Making Waves

At the Darling Marine Center


Dr. Robert Steneck

Global Marine Awards


Dr. Les Watling

The Pew Fellows Program in Marine Conservation has named Professors Les Watling and Bob Steneck as 1998 recipients of its annual fellowships in marine conservation. These international honors, regarded as the world's preeminent awards for ocean preservation, recognize the outstanding work of Watling and Steneck, along with eight other individuals from diverse marine-related disciplines.

Since their inception in 1990, the Pew awards have become recognized as one of th highest honors for marine research scientists. Though other institutions have been recognized twice, the School of marine Sciences faculty are distinguished by being the first to receive two awards in one year.

Dr. Watling's research focuses on the ecology and the effects of habitat destruction of benthic (muddy sediment) ecosystems. His Pew award will be used to assess and compare the impact of mobile fishing gear, specifically bottom-trawling gear, on benthic habitats in three diverse regions of the US. Using video footage of ocean floor destruction, he will conduct outreach activities to improve policies and enhance conservation for marine habitats and sustainable fisheries.

Dr. Steneck will bring science, industry and fisheries stakeholders together to promote collaboration and infuse solid science into management of the lobster and urchin fisheries in Maine. Planned activities include sea sampling pilot projects, broad dissemination of data through science and trade journals, stakeholder workshops on fisheries science and management, and participation in fisheries management meetings.

n This Issue


Left to right: Dr. Kevin Eckelbarger and Tim Miller of the Darling Marine Center, Lori Williams and John Weinrich of Weinrich and Burt Associates, and Stacy Gammon of Arthur Dudley Construction.

Ground Breaking

Ground was broken in early November to make way for a new residence hall and dining facility.

From the original idea to the finished building, the project has taken almost seven years. To make it all happen, Center Director Kevin Eckelbarger acquired $1.6 million in funding. Most of the support came from the National Science Foundation and the University of Maine Foundation.

Continued on page 3.

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Darling Marine Center News

Clockwise from upper left: John Higgins, Linda Healy, Eric Annis and Peter Milligan.

New Faces

John Higgins, Linda Healy and Dr. Peter Milligan have joined the staff of the Darling Marine Center, Eric Annis began work on his PhD in September.

John is our Vessel Operations Coordinator/Boat Captain. Hailing from Stonington where he worked as a ferry captain for the Isle le Haut Ferry Service. He has also worked as a commercial fisherman and as a Fisheries Advisor for the State of Maine Department of Resources. He brings to the Darling Center a contagious enthusiasm for boats and the marine environment.

Linda is the new Administrative Assistant. She comes to us from Halcyon Yarn in Bath, ME, where she worked as the Marketing and Advertising Manager. To many of the staff and faculty here at the Center, Linda's face is a familiar one, having completed her Masters degree in Oceanography here in 1991. In her new position she will be the primary contact for interns and visitors, as well as the coordinator of newsletters, web pages and other promotional material.

Dr. Peter Milligan joined Dr. Gary King's microbiology lab as a Post Doc in late July after completing his PhD this spring at Rutgers University. Over the next two years, Peter will be examining carbon monoxide cycling at soil/atmosphere interfaces. Currently, he is investigating the influence nitrogen fixing bacteria may have on ambient CO concentrations.

Having completed his Master's degree from the Florida Institute of Technology in the study of coral physiology, Eric Annis moved to Maine and began work on his PhD this semester. He is currently interested in zooplankton and plans to study the planktonic phase of lobster larvae and settlement.

Welcome aboard everyone!

The Darling Marine Center is the marine laboratory for the University of Maine and is part of the College of Natural Sciences, Forestry and Agriculture. Faculty at the Darling Marine Center are associated with the University's School of Marine Sciences.

Dr. Kevin Eckelbarger, Director
Tim Miller, Laboratory Manager

If you would like more information about the Darling Marine Center or any of its programs, please contact: Linda Healy, Administrative Assistant
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Making Waves is a biannual publication of the Darling Marine Center. Layout and design by Linda Healy. Printed on recycled paper.

DMC's 1999 Web Site

In early 1999 the Center's web site will be revised. The new site will be easy to navigate and include information about the ongoing research and education programs.

Information and applications for prospective students, interns and visiting investigators will also be made available on line. Pictures and descriptions of our laboratory, classroom and housing facilities, as well as our research vessels will be included to facilitate planning.

Also available on line will be a calender of classes, workshops, lectures and other special events. Check it out!

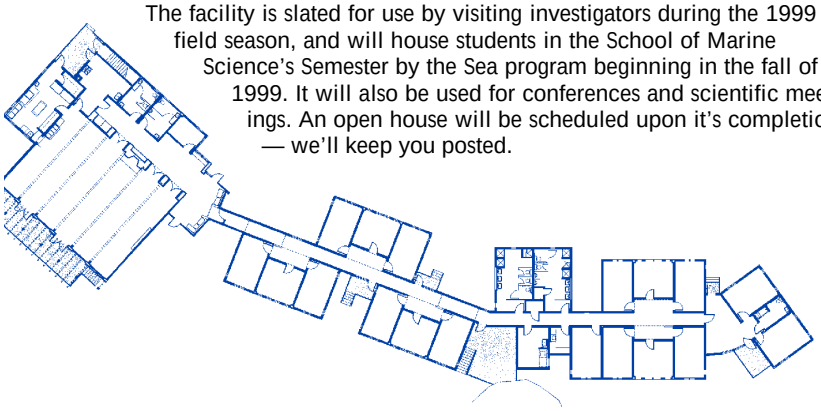
Ground Breaking

ontinued from page 1

he building was designed by Weinrich and Burt Associates in Damariscotta and the rthur Dudley Construction of Standish, Maine, is in charge of the construction.

he facility will include a large dining area with a deck, sixteen student rooms and two iculty suites for a total of 68 beds. The floor plan follows the contour of Wentworth oint and is set back from the water so as not to be obvious from the Damariscotta iver. To maintain the Center's wooded setting, a minimum of trees were removed from ıe site and final landscaping will retain the peaceful atmosphere.

