



*Carlye Calvin for NOAA
Medal of Science winner Susan Solomon.*

Susan Solomon to Receive National Medal of Science

Susan Solomon, an atmospheric scientist at NOAA's Aeronomy Laboratory in Boulder, Colo., will receive the 1999 National Medal of Science, the White House announced Jan. 31.

President Clinton will present the medal during a White House ceremony in early March.

Solomon is the first NOAA scientist to be awarded the medal, which is the nation's highest scientific honor.

Commerce Secretary William M. Daley praised Solomon's achievement—*continued on page 8*

Live Television, Student Summit Top Off Sustainable Seas Expedition in Hawaii

—By Delores Clark

The Sustainable Seas Expedition in the Hawaiian Islands Humpback Whale National Marine Sanctuary came to a close Jan. 25 with a student summit and a live television broadcast of KidScience on the Public Broadcasting System, featuring National Geographic Society explorer-in-residence Sylvia Earle, sanctuary manager Allen Tom and sanctuary research coordinator Steven Gittings.

KidScience, a production of Hawaii Public Television, was broadcast live via satellite to 24 mainland states, the Hawaiian Islands and American Samoa. Students participated in the

program through hands-on activities in the classroom and by interacting live with the scientists in the sanctuary by telephone and over the Internet.

Later that day, 40 students from the Hawaiian Islands were joined by 40 students from American Samoa in the student summit at the sanctuary. Hawaiian students who had earlier participated in research activities aboard the NOAA Ship *Kāimimoana* reported on their experiences. Along with Earle and Gittings, they also fielded questions from other students.

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Kip Evans/NGS

Craig Russell (far right) of the Hawaiian Islands Humpback Whale National Marine Sanctuary staff explains to students the tracking and navigation of the submersible drone DeepWorker.

Barbara Moore: On the Cutting Edge

This is the second in a series of profiles of women and men who have been NOAA employees since NOAA was established in 1970.

—By Dane Konop

Barbara Moore is the first director of the National Undersea Research Program who also happens to be a woman. This is unusual. Undersea diving has long been a male-dominated field, since many professional divers learned to dive in the Navy, which does not train women.

But being the only professional woman in her academic and professional peer groups has generally been the norm for Moore.

Growing up in Philadelphia in the late 1950s, Moore says she always knew what she wanted to be when she grew up—a chemical engineer! Even today there are relatively few woman who are chemical engineers. In the '50s, it was virtually unheard of.

As a student at the Drexel Institute of Technology in Philadelphia, she was not just the only woman chemical engineering major, she was the only woman in the entire engineering department. After getting her bachelor of science degree in chemical engineering, she set her sights on oceanography graduate school. But first, she decided to take up another challenge “before I had a job and a family,” Moore says. Just out of college, she promptly joined the Peace Corps.

She was posted to Addis Ababa, Ethiopia, as a high school physics teacher. It was exciting for a girl born, raised and educated in Philadelphia, she says, because “I lived a stone’s throw from the palace where Emperor Heile Selassie lived. But it was frustrating teaching because the students knew what they needed to learn to complete school. But that’s not what they needed to learn as far as

basic science is concerned,” she says. One exam question was on the workings of an electric door bell, a device none of them had ever seen in real life.

Cheating was also rampant. “I saw things in black and white in those days,” Moore now says. “Something was either right or wrong. And I was inflexible. So I was frustrated,” she says. But she began to see things in shades of gray. She also learned to make a quick course correction when necessary, and returned to the states a few months short of her two-year hitch.

Following a short stint at the Naval Ordnance Laboratory in White Oak, Md., she landed a job at the Naval Oceanographic Office. When she asked to go out on a cruise, she was told by her superiors, “Oh no, “We don’t have facilities on ships for women.”

“So I bugged them and bugged them,” she says, “until finally they said, ‘If you can find another woman to go with you, there is one cruise you can go on.’”

It’s not surprising there were openings, aboard the USNS *Gillis* for two weeks in the North Atlantic—in January!

Somehow she recruited another woman from her division.

“One of our assignments was to test these new devices that had just been developed—expendable bathythermographs. We were dropping them over the side at the same time we were lowering the old bathythermographs over. There’s ice all over the deck. They’re stringing up life lines everywhere. And the ship is tossing back and forth,” Moore says. “I got terribly seasick and so did the other girl.”

