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# NEWSLETTER

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OCEANOGRAPHIC INSTITUTION

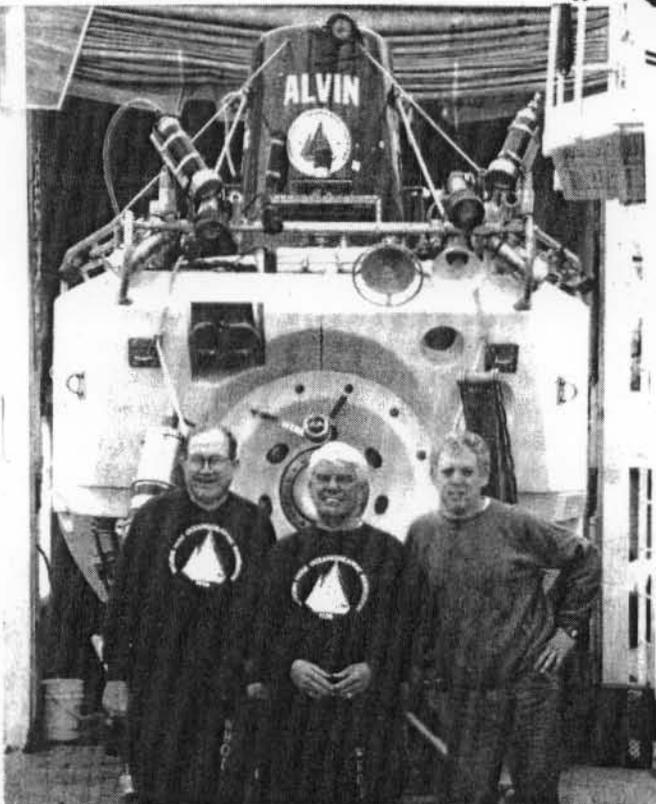


MARCH - APRIL 1996

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Photo by Dan Fornari



NSF Director Neal Lane (left) and Congressman Jerry Lewis (center) pose with Alvin Pilot Dudley Foster prior to their dive March 17 off Catalina Island.

*"It was a phenomenal experience...Diving a mile deep in the ocean is the fulfillment of a dream I've had since diving for coins at the bottom of my local pool as a kid growing up in San Bernadino..."*

Congressman Jerry Lewis

*"The capabilities of research vessels like the Alvin remind us once again that we are on the threshold of a truly revolutionary era of discovery and progress in research and education..."*

NSF Director Neal Lane

## Congressman, NSF Director Dive in *Alvin* to Observe Ocean Science Research Firsthand

Congressman Jerry Lewis (R-California), chair of the House Appropriations Committee which allocates funds to the National Science Foundation (NSF), and Dr. Neal Lane, Director of NSF, had the opportunity to observe ocean sciences research firsthand March 17 during an *Alvin* dive off the Southern California coast near Catalina Island.

The opportunity to dive in *Alvin* enabled Lewis and Lane to speak informally one-to-one for the first time. They were also able to see firsthand some of the research and facilities they support. Dive #3056 with Pilot Dudley Foster lasted about five hours from the time the sub was launched from *Atlantis II* to recovery back aboard ship. During the dive they observed rock formations and the rugged geologic terrain as well as marine life. Samples were collected for later analysis.

Congressman Lewis and Dr. Lane explored the Catalina Escarpment, a steep slope that forms the southern flank of Santa Catalina Island, which was created through faulting and large scale erosion of the uplifted rock formations. The escarpment trends in a northwest-southeast direction and extends from approximately 1300 meters to 150 meters depth. *Alvin* traversed the slope from approximately 1100 meters to 400 meters depth during the course of the dive.

The geology and tectonics of the area were presented to Congressman Lewis and Dr. Lane prior to the dive by Dan Fornari of the WHOI Geology and Geophysics Department and Mark Legg, who is a member of the Southern California Earthquake Center. The Center is a consortium of scientists from universities and corporations in California who are studying earthquakes and faults in the region. Several private geophysical companies in California including ACTA, Inc., where Dr. Legg is employed, are members of the Center.

