



AT SEA

The University of Delaware
Graduate College of Marine Studies
Newsletter

Volume 21, Number 1

Summer 2001

Charting New Courses

by Kari Gulbrandsen

Editor's Note: Over the past several months, the College of Marine Studies (CMS) has hired five new assistant professors. Adam Marsh, a marine biochemist, was first on board in March 2000. The following article highlights his research in Antarctica, one of the most extreme environments on Earth. Katharina Billups, Christopher Sommerfeld, James Corbett, Jr., and Andreas Münchow joined CMS less than a year ago and are busy developing their programs, which are summarized on page 3.

Adam Marsh, assistant professor in the Marine Biology-Biochemistry Program, is interested in determining how marine organisms develop in "extreme," or harsh, environments. His research has taken him to the freezing cold waters of the Antarctic oceans, crushing pressures of deep-sea basins, and even estuaries such as the Delaware Bay. Although estuaries do not seem to be in the same category as Antarctic oceans and deep-sea basins, wide variations in temperature and salinity occur and marine animals must have the ability to adapt to these changing conditions in order to survive.

Proteins are important molecules in understanding how marine organisms grow and develop in these environments. In fact, because of their importance in the growth, maintenance, and repair of a living organism, proteins are often called the "building blocks" of living matter. It takes a huge amount of energy for an organism to synthesize proteins. This energy is stored in the chemical bonds of molecules within the cells. As the cells obtain raw materials, such as food, from their environment, chemical reactions convert the food into energy.

In a project funded by the National Science Foundation's (NSF) Office of Polar Programs, Marsh and colleagues Rob Maxson and Donal Manahan from the University of Southern California traveled to Ross Island, Antarctica, over the past eight years, to study the growth and development of the Antarctic sea urchin, *Sterechinus neumayeri*. They dis-

covered that the sea urchin is able to synthesize proteins more efficiently than any other known organism to date. Because of this ability, the Antarctic sea urchin needs very little food to grow and develop.

"The purpose of this project was to try and understand how an organism can live at the limits of our biosphere, in the freezing cold waters of the Antarctic seas," says Marsh. "This, in turn, helps us understand how organisms can develop in areas such as the Delaware Bay, where there are rapid variations in temperature and salinity."

Conducting Research in Antarctica

Getting to Antarctica is a tremendous undertaking in and of itself. Marsh flies from the United States to Christchurch, New Zealand, where NSF's Antarctic Center is located. A hurry-up-and-wait attitude prevails because flights to Antarctica are based upon weather conditions and may be made on very short notice or delayed several hours.

The center of U.S. research activities in the Antarctic is McMurdo Station, located on the southern part of Ross Island. McMurdo has grown from just a few buildings in 1956 to Antarctica's



Adam Marsh at the South Pole, Antarctica. Marsh is wearing approximately 30 pounds of extreme cold-weather gear. Provided by the U.S. Antarctic Program, it includes several layers of polar fleece, wind pants and jacket, a parka, three pairs of gloves, and a neck gaiter and knit hat. Large, insulated boots (bunny boots) keep his feet warm. Marsh is also wearing sunglasses and sunscreen to protect himself from the intense sunlight that reflects off the snow and ice.

largest research community with over 100 structures. Surprisingly enough, McMurdo can boast of many of the conveniences of home, including a gym, barber shop, two bars (smoking and non-smoking) and a coffeehouse.

"Research in Antarctica is conducted from October to February — the Antarctic summer. The temperature is usually in the 20s and 30s, so I can wear jeans and a jacket, just like what I wear during the winter months in Lewes," remarks Marsh.

Hours of daylight during the summer vary from 18 to 24 hours. "The increased hours of daylight wreak havoc on the body," says Marsh. "Even with only five

(Continued on page 3)



At the Helm

The Graduate College of Marine Studies (CMS) is now experiencing a period of almost unprecedented renewal and growth in virtually all facets of our operation. In this *At Sea*, you will read about new faculty and their research programs, the honors and tributes our current faculty have received, and the international collaborations that strengthen our programs.

Nowhere is our growth more evident than in the five new faculty members we recently welcomed aboard. Drs. Adam Marsh, Katharina Billups, Christopher Sommerfield, James Corbett, Jr., and Andreas Münchow are a diverse group of scientists with established reputations and significant accomplishments already under their belts. They bring expertise in new areas that will enhance our educational mission.

