimated population of only 300-400 individuals. A major source of their injury and death involves collision with ships. The updated MSR system requires ships entering two large designated areas along the U.S. east coast to report their location and planned routes. Once these parameters are entered, the MSR system returns a whale location report with instructions for how to avoid colliding with them, along with the latest right whale sighting information derived from NOAA whale surveys.

**North Atlantic right whale with calf.**

AOML researchers met with partners from NOAA's National Data Buoy Center, the University of Puerto Rico at Mayaguez, and ANAMAR in the Dominican Republic on March 25-26 to plan for how they will deploy, pilot, recover, refurbish, and store underwater gliders. These autonomous vehicles, which provide a cost-effective means for gathering ocean observations, will be used for a two-year project that begins in July 2014. AOML and its partners will deploy underwater gliders in the Caribbean Sea and North Atlantic Ocean during the Atlantic hurricane season to assess the impact of a network of underwater gliders for improving tropical cyclone seasonal and intensification forecasts as a component of a larger international, multi-institutional effort. During the second day of the meeting, participants conducted an at-sea test to train for how to deploy and recover the underwater gliders.



**An autonomous underwater glider at the sea surface.**



**Maribeth Gidley of AOML collects samples from a South Florida beach.**

The educational public television series *Waterways* is collaborating with researchers from AOML's Environmental Microbiology Laboratory, the University of Miami's Rosenstiel School, and the University of Miami's Miller School of Medicine to prepare an episode on recreational beach water quality and the potential for exposure to microbial contamination while at the beach. The initial filming of interviews with Drs. Chris Sinigalliano and Maribeth Gidley of AOML were conducted in March, along with filming of laboratory sampling and analysis techniques used at AOML to detect and measure microbial contaminants in the beach and coastal environment. The episode will also review previous epidemiological studies conducted at South Florida beaches and current state-of-the-art molecular methods being developed and/or tested at AOML for beach/water quality assessment and molecular microbial source tracking. Ultimately, the episode will inform the public of how to have a safer beachgoing experience and of NOAA's measures to ensure the quality and conservation of these invaluable ecosystems. The episode is anticipated for public broadcast by late summer.

## Researchers Continue Efforts to Monitor Currents in the Atlantic

Scientists with AOML's Physical Oceanography Division (PhOD) participated in a research cruise in March as part of a continuing effort to monitor currents in the Atlantic that propel the global Meridional Overturning Circulation (MOC). Dr. Christopher Meinen of AOML served as the co-chief scientist. He was joined at sea aboard the R/V *Atlantic Explorer* by Jay Hooper, Pedro Peña, Kyle Seaton, and Andrew Stefanick, all of PhOD, and colleagues with the University of Miami's Rosenstiel School.

The MOC acts as a conveyor belt that carries warm equatorial water to the far northern latitudes where it is chilled by cool air and sinks to great depths. The cold, deep water then returns southward towards the equator. Climate models and paleoclimate observations have demonstrated a strong correlation between changes in the MOC and global climate variability. Variations of the MOC are connected to changes in surface air temperatures, precipitation patterns, and hurricane intensification across the northern hemisphere.

PhOD scientists have been at the forefront of MOC research at 26°N for more than three decades, dating back to 1982. Since 2000, they have led an observational program to study the Florida Current and the Deep Western Boundary Current, two key limbs of the MOC system, through their Western Boundary Time Series (WBTS) project.

The WBTS program maintains one of the longest time series of ocean transport measurements in the world, and in 2004 it became a cornerstone for a major international initiative between the United States and United Kingdom to study the Atlantic basin-wide MOC



AOML scientist Pedro Peña (left) works with colleagues from the University of Miami's Rosenstiel School to prepare the CTD package for a cast.

flow at 26°N. Through this international collaboration, conducted by the US-National Science Foundation funded MOCHA project and the UK-Natural Environment Research Council funded RAPID-MOC project, scientists are able to quantify the temporal variations of the complete MOC at this latitude and better understand the mechanisms that control MOC variations.

During the March 15-31, 2014 cruise in support of these collaborative projects, scientists collected 41 high-quality conductivity-temperature-depth (CTD) water column profiles, acoustically downloaded data from five pressure-equipped inverted echo sounder (PIES) moorings, deployed one new PIES mooring, and recovered one CPIES mooring (a PIES additionally equipped with a current meter). Three tall and two short moored instruments of various types were also recovered and deployed.

In addition to these activities, the cruise provided an opportunistic platform for deploying ten satellite-tracked drifting buoys in support of the Global Drifter Program. The continued success of these joint programs has extended the long time-series of Florida Current and Deep Western Boundary Current observations that are crucial to the study of climate time-scale oceanic processes. Beyond helping researchers better understand changes in the MOC, these measurements are also crucial tools for assessing the realism of state-of-the-art ocean and coupled climate simulations.



Night-time recovery of the CTD package aboard the R/V *Atlantic Explorer*.

Coral researcher Jim Hendee of AOML's Ocean Chemistry and Ecosystems Division represented NOAA at Northeast High School's STEAM (Science, Technology, Engineering, Arts, Math) Career and Resources Fair on March 13th. More than 500 students attended the event geared towards encouraging career paths in the sciences, arts, and technology. Jim was interviewed by close to 100 students who wanted to know what he liked best about his job and the educational requirements needed for a career with NOAA. He provided a variety of handouts to help students become acquainted with both NOAA and AOML and enjoyed watching their reactions after being told of the interesting research conducted by NOAA and AOML in support of environmental stewardship.



## Congratulations

Jennifer Calderon-Diaz, an administrative specialist with AOML's Hurricane Research Division (HRD), was named NOAA's March 2014 Employee of the Month. Jennifer received the award for the key role she plays in support of HRD's annual Hurricane Field Program.