Samples of the rock formations from exposure on the escarpment were collected in order to provide structural and petrographic data. These samples will allow scientists studying the region to better understand the nature of

*Continued on page 2*

## Lewis/Lane Dive *continued from page 1*

rock formations exposed to different levels on the Catalina Escarpment and what their role is in the tectonic history of the region.

"The borderland fault system that lies offshore southern California is associated with the San Andreas fault system, but the offshore faults are poorly understood," Associate Scientist Dan Fornari of the Geology and Geophysics Department notes. "A better geological and tectonic model of the offshore faults is needed in order to accurately assess the hazards associated with these features and to help with the understanding of history and dynamics of seismicity in southern California."

"Diving a mile deep in the ocean is the fulfillment of a dream I've had since diving for coins at the bottom of my local pool as a kid growing up in San Bernadino," Lewis said prior to the dive. "So much is unknown about our planet that lies largely underwater. Part of my job is to determine what taxpayers are getting for the money spent supporting the ship and submersible operations, and the basic research that is carried out using these facilities. If this type of study and research continues to lead to scientific breakthroughs, then we'll likely determine that the costs are more than justified."

Congressman Lewis serves as chairman of the House of Representatives Appropriations Committee for Veterans Affairs, Housing and Urban Development and Independent Agencies, which includes the National Science Foundation and NASA.

During a lecture at the Empire Scuba Dive Club in Redlands, CA, shortly after the dive, Congressman Lewis told his constituents that he made the dive not only because of his love

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Writer/Editor: Shelley M. Lauzon  
Staff Support: Kathleen Patterson

Photo by Jane Neumann



Congressman Lewis (second from right) and NSF Director Neal Lane (far right) were briefed about the geology near Catalina Island in the main lab aboard Atlantis II prior to their dive by Dan Fornari (third from left) and Mark Legg (second from left). Senior Associate Director and Director of Research Jim Luyten is at far left and Director Bob Gagosian is third from the right.

of the water but also to see how the money he now has such a key role in allocating is being spent by the National Science Foundation.

"It was a phenomenal experience that has caused me to look at not only the National Science Foundation as something worthwhile but the work of NASA as well." He also noted there is much to be said for witnessing a program firsthand to measure its value. "I don't think we do that enough," he said of the Congress. "There's great value in us getting out of Washington."

NSF Director Neal Lane, a physicist, has been director of NSF since October 1993. The foundation is an independent agency of the federal government that provides support for research and education in the sciences, mathematics and engineering.

Like Lewis, he enjoyed his *Alvin* dive experience. A few days after the dive, Lane spoke about his experience at the start of two briefings on the Fiscal Year 1997 budget request for NSF, held for reporters and for members of the science and engineering community.

"It's no secret that we find ourselves in a confusing and truly paradoxical period of time. The funding outlook has never been more uncertain or unpredictable, while at the same time opportunities in research and education have never been more promising or more exciting," he told the reporters and NSF constituents.

"This past Sunday, I got a good sense of how exciting those opportunities are. Congressman Jerry Lewis and I were able to take a dive off the coast of southern California in the submersible vessel, the *Alvin*. It was a wonderful experience that gave us the chance to view the life and the geology of the ocean floor at depths approach-

*Continued on page 8*

## Ruth Turner Honored at Women Pioneers Seminar

Benthic Biologist Ruth Turner, professor of biology emerita at Harvard University and formerly adjunct scientist in the WHOI Biology Department, was honored April 2 at the third annual Women Pioneers in Oceanography seminar, sponsored by the WHOI Women's Committee. A large crowd was on hand on Clark 507 for the seminar and the informal reception that followed.