The ability to attract such a talented group of scientists to CMS is due, in large part, to exceptional faculty and staff. Recently, two of our faculty received special honors from the University of Delaware. President Roselle and Provost Schiavelli appointed Dr. A. D. Kirwan, Jr., director of the Physical Ocean Science and Engineering Program, to the Mary A. S. Lighthipe Chair in Marine Studies. They also named Dr. George Luther III as the Maxwell P. and Mildred H. Harrington Professor of Marine Studies. These endowed positions, awarded for distinguished teaching and scholarship, were made possible through the generosity of benefactors who had a special love for the sea and a keen interest in marine research and education.



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Within the past few months, our faculty have earned additional honors. Associate Dean Nancy Targett has been appointed to the Ocean Studies Board of the National Research Council. The board's role is to advise the federal government on issues of ocean science, engineering, and policy. Its membership includes 22 of the nation's top marine scientists and engineers.

In January, our state's Coastal Management Program named Delaware's National Estuarine Research Reserve on the St. Jones River for a long-standing coastal hero who touched the lives of so many of our students, faculty, and staff — Professor Robert W. Knecht.

Writing about this is bittersweet, for Bob lost a battle with cancer on June 3. A pioneer in coastal management, he was the first director of the U.S. Coastal Zone Management Program and played a key role in establishing the National Estuarine Research Reserve System. As co-director of our Center for the Study of Marine Policy for the past 10 years, he collaborated with state, national, and international partners and helped build an exemplary program that attracts students from around the world.



Bob Bowden

Among his many accolades, in 1999, Bob received the Julius A. Stratton Leadership Award, a national award that earned him the title "Champion of the Coast." While we will miss Bob terribly, we celebrate the legacy he left us. His grace and savoir faire, his ability to bring people together to work toward a common good, and his unwavering commitment to the ocean and coast enriched all who knew him.

Carolyn A. Thoroughgood

Dr. Carolyn A. Thoroughgood
Dean, Graduate College of Marine Studies



I N M E M O R I A M

It is with much sadness that the University of Delaware and CMS mourn the loss of a true champion of Delaware, Professor Robert W. Knecht, 73, who lost an extended battle with cancer on June 3.

Knecht began his career in 1949 as an upper atmosphere physicist, working in U.S. government labs across the nation. In 1967, he received a Department of Commerce Gold Medal for his landmark contributions to science in the prediction of solar flares and the effect of asteroids on radio propagation.

He also was active in civic affairs and served as mayor of Boulder, Colorado, and chairman of both the Denver Regional Council of Governments and the Committee on Environmental Quality of the National League of Cities.

In 1972, he became the first Assistant Administrator for Coastal Zone Management at the National Oceanic and Atmospheric Administration in Washington, DC. He was responsible for implementing the Coastal Zone Management Act of 1972 and helped to establish the National Estuarine Research Reserve System. He received his second Depart-

ment of Commerce Gold Medal for his efforts.

In 1981, Knecht turned his attention to academia and began a career as a marine policy researcher and professor, serving at several institutions. He joined CMS in 1989 as professor of marine policy and co-director of the Center for the Study of Marine Policy. While at CMS, he encouraged the practice of coastal management on a global level through international negotiations and conferences. A prolific author, he also wrote extensively about coastal issues. In 1999, in recognition of his efforts to protect the ocean and coast, he was awarded the Julius A. Stratton Leadership Award.

In January 2001, Delaware recognized Knecht's tireless devotion in protecting the state's coastal resources by dedicating the research and education programs at the Delaware National Estuarine Research Reserve in his honor. They will serve as a living testament to Professor Robert Knecht, a coastal champion.

Contributions are now being accepted for the Robert W. Knecht Marine Policy Fellowship Fund. For information, please contact Catherine Johnston, Center for the Study of Marine Policy, at (302) 831-8086 or johnston@udel.edu.

Charting New Courses

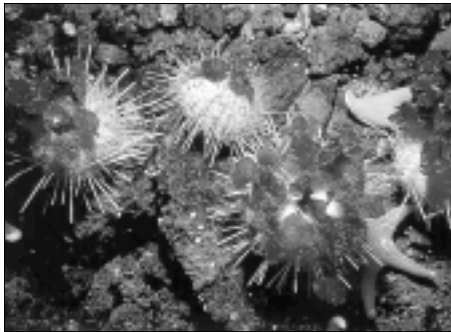
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to six hours of sleep a night, I wake up each morning raring to go.