Although Moore wanted to stay *continued on page 6*



UNCW

Barbara Moore (center) assists as her daughters (left to right) Elizabeth and Victoria rechristen the renovated underwater habitat Aquarius in 1997 as other officials look on.



Rick L. Shanklin/NOAA

An F3 tornado skipped across Owensboro, Kentucky, Jan. 3, destroying these apartments.

AWIPS, NWS Forecasters Save Lives in mid-West

—By Patrick Slattery

Forecasters and support staff earned praise from local emergency managers, state and federal officials and a U.S. senator following a spate of unusual summer-like storms that hit portions of Kentucky, Indiana and Illinois in early January.

The Weather Service forecast office staff in Paducah spent the better part of twelve hours on Jan. 3 issuing warnings for tornadoes, flash floods, severe thunderstorms and downbursts.

Kentucky Senator Mitch McConnell's office called meteorologist-in-charge Beverly Poole, congratulating the staff on a job well done and thanking forecasters for helping protect residents of western Kentucky during the event.

Forecasters cited the Automated Weather Information Processing System as a key tool in providing advanced warning for the wide-

spread storms. According to Poole, Paducah forecasters were able to examine four different types of data at the same time while they were on the phone with Louisville forecasters looking at the storms from a different angle. She said AWIPS was particularly effective in issuing a tornado warning for Owensboro, Kentucky, 23 minutes before the city was hit by an F3 tornado with 180-mile-per-hour winds.

"Being able to analyze different types of data and to discuss what was being seen with Louisville forecasters in real time gave us a real jump in getting out the warning," said NWS director John J. Kelly. "We've always preached that early warnings save lives, and that was clearly demonstrated in this case. The new technology worked as it was designed to and certainly helped the Paducah forecasters do their job," he said. "But, in the final analysis, what made the difference was the well-trained and professional staff who delivered for the residents in their county warning area in a very high pressure situation," Kelly said. ☺

NOAA, Live from the Storm on PBS

—By Jana Goldman

What's it like to ride in an airplane during a hurricane? Why do scientists intercept tornadoes? What do all those buoys out in the Pacific Ocean really tell us about climate? How do forecasters know when bad weather is coming?

Thousands of schoolchildren and adults will have those questions and more answered March 7 and April 11 when the the Public Broadcasting System airs two episodes of "Live From the Storm," both featuring NOAA scientists.

During the March 7 segment, entitled "The Who, What, When, Where and Why of Weather," viewers will fly in a NOAA P-3 through a hurricane, sail across the Pacific to take the ocean's temperature and see how and why researchers chase tornadoes and why weather appears when and where it does. The segment also visits the National Hurricane Center in Miami, Fla., for a first-hand look at how tropical storms are identified and monitored and when and how warnings are issued.

The April 11 "Research to the Rescue" segment focuses on how cutting-edge research and new technologies, such as Doppler radar, satellites and computers, contribute to make life safer.

During the broadcast, teachers and students will be able to ask questions of NOAA researchers at the National Severe Storms Laboratory and the Storm Prediction Center in Norman, Okla., via the Internet.

The show is being produced with support from the Office of Oceanic and Atmospheric Research, the National Environmental Satellite, Data and Information *continued on page 6*

Focus On...



James Stricker/NOAA

NOAA Anniversary Kick-off Parties Across the Country

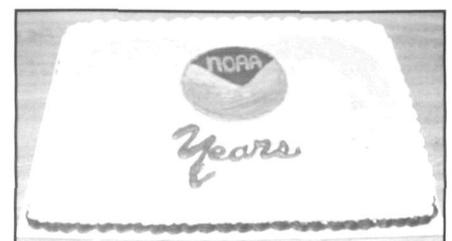
At simultaneous birthday parties across the country Jan. 12, employees kicked off NOAA's thirtieth anniversary year with a live Web simulcast of a video of key events in NOAA history and greetings from various NOAA offices and employees. And apparently everywhere there was cake.

Marine Operations Center director Rear Adm. Nick Prahl, program coordinator Jo Anne Bowman and staff celebrate NOAA's anniversary kickoff with cake and soft drinks at the marine center in Norfolk, Va.