Lisa DiPalma, Co-chair of the Women's Committee, began the program and introduced seminar moderator Cecily Selby, WHOI Trustee and Member of the Corporation. Speakers included Turner's long-time WHOI colleagues Judy McDowell, Scott Gallager, John Waterbury and Amélie Scheltema, all of the Biology Department, and Director Bob Gagosian.

Judy McDowell introduced the highlights and provided an overview of Ruth Turner's career. Turner, a specialist in marine mollusks, received her bachelor's degree from Bridgewater State College, her master's degree from Cornell University and her Ph.D. in zoology from Radcliffe College. She taught at small schools in New England, as an instructor at Vassar College, and as Assistant Director of Education and Assistant Curator of Birds at what is now the Museum of Science in Boston before beginning a long career in the study of shipworms and other marine mollusks of the deep sea.

The author or co-author of more than 200 scientific publications, Ruth Turner began her career studying marine mollusks in World War II. Judy McDowell noted that she received more than 30 years of support from the Office of Naval Research to conduct detailed studies of wood-boring mollusks. "She was the first to characterize the opportunistic behavior of wood-boring mollusks, challenging previously held beliefs that the rates of growth in the deep-sea were very slow." Her work opened many new areas of research.

"Her studies have taken her to every corner of the globe, and

she has a lot of fun doing her science," McDowell added. "Her enthusiasm for discovery is contagious and generations of her students and colleagues have benefited from their friendship with Ruth. She is the complete scholar."

Scott Gallager credited Ruth Turner with introducing him to blue-water oceanography and recalled his first deep-sea cruise with Turner aboard Research Vessel *Lulu*. He displayed a knit doll Ruth had made for his then three-year-old daughter, who is now 14.

John Waterbury noted that his collaboration with Turner began in 1979 and led, a few years later, to the much publicized discovery and isolation of the first cellulose-degrading nitrogen-fixing bacteria and the explanation of how shipworms can make a living with wood. One of the species of shipworms is named in her honor.

Amélie Scheltema also noted that a second mollusk is named in Ruth Turner's honor, and thanked Ruth for being a mentor to her since they first met in 1955. She displayed a catalog, complete with drawings Ruth had done, published in the 1960s. Other guests spoke about Ruth's many other contributions to the *Alvin* program and to other projects outside Woods Hole.

Director Bob Gagosian told the audience that Ruth did what she thought was best for her work and for the science, and that she stuck to what she thought was right, noting that as an important trait to remember in today's funding environment, "You broadened their view and helped them look over the horizon," he said of her career as a mentor and role model. He then presented Ruth with a WHOI chair.

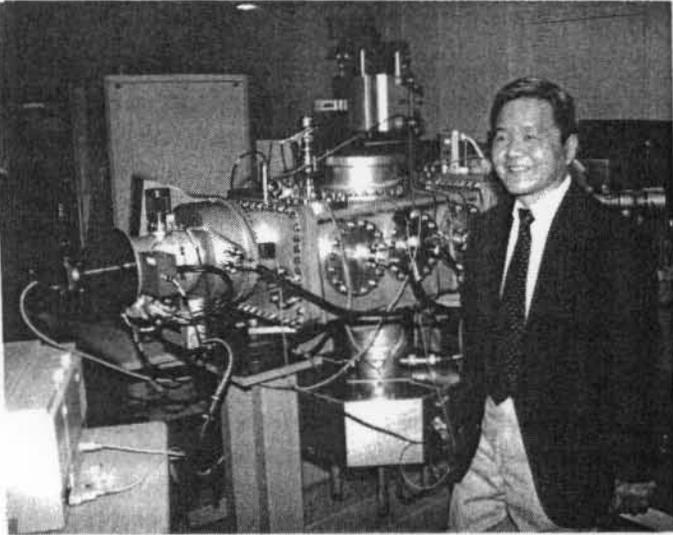
### Share Your Remembrances of Research Vessel *Atlantis II*!