"In addition, my caloric intake is very high — approximately 4,000 to 6,000 calories per day versus the 2,000 I normally consume at home. Despite eating lots of chocolate and nuts, I still lose an average of 5 pounds a month," he notes.

To collect the sea urchins for their study, Marsh and his colleagues dived into the icy waters of the Antarctic sea. They entered the water through an 8-foot hole that was drilled through the sea ice and used a tow rope to inch down this tube. The scientists wore insulated diving suits that covered all but their faces. After 60 seconds, their lips and cheeks would go numb.

Rob Robbins



Marsh and his colleagues found that the pincushion-like Antarctic sea urchin is able to synthesize proteins more efficiently than any other known organism.

"Going down the ice hole is a bit disorienting," says Marsh. "The 'tube' through the ice is 8 feet long, the sides are smooth and featureless, and the bubbles from the air regulator completely obscure your vision. So you slowly descend, until, all of a sudden, you pass through the bottom into the water column and you can see for more than 800 feet in any direction."

Although very little life can survive on top of the frozen continent, the waters are teeming with life that ranges from seals to whales to beautiful sponges that glow in the light. Marsh notes that seals would sometimes cause problems by blocking the dive holes to use for breathing. As a result, additional holes need to be drilled so that a diver always has a way out.

"Most of the habitable space on this planet is cold, so polar research is important even though it is demanding," says Marsh. "The coast of Antarctica provides a model system for looking at how organisms can survive at low temperatures."

Adam Marsh's and his colleagues' research on the Antarctic sea urchin is published in the March 9 edition of Science.

Stay Tuned for More Research

Although they have been here for less than a year, Drs. Katharina Billups, Christopher Sommerfield, James Corbett, Jr., and Andreas Münchow have hit the ground running — developing new courses and establishing research programs.

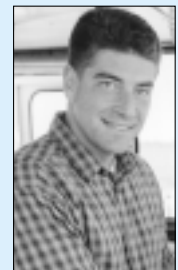
Katharina Billups joined CMS as an assistant professor in the Oceanography Program after completing a postdoctoral fellowship at Harvard University. Her research focuses on relating changes in the Earth's climate and oceans through time to changes in the Earth's orbit, polar ice caps, and oceanic currents. A knowledge of past climate conditions is a way to distinguish between natural variations and those that have been caused by society. Past climate conditions can be determined by conducting chemical analyses on the skeletal remains of microscopic organisms that have accumulated at the bottom of the ocean. These organisms lived thousands of years ago and preserve information about their environment.



Bob Bowden

Katharina Billups

Christopher Sommerfield is also in the Oceanography Program, but in contrast to Billups, his focus is on coastal-marine geology. His work seeks to understand the oceanographic processes that have shaped the shoreline and seafloor on time scales that range from hours to thousands of years. Prior to his arrival at CMS, he was a postdoctoral scholar with the U.S. Geological Survey at the Woods Hole Oceanographic Institution in Massachusetts. He has applied his interest in marine sedimentation to the study of pollution transport in estuarine and continental shelf environments that have been impacted by increasing urbanization.



Bob Bowden

Christopher Sommerfield

With the hiring of James Corbett, Jr., as an assistant professor, the Marine Policy Program will expand its focus to address current policy issues in marine transportation such as air pollution control, ballast water management, and fleet modernization and expansion. A licensed professional engineer in California, Corbett holds a doctoral degree in engineering and public policy from Carnegie Mellon University in Pittsburgh. He looks forward to encouraging scientists such as marine biologists and oceanographers, and technology and policy experts to work together to insure that sound policy decisions are made by businesses, government, and the general public.

Kathy Flickinger



James Corbett, Jr.

Andreas Münchow, associate professor in the Physical Ocean Science and Engineering Program, is an internationally recognized oceanographer with an expertise in collecting and analyzing coastal oceanographic data. His research focuses on the discharge of fresh water onto the coastal shelf, which can impact pollutant transport on a local scale to more far-reaching global climate changes. Before arriving at CMS, Münchow was an assistant professor at Rutgers University in New Brunswick, New Jersey, for six years.



Jack Buxbaum

Andreas Münchow

For more information about each of our new scientists, please see their faculty pages under "Academics & Research" on the CMS Web site at www.ocean.udel.edu. In addition, they may be reached at:

Katharina Billups: kbillups@udel.edu

Christopher Sommerfield: cs@udel.edu

James Corbett, Jr.: jcorbett@udel.edu

Andreas Münchow: muenchow@udel.edu

Billups and Sommerfield have offices in Cannon Lab on the Lewes campus, and Corbett and Münchow are based in Robinson Hall, Newark. We look forward to hearing more about their research programs in future issues of *At Sea*.