During hurricane season, the uncertainty of when and where storms might develop or occur often requires that Jennifer prepare travel and lodging accommodations at a moment's notice to move HRD scientists to staging bases across the U.S. and Caribbean. Jennifer's skill in coping with frequently-changing logistical requirements represent a critical contribution towards the successful completion of HRD's operational missions to aid hurricane specialists in providing accurate and timely forecasts to emergency managers, the media, and the public at large.

John Gamache and Frank Marks of AOML's Hurricane Research Division, along with colleagues Fuqing Zhang and Yonghui Weng of Pennsylvania State University, are the recipients of the American Meteorological Society's 2014 Banner I. Miller Award. The biennial award, presented during the 31st Conference on Hurricanes and Tropical Meteorology, recognizes "an outstanding contribution to the science of hurricane and tropical weather forecasting published in a journal with international circulation during the past 48 months." The team won the award for their 2011 paper in *Geophysical Research Letters*\* that examined the impact of assimilating high-resolution Doppler radar observations into hurricane prediction models in real time:

\*Zhang, F., Y. Weng, J.F. Gamache, and F.D. Marks, 2011: Performance of convection-permitting hurricane initialization and prediction during 2008-2010 with ensemble data assimilation of inner-core airborne Doppler radar observations. *Geophysical Research Letters*, 38:L15810, doi:10.1029/2011GL048469.



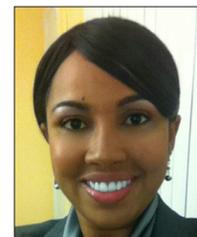
## Welcome Aboard

Dr. Ross Hoffman joined AOML through the University of Miami's Cooperative Institute for Marine and Atmospheric Studies (CIMAS) in January to become the manager for the Sandy Supplemental OSSE (observing system simulation experiment) project. This project involves the coordination of leading scientists at several NOAA facilities and the integration of a variety of computing resources that run on diverse platforms. The project's technical tasks include acquiring and validating new nature runs, simulating existing and proposed observing systems, and conducting OSE and OSSE experiments with both the old and new OSSE systems for at least two candidate observing platforms.



Ross received his Ph.D. from the Massachusetts Institute of Technology and then completed a post-doctoral appointment at NASA's Goddard Space Flight Center where he began a decades-long collaboration with AOML Director Dr. Bob Atlas. He worked for Atmospheric and Environmental Research (AER), Inc., in Massachusetts for 30 years but retired recently from his post as vice president for research and development. Ross is an expert in variational and ensemble data assimilation methods, OSEs, OSSEs, dynamical systems, and climate science. Since he will be working out of his home office in Cambridge, Massachusetts, sightings of Ross at AOML and CIMAS will be rare, but you can find him at [ross.n.hoffman@noaa.gov](mailto:ross.n.hoffman@noaa.gov) most days.

AOML's Office of the Director welcomed Dalynne Julmiste in April as the laboratory's new administrative officer. Dalynne joins AOML with a wealth of experience gained from service in the military, the private sector, and multiple federal agencies.



Dalynne began her career as a U.S. Naval aviation storekeeper, with travels to both domestic and foreign locations and service under the Naval Reserve Headquarters Command in New Orleans, Louisiana, and the Navy and Marine Corps Reserve Center in Miami. During her 8 years with the Navy, Dalynne earned a bachelor's degree in management information systems. She earned a second degree in hospitality management following her departure from the Navy and work in the private sector for Raymond James Financial.

While completing her Master's degree in business administration, Dalynne began her career in the federal government with the Department of Veterans Affairs. She subsequently transferred to the Department of Agriculture where she served as the Administrative Officer for the Subtropical Horticultural Research Station in Miami before her move to AOML. In addition to her college education, Dalynne holds multiple certifications and licenses acquired throughout her professional development. When asked why she wanted to work for NOAA, she simply said, "I love the ocean."

AOML's Physical Oceanography Division is hosting Michael Mehari, a research associate with the Rosenstiel School's Division of Meteorology and Physical Oceanography, to work on the Sandy Supplemental ocean OSSE (observing system simulation experiment) project. Michael earned a B.S. degree in marine biology and fisheries from the University of Asmara in Eritrea and a M.S. degree in oceanography from the University of Cape Town, South Africa. He pursued a Ph.D. in physical oceanography for two years at the University of Cape Town, but then decided to immigrate to the United States. His most recent professional experience was as an ocean/atmosphere data specialist at the International Pacific Research Center of the University of Hawaii, Manoa.



## It's a Girl!

Shirley Murillo, a meteorologist with AOML's Hurricane Research Division, and her husband Diesel are the proud parents of their first child, a daughter. Leah Jeanne Kuentzel was born in Miami on April 18, 2014 and weighed in at 8 lbs., 2 oz. Baby Leah, Mom, and Dad are all fine and doing well.





## U.S. Department of Commerce

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Secretary of Commerce  
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## Recent Publications *(AOML authors are denoted by bolded capital letters)*

**BARINGER, M.O.**, W.E. Johns, G. McCarthy, J. Willis, **S. GARZOLI**, M. Lankhorst, **C.S. MEINEN**, U. Send, W.R. Hobbs, S.A. Cunningham, D. Rayner, D.A. Smeed, T.O. Kanzow, P. Heimbach, E. Frajka-Williams, A. Macdonald, **S. DONG**, and J. Marotzke, 2013: Global oceans: Meridional overturning circulation and heat transport observations in the Atlantic Ocean. In *State of the Climate in 2012*, J. Blunden and D.S. Arndt (eds.). *Bulletin of the American Meteorological Society*, 94(8):S65-S68.

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