Research Vessel *Atlantis II* will be retired from the Institution's fleet this summer after a 33-year career. A WHOI community celebration is being planned, and the date will be announced shortly. Anecdotes, photographs, and other remembrances are invited from all who sailed on the ship or were part of its history for possible inclusion in a special edition of the *Newsletter* and for the ship's permanent history in the WHOI Archives. Please submit any items to Shelley Lauzon, News Office, MS#16, 93 Water Street, Woods Hole, MA 02543.

Photo by Tom Kleindinst



Left to right: Scott Gallager, Amélie Scheltema, Ruth Turner, Judy McDowell and John Waterbury.



Left: A proud Nobu Shimizu stands by the new ion microprobe at the regional facility's dedication April 29. Right: Research Specialist Graham Layne (right), who will oversee daily operations, explains the instrument to Stan and Pam Hart. Stan Hart has used the facilities older ion microprobe for years.



## New Regional Facility at WHOI Dedicated

A new high precision instrument at WHOI may burst the bubble on many long-held beliefs about the evolution of the Earth. Scientists will now be able to pursue answers to questions about the conditions of the earth soon after its formation some four billion years ago, the earth's past climate, and processes active within the planet today.

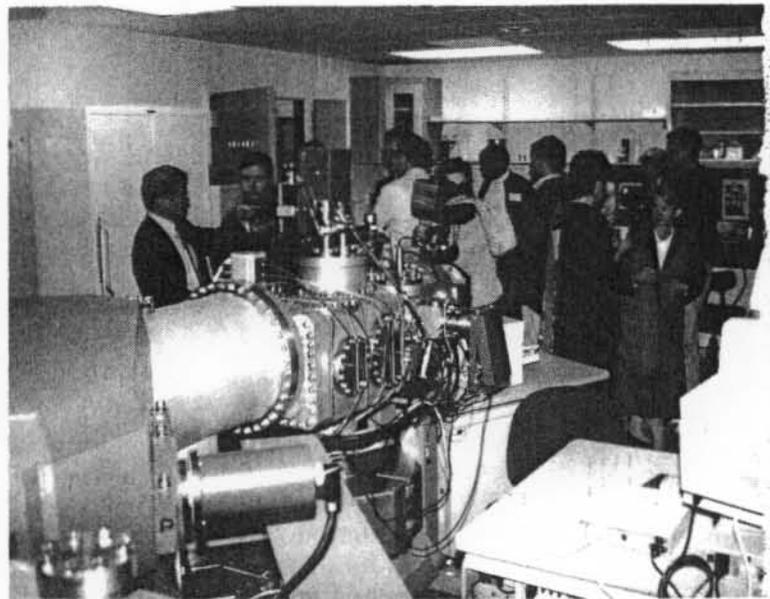
The instrument, an ion microprobe, is part of a new regional laboratory at the Institution, the Northeast Regional Ion Microprobe Facility (NERIMF). The regional facility, located on the first floor of Clark Laboratory, was dedicated April 29.

The \$2.26 million ion microprobe, one of only four such instruments in the world, extracts information from rocks about geological events that occurred millions, even billions, of years ago (see January-February *Newsletter* article). The microprobe works by focusing a narrow beam of ions at a carefully targeted spot on a polished rock sample. The ions and molecules fly out of the rock, or sputter, into a mass spectrometer, another instrument which determines abundances of individual isotopes and elements in the rock. The composition of a rock, its age and texture can be determined very accurately. That information is critical to understanding many geological processes, such as how magma forms and moves up into the mantle to form oceanic crust.

"The ion microprobe allows scientists to look at rocks from different depths on earth in the same way a biologist

looks at human tissues with the electron microscope," Geochemist Nobu Shimizu says of the instrument. "It provides us with a tremendous leap in understanding." Shimizu, a senior scientist in the Institution's Geology and Geophysics Department, heads the regional facility, which will be used by scientists from the NERIMF partners: Massachusetts Institute of Technology, Brown University, Lamont-Doherty Earth Observatory at Columbia University, Rensselaer Polytechnic Institute, the American Museum of Natural History, and other research organizations in the northeast U.S.