A. D. Kirwan, Jr., Honored with Mary A. S. Lighthipe Chair

University President David P. Roselle and Provost Melvyn Schiavelli recently appointed Professor A. D. Kirwan, Jr., director of the Physical Ocean Science and Engineering Program, to the Mary A. S. Lighthipe Chair in Marine Studies. Named after the Delaware native whose charitable gift made the appointment possible, this honor is bestowed on the basis of distinguished teaching and scholarship.



Kathy Flickinger

A. D. Kirwan, Jr.

Kirwan received the honor in recognition of his international reputation, which stems from his extensive record of scholarship, his well-supported research program, and his active role in graduate research and teaching.

“I was surprised and quite honored to receive the Mary A. S. Lighthipe Chair,” said Kirwan. “The faculty and staff at CMS is outstanding in nurturing graduate education and research.”

As national attention has shifted from the deep sea to the near-shore marine environment, Kirwan has been instrumental in developing and expanding partnerships with universities such as Brown University in Rhode Island, the California Institute of Technology, and Old Dominion University in Virginia; government research laboratories such as the Naval Research Laboratory and the North American Treaty Organization’s Supreme Allied Commander Atlantic Undersea Research Centre in Italy; and Ocean Physics Research & Development in Hawaii in the private sector.

These partnerships have been crucial in advancing research in the coastal zone. For example, in a recent research project, Kirwan collected radar data with scientists

at the Naval Postgraduate School in Monterey Bay, California. Kirwan then collaborated with scientists at Old Dominion University to improve an ocean circulation model designed by scientists at Ocean Physics Research & Development.

Chemist George Luther Becomes Named Professor

George W. Luther III, a marine chemist in the Oceanography Program, has recently been appointed as the Maxwell P. and Mildred H. Harrington Professor of Marine Studies.



Bob Bowden

George Luther

University President David Roselle and Provost Melvyn Schiavelli selected Luther for his distinguished and scholarly contributions to teaching and research and his service to the University and his profession.

Luther conducts a variety of marine chemistry research — from analyzing seawater for minute quantities of metals essential to life called trace elements, to exploring the relationship between electrical current and chemical reactions.

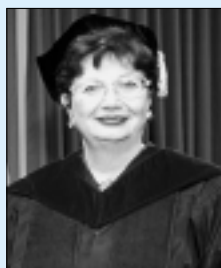
In the past few years, he and his colleagues have built needle-like microelectrodes that can be inserted into ocean waters and sediments to simultaneously measure a host of different chemicals that serve as environmental health indicators. The specialized sensors have been used in habitats ranging from salt marshes to deep-sea hydrothermal vents.

Since arriving at CMS in 1986, Luther has served as associate dean, advised 25 graduate students and postdoctoral fellows, and published more than 150 journal articles, reports, and book chapters. He is frequently invited to speak at universities in the United States and abroad. In 1996, the University of Cardiff in Wales awarded Luther its highest honorary title of Distinguished Visiting Fellow.

Luther is the associate editor of *Marine Chemistry*, *Aquatic Geochemistry*, and *Geochemical Transactions* and serves on several national scientific committees. In 1997, he chaired the Division of Geochemistry of the American Chemical Society. For the past three years, he was a member of the National Science Foundation’s Steering Committee for the Future of Chemical Oceanography in the United States. Last summer, he was appointed to the U.S. National Committee for the International Union of Geodesy and Geophysics by the National Academy of Sciences.

Dean Thoroughgood Elected Chair of CORE Board

Dr. Carolyn A. Thoroughgood, dean of the University of Delaware Graduate College of Marine Studies and director of the Sea Grant College Program, has been elected Chair of the Board of Governors of the Consortium for Oceanographic Research and Education (CORE). The Washington, DC-based association comprises 63 U.S. marine research institutions, universities, labs, and aquaria.



Bob Bowden

Dean Thoroughgood in academic regalia at UD Honors Day.

CORE was formed in 1994 to provide a collective voice in presenting the capabilities and needs of the U.S. marine science community to the federal government, ocean science industry, and the public. The association’s mission is to advance knowledge and learning in the science of oceanography.