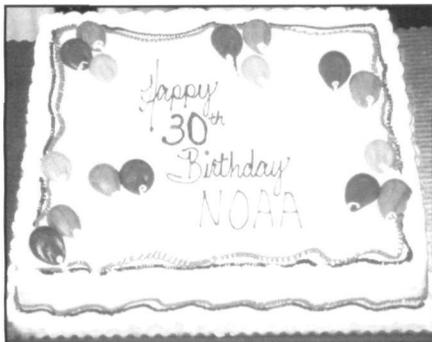


Ellan Taylor/NOAA

Two anniversary kickoff receptions were held in Honolulu, Hawaii, one at the NWS Pacific Region headquarters (pictured), which was attended by employees from the Pacific Region and the NMFS Pacific Islands Area Office, plus several NMFS fishery observers. A second reception was held at the NMFS Honolulu Laboratory.



Carter M. Estes/NOAA



Chris J. Smith/NOAA



Elaine Wilbur/NOAA

(left to right) Pat Jordan, Tina Palmerin, Michelle Swinton and Nancy Greenthaner celebrate the NOAA anniversary kick-off at NWS Central Region headquarters in Kansas City, Mo.



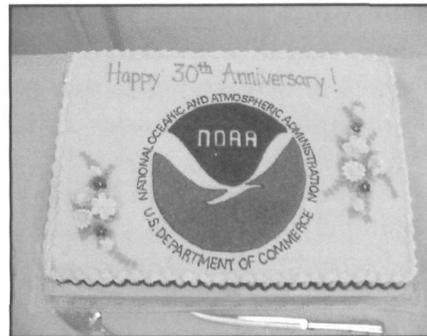
Chris J. Smith/NOAA

There was a strong turnout in St. Petersburg, Fla., where employees of the NMFS Southeast Regional Office, Law Enforcement Division, Seafood Inspections Office and Financial Services Branch, the NMFS Headquarters Highly Migratory Species Division and the NMFS Office of Intergovernmental and Recreational Fisheries celebrated NOAA's thirtieth anniversary kickoff with employees of the NOAA Southeast Office of General Council and the NOS Southeast Damage Assessment Center.



Herb Sauer/NOAA

Many NOAA facilities across the country celebrated with birthday cakes, including the NWS Training Center and Aviation Weather Center, Kansas City, Mo. (preceding page), NMFS, St. Petersburg, Fla. (top), the Environmental Research Laboratories, Boulder, Colo. (lower left), and the Atlantic Marine Center, Norfolk, Va. (bottom right).



James Stricker/NOAA

Sustainable Seas

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Altogether, about 300 lucky Hawaiian students from elementary school to high school level were involved in the project, which began Jan. 10 with educational exercises aboard *Ka'imimoana*, Atlantis Adventures tourist submarines and whale watching boats provided by local companies.

"Sustainable Seas has had a tremendous impact on the students and teachers who participated in the training workshops and the onsite experiments," said Patty Miller, a teacher and the director of KidScience. "These kids have grown up around the ocean and the whales, but they now have a new appreciation for them."

Led by Earle and other noted scientists, the expedition included 27 research dives, including four at night, in the four-island region of Maui, Molokai, Lanai and Kahoolawe.

The deepest dive occurred off Papaoa Point, Lanai, where the sub *DeepWorker* dove to 1,299 feet. A rare pelagic octopod, *Haliphron Atlanticus*, was observed and captured on film by Earle on the last dive of the mission.

Scientists also surveyed the Lahaina Roads area, a "drowned reef" two to three miles off Lahaina. This unique lagoon features black coral along the walls of the former freshwater lake. Scuba operations were conducted to obtain underwater footage of the *DeepWorker* rendezvous with the student expedition aboard the Atlantis Adventures submarine and to shoot footage for an education video.

Ka'imimoana was used as a multi-purpose platform for launch and recovery, night acoustic surveys and remotely operated vehicle work.

The Hawaii expedition was a

joint endeavor with a local company, American Marine Corporation, which provided a vessel, *American Islander*, two submersibles, *DeepWorker* #8 and #9, and personnel support.