"We tend to look at the earth in a simplistic way," Shimizu says. "We try to understand patterns on the map, the large scale things like the mid-ocean ridge system which is one of the largest geologic features on earth. When you are dealing with such large



## New Faces



Imogene M. Bump  
Staff Assistant II  
Development  
Fenno  
Ext. 2781  
D. Milot



Gary S. Caslen  
Procurement  
Assistant I  
Procurement  
Quissett Warehouse  
Ext. 2413  
P. Duffy



Amy Gloria  
Senior Accountant  
Controller  
Challenger  
Ext. 3505  
D. Rudden



Robin Hurst  
Accounting Assistant  
Controller  
Challenger  
Ext. 2844  
L. Murphy

## Staff Honors and Awards

Scientist Emeritus K.O. Emery of the Geology and Geophysics Department has received the Outstanding Alumni Award for 1996 from the University of Illinois at Urbana-Champaign "in recognition of outstanding contributions to marine geology and geoscience." The award, the highest honor given by the University's Department of Geology, was also bestowed by the alumni GeoThrust Committee. K.O. received the Illini Achievement Award in 1977.

Senior Scientist Bob Ballard of the Applied Ocean Physics and Engineering Department will receive the National Geographic Society's Hubbard Medal this fall. The medal, named for the Society's first president, Gardiner Greene Hubbard, recognizes distinction in exploration, discovery and research. Past recipients of the Hubbard Medal include Charles and Anne Morrow Lindbergh, explorers Richard Byrd and Richard Amundsen, astronaut John Glenn and two teams of Apollo astronauts.

## Congratulations

— to Dale Goehringer and Jim Toner on the birth of their daughter, Kathleen Margaret Toner, February 20 at Cape Cod Hospital in Hyannis. Kathleen weighed 6 lbs, 10 ozs. and joins sister Mary, 2, at home. Dale is a research associate in the Biology Department.

— to Lisa and Craig Taylor on the March 23 arrival home of their daughter, Brianna Jyun Taylor. Brianna was born in Hangzhou, China, February 11, 1995. Lisa is a staff assistant in the Biology Department and Craig is an associate scientist, also in Biology.

— to Maria and Tim Silva on the birth of their first child, Cole Evan, April 12 at Falmouth Hospital. Cole weighed 8 lbs., 1 ozs. Maria is a staff assistant in the Education Office and Tim is an engineering assistant in the Information, Publications and Graphic Services group.

— to Lauren Mullineaux and Mark Grosenbaugh on the birth of their second son, Gus Daniel, April 28 at Jordan Hospital in Plymouth. Gus weighed 8 lbs., 3 ozs. and joins brother A.J, 3, at home. Lauren is an associate scientist in the Biology Department and Mark is an associate scientist in AOP&E.

## Promotions

Mary Berry (Directorate)  
to Development Officer (1/21/96)

Paul V. Dunlap (Biology)  
to Associate Scientist with Tenure (3/1/96)

Robert Eastwood (AOP&E)  
to Research Engineer (1/22/96)

Mark E. Hahn (Biology)  
to Associate Scientist (3/1/96)

Hélène Longyear (IPGS)  
to Staff Assistant III (2/4/96)

Theresa McKee (PO)  
to Senior Research Assistant I (1/21/96)

Sandra Murphy (IPGS)  
to Staff Assistant III (3/3/96)

Frank B. Wooding (G&G)  
to Research Specialist (2/26/96)

features, you tend to think that processes occur only on large scales - hundreds or thousands of kilometers. While it is important to study them, you can miss a great deal. When you look at samples with the ion microprobe, you discover that the process you want to understand is actually taking place on a very small scale - like centimeters or millimeters. This tremendous juxtaposition of scale is not just in space but also in time. We tend to look at geological processes as taking place over millions of years, but that's just a perception. We don't really know."