As Chair of the CORE Board, Dean Thoroughgood will help foster greater interaction between the ocean science community, federal policy makers, and industries so that marine research is adequately supported.

“Academic research provides the essential foundation for addressing the major ocean challenges facing us, from fisheries decline to global climate change and weather forecasting,” she

says. “Ocean science yields the objective information needed to address these issues for the public’s benefit and the environment’s.”

Thoroughgood will work closely with CORE’s new president, Vice Admiral Conrad Lautenbacher, Ret. Previously, from 1994 to 1996, as the first Chair of the Core Board, she assisted Admiral James Watkins with the association’s formation. He recently retired as CORE president.

A native of Easton, Maryland, she earned her master’s and doctoral degrees in nutritional biochemistry from the University of Maryland and her bachelor’s degree from the University of Delaware. She joined the UD faculty in 1968 and was appointed dean of the College of Marine Studies in 1985.

Earlier this year, Dean Thoroughgood was asked to serve on President Bush’s transition advisory committee for the U.S. Department of Commerce. Currently, among her activities, she is on the board of trustees of the Southeastern Universities Research Association, on the board of directors of the Delaware Innovation Fund, and president of the Delaware Chapter of the International Women’s Forum.

Luther joins two other Harrington professors at CMS: Richard Garvine, a physical oceanographer who discovered the Delaware Coastal Current, and David Kirchman, a microbiologist who has made significant revelations about the critical functions performed by marine bacteria in plant nutrient and carbon cycles.

The Harrington professorship was created at the bequest of the late Maxwell P. and Mildred H. Harrington. Both Delaware natives, the Harringtons were fascinated by the ocean and had a special interest in CMS. Mr. Harrington, a UD alumnus, graduated in 1950 with a bachelor's degree in civil engineering. For several years, he worked for the federal government in marine sciences and served as an engineer at Camp Lejeune, the U.S. Marine Corps base in Jacksonville, North Carolina. In later years, he retired with his wife, Mildred, to Myrtle Beach, South Carolina.

Nancy Targett Appointed to National Ocean Studies Board

Robert Cohen



Nancy Targett, associate dean of CMS, has been appointed to the Ocean Studies Board of the National Research Council. Its membership includes 22 of the nation's top marine scientists and engineers.

The board is responsible for conducting ocean studies of critical importance to the United States. The board has investigated such topics as the status of marine and coastal environments, the ocean's role in global climate, ocean-related aspects of national security, marine technology and infrastructure needs, fisheries science, and marine education.

"I was very honored to receive the appointment," said Targett. "It's a unique opportunity to work with a diverse group of experts to determine the science, policies, and infrastructure needed to understand and protect our marine environments and resources. We will be looking for solutions to ocean issues that are important to our national interests," she noted.

Targett, who is a marine biochemist, joined CMS in 1984 and is based at the Hugh R. Sharp Campus in Lewes. She conducts research on how chemistry mediates interactions between marine organisms in habitats ranging from coral reefs to the Delaware Bay.

At coral reefs in the Bahamas, she and her students discovered that certain tropical brown algae contain chemicals called phlorotannins, which help protect the algae from plant-eating fish. In further research, they showed that high nutrient levels in the water will trigger the algae into growing versus generating chemicals to defend themselves. While this can provide additional food for fish, the corals can be choked out by the algae.

In the Delaware Bay, Targett has been working to develop an artificial bait to relieve fishing pressure on the female horseshoe crab, which is used as bait in the eel and conch fisheries. Targett and her students have isolated the compound in the female crab that attracts eels and conch and are now working to incorporate the attractant into an inexpensive bait.

Targett is strongly committed to public service. In 1999, she was selected for

the Aldo Leopold Leadership Program, sponsored by the Ecological Society of America, which seeks to bridge the gap between public perception of environmental issues and scientific fact by training scientists to communicate with the public. Last year, she completed six years of service as a federal appointee to the Mid-Atlantic Fisheries Management Council, which oversees fisheries from New York to Virginia.

She is a lifetime member of the International Society of Chemical Ecology, the associate editor of the *Journal of Chemical Ecology*, and on the editorial board of the journal *Biofouling*.

She received her bachelor's degree in chemistry and biology from the University of Pittsburgh, her master's degree in marine science from the University of Miami, and her doctorate in oceanography from the University of Maine.