The public enjoyed several community events sponsored by the humpback whale sanctuary to commemorate the Sustainable Seas Expedition, including open houses at sanctuary headquarters in Maui and the Waikiki Aquarium in Honolulu and at a family ocean fair held in Kailua-Kona on the Big Island. A life-size model of the *DeepWorker* submersibles was on display along with crafts, games, exhibits and theatrical performances. The ocean fair featured talks by Earle, NASA astronaut Joan Higginbotham and underwater photographer Flip Nicklin.

The project in Hawaii was the tenth Sustainable Seas Expedition, a joint project of NOAA and the National Geographic Society to explore the underwater habitats of NOAA's twelve national marine sanctuaries. Made possible by a grant from the Richard and Rhoda Goldman Foundation, the project uses sophisticated underwater submersibles to film and collect data.

"The Sustainable Seas Expedition in Hawaii more than met our expectations," said Allen Tom, manager of the humpback whale sanctuary. "It was fun and educational and brought a lot of attention to the sanctuary program and the whales. Each mission has discovered something new and valuable for the scientists and managers of NOAA's sanctuaries," he said.

The Sustainable Seas Expedition team next heads to the South Slough National Estuarine Research Reserve in California in May. ..

Moore

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onboard, "They wanted to put us both off the ship, because you couldn't keep just one woman on the ship," Moore says.

The men she was working with wanted her to stay. Moore recalls, "They called Tex Treadwell, who was the commander of the oceanographic office. It was a Sunday, and they asked permission for me to stay on the ship. And he said 'yes.'"

The ship put back to the Atlantic, the weather got much better and she finished the cruise.

Back ashore, Moore did a short stint at the Navy Oceanographic Instrumentation Center before receiving a fellowship to Catholic University in Washington, D.C. She returned to the Navy with a masters in science and technology.

"I was working in the Navy Yard when the piece of NAVOCEANO in which I was working became part of NOAA," Moore says.

The newly established NOAA was given responsibility for monitoring coastal pollution, which required specialized instrumentation for measurements. "I specialized in chemical instrumentation. It wasn't by design, but it fit together perfectly," she says.

In October 1973, Moore made her first dive in Hydrolab, a small habitat operated by the Manned Undersea Science and Technology Program, the predecessor to NURP. *continued on page 7*

Live from the Storm

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Service and the National Weather Service. The NOAA Office of Marine and Aviation Operations assisted by arranging for flights into Hurricane Dennis. The National Aeronautics and Space Administration is also participating. ..

Moore

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Moore was testing ocean instruments in the laboratory, but wanted to see how they actually would work in the field, "which in this case was the sea floor 50 feet below the surface," she says.

Acceptance of her research proposal presented Moore with a new problem. "I didn't know how to dive at the time. So I went and took all the diving classes at the YMCA in Rockville, Md., and got certified," Moore says.

With her freshly minted dive certification and her instruments that needed testing, Moore headed off to Freeport in the Bahamas, where Hydrolab

was located. There she joined two other aquanaut-scientists, both men she did not know, to live and work for a week on the sea floor in a barrel-like habitat about the size of a small camper trailer.

"I started out with great trepidation and fear," she says now, "to be stuck in this barrel with these strangers. But the whole thing was fascinating. It was like being in an inverse aquarium. There was a four-foot diameter port at the end of the habitat. From anywhere in the habitat you could look out that 'picture window' right on the edge of the reef."

She was pleasantly surprised by her company in the cramped Hydrolab. "I did discover you either end up loving your roommates or hating them. There's

nothing in between; you're so close together. We got along very well," she says, and the mission was a success.

In 1978, Moore was accepted into the Department of Commerce's ComSci Program and spent the better part of one year working on the staff of Senator Lowell Weicker, "trying to get an article in the Law of the Sea Treaty



Barbara Moore is surrounded by colleagues on a visit to China.

that treated whales differently than fish," she says.

The effort was successful, and groundbreaking. "Marine mammals would have a special status and would be managed by regional organizations as opposed to coastal states," she explains.

Moore returned to NOAA in 1979 to work in the old Office of Ocean Engineering, where she remained for a few years developing ocean instruments and administering university contracts.

In 1981, Moore moved to main Commerce as special assistant to new Administrator John Byrne. After a year, she joined the NOAA Policy and Planning Staff in "more of a think job," she says, "looking at trends in fishery issues."