The new ion microprobe arrived at WHOI in February from France, where it was built by Cameca. Since then, it has been assembled, tested, and readied for operation. Shimizu's lab has another ion microprobe, now 18 years old, but still much in demand. Together, these two ion microprobes, the only two in the Northeast U.S., will give the regional facility capabilities in solid earth geochemistry few places in the world have, and Shimizu expects both instruments to be heavily used.

"There are certain things we cannot do with the older machine, which can measure one isotope at a time. This new instrument, capable of measuring five isotopes at once and with ten times the sensitivity, has much greater mass resolution and transmission than our other machine," Shimizu says. "It will be able to do analyses faster and with greater precision, and that is important given the range of questions we are trying to answer."

Last year, Shimizu and colleagues in Russia published evidence that reduced the age of some of the world's oldest diamonds by almost a full order of magnitude. Using the ion microprobe, Shimizu analyzed tiny pieces of garnet imbedded in diamonds from the Siberian shield, one of the

world's oldest geological formations. Much of the scientific understanding about the geophysical development of continents had been built around these diamonds, thought to be formed some 3.2 billion years ago. Shimizu found that the diamonds were actually formed shortly before they reached the earth's crust - about 360 million years ago. Diamonds had suddenly become about 2.8 billion years younger than anyone had thought.

Costs of the \$2.26 million facility have been shared, with the National Science Foundation providing \$1.1 million; the Kresge Foundation of Troy, Michigan, \$500,000; and the Cecil and Ida Green Foundation of Dallas, Texas, \$200,000. Additional support was provided by the G. Unger Vetlesen Foundation, by Frank and

Lisina Hoch, and by the partners of NERIMF.

For its first two years of operation, scientists at the partner institutions and organizations will have priority use as they test new technologies and the machine's capabilities. After that two-year period, the microprobe will be made publicly accessible and is expected to attract researchers from all over the world.



*Assistant Scientist Peter Kelemen (second from right) of the Geology and Geophysics Department ponders a question from department colleague Delia Oppo (far right) and a guest. Kelemen and Shimizu will coordinate research at the facility.*



## WHOI Sea Grant Publishes Catalog

WHOI Sea Grant recently completed its first comprehensive publications catalog. The 80-page catalog lists nearly 600 marine scientific publications, including technical reports, fact sheets, journal articles, program guides, videos, books and maps that have resulted from WHOI Sea Grant support since the inception of the program in 1971.

Publications are categorized under the theme areas Coastal Processes, Fisheries and Aquaculture, Marine Policy, Oceanography, Pollution, Outreach and Advisory Services, Audio, and Video. The catalog features an annotated bibliography and includes order forms. Publications that may be useful for educators and/or students are noted. Single copies are available at no charge by contacting WHOI Sea Grant at 289-2398 or [seagrant@whoi.edu](mailto:seagrant@whoi.edu).

## From Outer Space to Inner Space: First Astronaut Makes a Dive to the Seafloor

Dr. Kathryn D. Sullivan, the first woman to walk in space and a veteran of three NASA space shuttle missions, became the first astronaut to make a deep dive to the ocean floor in *Alvin* on April 11. Sullivan, a geologist, made Dive #3067 with Chief Scientist Alan Chave and *Alvin* pilot Robert Lee Williams.

Leg XXV of *Atlantis II* Voyage #132 began April 3 in Manzanillo, Mexico, and ended in Acapulco April 27. Sullivan served as a member of the scientific team and worked with Chave, a senior scientist at the Institution's Geology and Geophysics Department, and 18 other researchers from U.S. universities and research organizations. Four separate research programs were conducted and 13 *Alvin* dives made during the three-week expedition along a portion of the East Pacific Rise near 10° North, 104° West about 450 miles off the coast of Mexico.

Shortly after surfacing from the dive, Sullivan recalled her 1974 experience as a graduate student on Research Vessel *Knorr*, which was supporting *Alvin* operations on the Mid-Atlantic Ridge. She has kept in contact with WHOI colleagues, and jumped at the *All* cruise invitation.