Marine Associates' Corner



FROM THE CHAIRMAN

Robert Cohen



As a Marine Associate, you have a terrific opportunity to share in the future of marine research and education by participating in the activities of the College of Marine Studies.

This past winter and spring, the noon-time lecture series at the Hotel du Pont in Wilmington was a rewarding and enjoyable way to spend the lunch hour. From captivating speakers, we learned about ocean research in Antarctica, how to prepare for coastal storms in Delaware, and the importance of aquaculture.

This summer, you can continue to be involved in the college's activities. Free tours of the research facilities in Lewes are offered every Friday, starting at 10:30 a.m., during June, July, and August.

The Ocean Currents Lecture Series, highlighting the latest marine research, also is under way at the Lewes campus. It is presented once a month, from April through September, at 7:00 p.m. in Cannon Lab. While the lectures are free, reservations are required. For more information, please call (302) 645-4279.

There's a whole ocean around us, and it's just waiting to be explored. Let's support the scientists, staff, and students who can lead us on the path to discovery!

William M. W. Sharp
William M. W. Sharp

2001 University of Delaware Marine Associates

I/My family would like to become a member(s) of the Marine Associates. Enclosed are my/our annual dues of \$50.

Name: _____

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Please return to: Ms. Sandy Magers, The Graduate College of Marine Studies, University of Delaware, Newark, Delaware 19716. (Checks should be made payable to the University of Delaware.)

Expanding Horizons at Home and Abroad

Typhoons, Language, and Science in Korea

Frequent typhoons (Korea's equivalent of our hurricanes) and a foreign language didn't stop Susan Park, Ph.D. student in oceanography, from collecting samples of the Japanese shore crab, *Hemigrapsus sanguineus*, in Korea last summer. Although this crab is a native of the western North Pacific Ocean, it has recently invaded the United States and has been found from New Hampshire to North Carolina.

Park, under the guidance of her adviser, Dr. Charles Epifanio, is looking at the dispersal of the crab larvae to try and determine how the crab has been able to spread up and down the coast of the United States, even though the adult crab can not swim.

Park was fortunate to collect these crabs in their native habitat after being selected as a participant in the Summer Research Institute, sponsored by the Korea Science and Engineering Foundation and the National Science Foundation. Its primary goal is to initiate relationships between U.S. graduate students and their Korean counterparts that will encourage future collaborations between the two countries.

Six students, including Park, were sponsored last summer. After a two-week orientation, they were placed in various institutions. Park was hosted by Dr. Sung Yun Hong at Pukyong National University in Pusan, Korea. Hong studies the larval development, reproduction, and ecology of crustaceans. This research is similar in scope to the research Park is currently conducting at CMS.

"I found that the biggest difference between our two cultures was the formality of the Koreans," said Park. When Dr. Hong arrived at the lab, it was customary for students and faculty to greet him with a bow. Students were also more than happy to run errands for him whenever they were asked," she continued.

However, Park found that Korean students are essentially the same as American students — they work long, hard days that often include weekends. But, like Americans, they know how to relax when they have the opportunity to take time off.

"I felt the program was a true success," concluded Park. "I improved my Korean, made good friends, and learned about science and life in Korea. I was impressed by the generosity, helpfulness, and kindness of nearly everyone I met."

Park is looking forward to a return trip, possibly even for a post-doc, thus increasing her chances of collaborating with scientists in Korea in the future.

Science and Outdoor Adventures in New Zealand

How does the practice of science in New Zealand compare to the practice of science in the United States? After returning from a year-long sabbatical in Aotearoa, "Land of the Long White Cloud," Doug Miller, associate professor of oceanography, found that their culture and a gung-ho, get-it-done attitude, shapes the way New Zealanders conduct research.



AF Norrko, NIWA

Doug Miller looks for burrowing mud crabs in the mud flats of New Zealand. Note the mangroves in the background.

Research in New Zealand is typically more applied than theoretical, addressing real-world issues, such as the effects of big events such as storms and harbor sedimentation on marine resources. These are analogous to regional issues in Delaware and the Mid-Atlantic such as dredge spoil disposal, beach nourishment, and benthic habitat assessment.

Large-scale, manipulative experiments are designed and carried out in large multidisciplinary teams. This type of research attracted Miller to New Zealand. His primary goal was to gain hands-on experience in field experiments that could be applied to his research in Delaware.