She then left for a three-year

detail with the Office of Science and Technology Policy, where she worked for the President's science advisor. She and her OSTP colleagues were officially White House staff, although they worked in the New Executive Office Building. Working at the White House "was the place where you could really see the big picture, see what kinds of things those folks are interested

in, how they looked at issues, which is not at all the way we look at issues," Moore says.

During this period, she met her husband, John, a professor of law at the University of Virginia, who was the chief negotiator for the Law of the Sea deliberations.

"The oceans brought us together," she says.

Following the birth of the couple's two daughters, Victoria and Elizabeth in 1984 and 1986, much of her earlier experience began to jell as she took a new job as head of the Office of Oceanic and Atmospheric Research's international affairs staff, working to establish scientific cooperation with China and Russia.

Virtually all of her colleagues, of all nationalities, were men.

A science agreement with Russia that she worked on with the late Ned Ostenso was one of the first open doors to the former Soviet Union, she says.

Following her stint in international affairs, she was named to head the National Undersea

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Solomon

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ments, noting that "Solomon has been one of the most important and influential researchers in atmospheric science during the past 15 years. Her work to unravel the mysteries of the Antarctic ozone hole is an example of the important role played by government scientists in figuring out the answers to the larger picture of global change. We in the Commerce Department are very proud of her outstanding work."

Administrator D. James Baker said, "Dr. Solomon is a talented and dedicated scientist whose key insights into the cause of the Antarctic ozone hole have changed the direction of ozone research. We applaud Dr. Solomon's contributions to our better understanding of the ozone layer and to the chemistry underlying it."

Solomon said, "This is a wonderful honor for me personally, but it's

very important to underscore that it reflects the fact that I was in the right place when the scientific opportunity of a lifetime came along. The opportunity was the surprising revelation that there was a huge hole in the Antarctic ozone layer, and the place was NOAA. I owe this award to wonderful colleagues and a fantastic research environment."

The National Science Foundation announcement recognized Solomon for her insights in explaining the cause of the Antarctic ozone hole.

Solomon carried out key work theorizing that chemical reactions involving manmade chlorine are responsible for the remarkable Antarctic ozone depletion. She also served as the leader of the National Ozone Expeditions to the Antarctic in 1986 and 1987, where she conducted observations that provided the first direct evidence of this chemistry.

In 1994, an Antarctic glacier was named in her honor in recognition of that work.

Solomon is one of 12 recipients of this year's medal, established by Congress in 1959 as a presidential award for individuals "deserving of special recognition by reason of their outstanding contributions to knowledge in the physical, biological, mathematical or engineering sciences." A committee of 12 scientists and engineers appointed by the President evaluates the nominees for the award.

Solomon received her Ph.D. in chemistry from the University of California at Berkeley in 1981 and has been a research scientist at the Aeronomy Laboratory since then.

She is the recipient of many honors and awards, including the Department of Commerce Gold Medal and the 1999 Carl-Gustaf Rossby Award from the American Meteorological Society. ..

—Barbara McGehan

Moore

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Research Program, which would draw on her earlier diving experience, her work with marine instrumentation and her time spent on the Hill and at the White House.

The program had been a favorite of Weicker and others in Congress. But when Moore was named to lead NURP, the program had not been in the President's budget submission, any President's budget, since 1982. Although it was considered a valuable science program, three consecutive administrations zeroed out the program, only to have its funding restored by Congress.

Moore's task was to resolve this budget conflict and produce changes that would make the program more acceptable, and accountable, to the administration.

Then in 1998, for the first time

in 16 years, the President's budget included funding for NURP.

"We did it by making enough changes in the program so that we could turn its productivity to suit NOAA's research needs," Moore says. She is most proud that the "centers speak with one voice now, instead of six individual voices. They talk about NOAA's mission and NOAA's research priorities. The major change has been the centers accepting NOAA's research agenda."

As to what lies ahead for the re-invented program, Moore says, "I think we have a bright future. The timing is right. There's a lot of interest in the exploratory aspects of what we do, finding out what's down there on the sea floor. I see a growing recognition of the need to support exploration," she says.

Would she encourage her own daughters to pursue a career in

ocean science and engineering?

Her answer is immediate and positive. "I think there's a great future in oceanography," she says. "It's not a big money maker, but it's a field where you can be on the cutting edge of knowledge."

Having been there, she would know. ..

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