"I looked at all the photos, videos and samples from the bottom with great envy, trying to imagine what the landscape really looked like, and trying vainly to synthesize mentally all the separate pieces of data and anecdotes into a clear sense of the bottom," Sullivan said of that 1974 cruise. "I resolved right there to shape my later scientific work so that someday I could dive on an active mid-ocean ridge and see it for myself."

"My career took a different turn, however, and I joined NASA in 1978. As a Mission Specialist Astronaut I got to work with a challenging and for me very satisfying mix of science, engineering and operations. Today's dive more than lived up to my 22 years of dreams and expectations," she said in a fax message. "It was a delightful mix of sharp professional operations, good science and great personal exploration. Being on the inside of something like this and making a contribution, even just a small one, is much more interesting and satisfying to me than watching from the sidelines."

"I felt quite at home inside the sub and, like on the Shuttle, was partly awed and partly bemused to look out the porthole from our safe little ball at an amazing world in which I could not survive unprotected," she said. "It still awes me that we can put humans into such environments with such confidence and safety that we focus most of our working energy during the mission towards productivity rather than survival. Says a lot about the caliber of both the technology and the operations teams."

"In terms of the personal goals I had stored up since 1974, this was truly a perfect dive. Seafloor hydrothermal vents like we are working on here had not yet been discovered when I first encountered *Alvin*. They are incredible sites, with dramatic chimneys and towers, and with fascinating biology and chemistry. I don't know how many people get to see two high temperature vent sites, two major biological sites and a 1 kilometer survey transit along an axial surface caldera on one dive - but we did it on this dive, with two rookie observers!"

"Every sight surpassed my expectations," Sullivan said of the experience. "It is different to see these things with your own eyes, fully aware of where you are and how strange it is to be there. I know I still have only meager knowledge of the detailed landscape at this ridge crest, but at last I have that first-hand sense of the scale and variety of such places."

Sullivan noted an artist's rendition of the caldera, done by Paul Oberlander of Graphic Services for Geologist Dan Fornari, hanging on the galley wall aboard *Atlantis II*. Fornari, Chief Scientist for the Deep Submergence Operations Group, studies the mid-ocean ridge system.

"I've looked at it for seven days, and for seven days it's looked like a kind of hokey stylized representation. I thought about that picture on the bottom, while looking at lava pillars and walls built of dozens of little lava layers, at collapse pits and sheet flows and ropey surfaces that form frozen whirlpools in the basalt," she noted. "When I got back aboard ship, I went into the galley and looked at it again. Now, at last, I really understand that it's an accurate portrayal of one of the most amazing and dramatic living landscapes on this planet. Well worth every day of the 22-year wait!"

Sullivan recently stepped down as Chief Scientist at the National Oceanic and Atmospheric Administration (NOAA) to become president of COSI, Ohio's Center Of Science & Industry, in Columbus, Ohio.

Photo by John Krauspe



*Kathy Sullivan gets out of Alvin after her dive April 11. This image was taken by a digital camera and sent back to the WHOI News Office via satellite. The digital files were then sent via email to newspapers, which used the color version of this image with stories about the dive.*

ing a mile. In this world of perpetual blackness, punctuated only by luminescent aquatic animals, we saw an amazing variety of life forms that do not exist anywhere else on the planet ....”

“The capabilities of research vessels like the *Alvin* remind us once again that we are on the threshold of a truly revolutionary era of discovery and progress in research and education,” Lane said. “We now have at our fingertips an array of experimental instruments, computers, and information networks to open frontiers that were unimaginable just a few years ago. Over the next decade, the potential for rapidly increasing our understanding of both the natural world and that shaped by humans — and applying new knowledge and technologies — is staggering. All signs are that we are on the brink or perhaps in the midst of a new golden age of discovery...”