Miller worked with Dr. Simon Thrush of the National Institute of Water and Atmospheric Research Ltd. Miller assisted with routine sampling, planning sessions for experimental design, preliminary sampling, and execution of large-scale sedimentation experiments. Miller also participated in experiments at the University of Waikato under the guidance of Dr. Conrad Pilditch, a biological oceanographer.

Miller found that the people of New Zealand, who affectionately refer to themselves

Bob Bowden



Sergey K. Konovalov

Visiting Professor from the Ukraine Studies at CMS

In the past few months, students and faculty at the Lewes campus may have come across a stranger who has taken up residence in the library. Dr. Sergey K. Konovalov from the Marine Hydrophysical Institute in Sevastopol, Ukraine, is working with George W. Luther III, Maxwell P. and Mildred H. Harrington Professor of Marine Studies, to develop an in-place sampling technique that can determine the chemical make-up of the Black Sea.

The Black Sea is a natural oxic/anoxic marine ecosystem. These ecosystems are characterized by low levels of oxygen and the presence of sulfide. The Black Sea has existed for over seven millennia and is considered to be a laboratory basin for oceanographers from around the world. It is used to

investigate the interaction of oxic and anoxic layers and conditions that do not change over time. Extensive data have been collected since its chemistry was discovered about 100 years ago.

Konovalov is also comparing different methods of sulfide determination by analyzing both recent and previously collected data. This process has already helped to identify future sampling locations.

"In addition to providing important scientific information, these projects may provide something that is even more important," says Konovalov. "Simply stated, oceanography could not survive in the Ukraine without international help. And there is no doubt that the United States is number one in the sciences. Anything a scientist needs for research is available. This is the 'magic' that has built the United States and makes it an excellent example of what can be accomplished."

as “Kiwis,” are raised with one foot in the outdoors. “Chaperoning field trips was very different in New Zealand,” commented Miller. “One field trip involved a full-day’s hike up a river gorge — at times I found myself wading in cold river water that was chest high. These type of field trips are how the Kiwis develop self-reliance and confidence in their youth.

“Working overseas provided two perspectives: one on a far-away place, new people, and different ways of doing science. The other is a fresh view of my own institution and lab, and in some ways that’s almost as valuable,” says Miller. “And it was a terrific bonus to live in a beautiful and welcoming country like New Zealand. Without exception, my colleagues were hospitable and accommodating, and I look forward to repaying their kindness as they visit the States in the coming months.”

Researching “Brain Food” in Japan

It may be an old wives’ tale that fish is brain food. However, it is a known fact that fish is an important part of a healthy diet. And this is especially true in Japan, where fish — in particular, the Japanese flounder — is an important food staple.



Tim Targett sits on a tatami mat in Japan, instead of a chair, to enter research data on the Japanese flounder.

Over the past several years, Timothy Targett, professor of marine biology-biochemistry, has been acquiring an international reputation for his research on the optimum growth conditions of fish such as the flounder, in general, and, more specifically, on the summer flounder.

Targett’s research on the summer flounder, which is a species similar to the Japanese flounder, caught the attention of Professor Masaru Tanaka of Kyoto University in Japan. Tanaka invited Targett to apply

Alumni Update



Editor’s Note: Alumni Update, a periodic feature of *At Sea*, helps our graduates stay in touch and illustrates the exciting careers built on a CMS education.

Scott Truver
Ph.D., Marine Policy, 1978

Scott C. Truver recently was promoted to Vice President, National Security Studies, of Anteon Corporation, an information technology and engineering services company. Truver’s career with Anteon began in 1991 as the Director for Studies and Analysis; in 1994, he became responsible for the Center for Security Strategies and Operations (CSSO). The CSSO provides services to help its customers develop concepts, articulate policies and programs, and communicate vital ideas.

Since 1977, Truver has been involved with projects for the Office of the Secretary of Defense, the Defense Advanced Research Projects Agency, the Defense Nuclear Agency, the Department of the Navy and U.S. Navy and Marine Corps, the U.S. Coast Guard, the Maritime Administration, the National Science Foundation, the Naval Studies Board of the National Academy of Sciences, and U.S. and foreign industry. He worked closely with Dr. Lee Anderson, director of the Marine Policy Program at CMS, to update and revise the U.S. Coast Guard’s Fishery Law Enforcement Planning Model. Truver has also worked with the Center for the Study of Marine Policy and the U.S. Naval Institute to plan a major conference on naval requirements and programs. Currently, he is working with Dr. Gerard Mangone to plan an international conference on maritime security to be co-hosted by the Naval Institute and the government of Singapore.

He is the author or co-author of four books and several hundred articles and reports in the areas of national security strategy and policy, defense and naval programs and operations, the law of the sea, and maritime affairs. His first book, *The Strait of Gibraltar and the Mediterranean Sea*, was based on his dissertation, which was one element of the International Straits of the World series directed by Dr. Mangone. Truver has also written *Weapons That Wait: Mine Warfare in the U.S. Navy*, *America’s Coast Guard: Safeguarding U.S. Maritime Safety and Security in the 21st Century*, and *Riders of the Storm*.

Truver received the E. Sam Fitz Award from CMS in 1980.

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his expertise to the Japanese flounder. Targett accepted the offer and, for the past two years, has spent one to two months of each summer conducting research at Kyoto University’s Fisheries Research Station in Maizuru, Japan.

“This was a cooperative effort — a give-and-take between the scientists of our countries,” commented Targett. “There are many factors, such as temperature and salinity, that affect the growth and production of fish. The Japanese have an elaborate system of fish hatcheries for stock enhancement, which gave us a unique opportunity to research young Japanese flounder under controlled conditions.”

Over the past two summers, with the support of the University of Delaware’s International Programs and Special Sessions, the National Sea Grant Office, and the Japanese government, Targett and two of his graduate students — Richard Wong and Kevin Stierhoff — were able to conduct research in Japan.

In addition to acquiring valuable research experience, Wong and Stierhoff had the opportunity of a lifetime to learn about life in a country they may not have been able to visit otherwise. Both commented on how safe they felt when walking around in Japan — even at all hours of the night, a sentiment echoed by Targett.

Faculty Tidings

David Chapman, a professional engineer with a background in naval architecture, marine engineering, and vessel operations, has joined the faculty of the Marine Policy Program as an associate research scientist for marine transportation issues. He also holds a part-time appointment as a port and marine transportation specialist for the Sea Grant Marine Advisory Service, and in that role, will transfer research relating to fuel efficiency and other issues to the maritime industry. He earned his bachelor's degree in naval architecture and marine engineering from the Webb Institute of Naval Architecture in Glen Cove, New York, and a master's degree in business administration from Drexel University in Philadelphia.

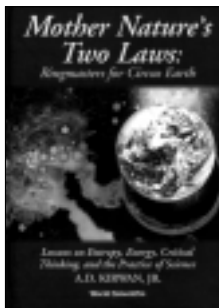


David Chapman

Bob Bowden

A. D. Kirwan, Jr., director of the Physical Ocean Science and Engineering Program and newly appointed Mary A. S. Lighthipe Chair in Marine Studies (see article on page 4), is the author of *Mother Nature's Two Laws: Ringmasters for Circus Earth, Lessons on Entropy, Energy, Critical Thinking, and the Practice of Science*. Published by World Scientific, the 173-page book is available from their Web site at www.worldscientific.com and at bookstores.

"This book is the result of years of frustration over seeing how science is presented in the media and by government agencies," says Kirwan. "Because these sources are not always reliable, our tax dollars



are often wasted on curious legislation and faulty policies."

In his book, Kirwan concludes that anyone can tell the difference between fact and fiction in science and technology news with a modest amount of critical thinking, a little insight into the practice of science, and a basic understanding of the first two laws of thermodynamics.

Craig Cary, marine biologist, and **George Luther III**, marine chemist, were recent guests on National Public Radio's "Science Friday." The show was broadcast live from the annual meeting of the American Association for the Advancement of Science, where the latest research on deep-sea hydrothermal vents was being discussed.



Craig Cary


Bob Bowden

Cary described the various organisms that live at the vent sites such as the giant tubeworms, which are "packed full of bacteria." These bacteria essentially feed the worm from the inside. Luther went on to explain how the organisms use the chemicals at the vent site, instead of food, as energy. Both Cary and Luther were given the opportunity to answer questions about their work.



George Luther

Bob Bowden



Updated CMS Web Site Offers Ocean of Information

CMS is pleased to announce that its updated Web site at www.ocean.udel.edu is now on-line. The CMS site is not just for students and faculty; it also offers an ocean of information to the public. Visitors to the site can watch video clips on topics such as blue crabs and El Niño, take a virtual deep-sea adventure to see how our scientists conduct research at the bottom of the ocean, and even find out how to cook up a tasty meal of seafood. So, be sure and "Visit Our World!" the next time you are surfing the Web.



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