“But what is extraordinary today is that major breakthroughs seem to be occurring at increasingly frequent intervals all across the frontiers of science, engineering and technology,” Lane continued. “This makes clear that we cannot, indeed must not, lower our sights as a nation when it comes to science and technology. Never again should America be caught off guard as it was with the launch of Sputnik or when we saw our competitiveness erode in the 1970s and 80s. World leadership in science is like a muscle—you use it or lose it—as a community and as a nation!”

## Ship Notes

### ATLANTIS II/ALVIN

R/V *Atlantis II* and DSV *Alvin* returned to service March 17 after a two-month stand-down period in San Diego. Three *Alvin* dives were conducted for engineering purposes off Catalina Island, followed by three dives for biological studies off the California coast March 21-24.

*Alvin* then headed to Manzanillo, Mexico, and departed Manzanillo April 4 for a 22-day cruise along the East Pacific Rise near 10°N, 105°W. Despite some ship generator problems that forced a brief return to port, thirteen of the 14 scheduled *Alvin* dives were conducted before the vessel and sub arrived at Acapulco, Mexico. April 27.

The ship and sub then passed through the Panama Canal and headed for Woods Hole, arriving home May 12. After several weeks at the dock they will return to service June 5

with a two-week biological cruise to Deep Water Dumpsite 106 off the New York/New Jersey coast.

### KNORR

R/V *Knorr* departed Durban, South Africa, February 10 to conduct high-resolution bathymetric studies using the Sea Beam mapping system in the high latitudes of the southwest Indian Ocean.

*Knorr* arrived in Capetown, South Africa, March 28 and departed April 3 to begin the first of a series of cruises in the South Atlantic. A port call was scheduled at Montevideo, Uruguay, May 10-16. Scientists on Leg XVIII of Voyage #145 will study concentrations and distributions of trace metals and synthetic organic compounds in the major surface, intermediate and deep water levels of the South and North Atlantic Oceans as part of the International Oceanographic Commission's

In addition to making the dive, both the Congressman and NSF Director had an opportunity to learn about *Alvin* operations in general and those of its support vessel, the 210-foot Research Vessel (R/V) *Atlantis II*. Research and operating costs of both the ship and sub are principally supported by the National Science Foundation with additional support provided by the U.S. Navy's Office of Naval Research (ONR) and the National Oceanic and Atmospheric Administration (NOAA).

As mementos of their dive, *Atlantis II* Master Gary Chiljean decorated styrofoam cups with details of the dive and a shamrock in honor of St. Patrick's Day. The standard-size coffee cups, taken to the ocean bottom in a mesh bag attached to *Alvin*, shrink from pressure to the size of a shot glass and are highly coveted souvenirs.

R/V *Atlantis II* and DSV *Alvin* departed Woods Hole in January 1995 and spent most of the past year working in the Pacific Ocean off the western coast of the United States from the Canadian border south to Central America. They returned to Woods Hole May 12 and are scheduled to make several cruises in the North Atlantic this summer before *Atlantis II* is retired from the WHOI fleet after a 33-year career (see article page 3).

After these summer cruises, *Alvin* will be offloaded for a scheduled overhaul in the Iselin High bay through the winter. *Atlantis II*, which is up for sale, will depart Woods Hole for the last time later this summer for a Gulf of Mexico shipyard where the stern launch/recovery A-frame will be taken off for transfer to *Atlantis*.

Contaminant Baseline Survey. *Knorr* is due at Bridgetown, Barbados, June 20.

### OCEANUS

R/V *Oceanus* departed Woods Hole March 11 to continue biological and other studies of the Georges Bank ecosystem as part of the Global Ocean Ecosystems Dynamics Experiment (GLOBEC). The ship returned to Woods Hole March 22 and departed again for Georges Bank March 30 for two weeks of mooring work related to the GLOBEC program.

*Oceanus* remained in port April 13 through May 6, when it departed for a week-long cruise off the coast. The ship returned to Woods Hole May 17 and is scheduled to depart May 23 on a week-long chemistry cruise to study naturally occurring radionuclides in seawater and their distribution in relation to hydrography in the western North Atlantic.