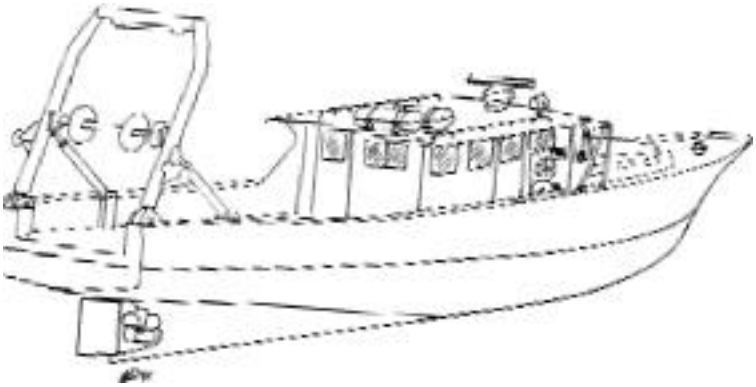
The facility is slated for use by visiting investigators during the 1999 field season, and will house students in the School of Marine Science's Semester by the Sea program beginning in the fall of 1999. It will also be used for conferences and scientific meetings. An open house will be scheduled upon it's completion — we'll keep you posted.



Marine Animal Rescue Center

he Northeast Marine Animal Lifeline (NMAL) established a temporary rehabilitation enter for diseased, abandoned, and injured marine creatures at the Darling Marine enter this summer. According to NMAL president and founder Greg Jakush, the enter's flowing seawater facility and its central location on the Maine coast made it an leal host for the rehabilitation center. The organization is looking for a permanent site ı southern Maine.

larbor seal pups were the targeted residents of the NMAL facility. According to NMAL iologist Peter Merrill, disease, abandonment, and injury imperil about 100 seal pups of ıe almost 1,000 born each year in Maine's waters. This year the NMAL treated several undred animals statewide.



Co-operative Extension at the Darling Marine Center

Dana Morse has plugged in his laptop and set up his office at the Center in his new capacity as Sea Grant's midcoast Extension Associate. In a nutshell, his job is to transfer information; letting the fishing public know about issues, meetings and pertinent research, and relaying information from the fishermen to academia and management. Due to the varied nature of the midcoast's fishing community, Dana will be involved with everything from the lobster, urchin, clam and shrimp industries, to aquaculture concerns and fisheries gear technology.

New R/V

The Darling Marine Center will soon have a new and a larger research vessel that can accommodate more students and a variety of other research and dive operations. Currently in the procurement phase, the Center is looking at vessels in the 42-44' range with a split wheel house and lobster-boat hull design. Lab space will be created by extending the split wheel house cabin 6-7 feet to make the entire cockpit 12-14' long. The drawing (left) is a representative view of such a vessel outfitted with an articulated hydraulic A-frame and removable net reel. Delivery of the new vessel is expected by September 1999.

)r. Warren Riess

Dr. Riess to Serve on Historic Landmark Committee

The Darling Center's maritime historian, Dr. Warren Riess has recently been appointed to the Landmarks Committee of the National Park Service Advisory Board.

The Landmarks Committee meets twice a year to review applications and make selections of sites to be designated as National Historic Landmarks. It recently elected to expand it's size from seven to eight members to include a marine historian because a number of famous maritime sites were being recommended as historic landmarks. Dr. Riess was selected for the post because of his expertise in maritime history and underwater archeology.

)cean Chemistry is Coming into FOCUS

)r the better part of the year, Dr. Larry Mayer has served on the steering committee of national effort to assess the status and future of chemical oceanography in the United :ates. This NSF-initiated effort, known as FOCUS (Future of Ocean Chemistry in the .S.), involves the entire ocean chemistry community, and a report summarizing their ndings, forecasts and recommendations will be completed soon. For more informa-)n, visit their web site at: www.joss.ucar.edu/joss_psg/project/oce_workshop/focus/.

:xamining the Global State of Coral Reefs

1 June 1998, Dr. Bob Steneck played a key organizing role in the Atlantic and Gulf eefs of the Americas — Rapid Assessment Protocol workshop (AGRA-RAP) workshop 1 Miami. Eighty-five participants from 21 countries, representing 16 different reef areas, rrived at a clear and positive consensus in support of the proposed rapid assessment rotocol. This large-scale collaboration comes in the wake of recent reports of coral eef decline and disease throughout the world. AGRA-RAP may contribute to verifying 1e global state of coral reefs, as over 20 scientists plan to use the protocol within the ext six months.

)EUVRE: Developing A Vision for Biological Oceanography

r. Gary King attended the Ocean Ecology: Understanding and Vision for Research)EUVRE) meeting in January. Sponsored by the National Science Foundation, the pur-)se of this workshop was to bring together a variety of marine biologists and biologi-al oceanographers to review to state of the art in biological oceanography and to proj-:t major needs and research opportunities for the future. Participants developed a set f "white papers" on a number of topics and then produced a synthesis document vailable on the web and from NSF.

:xploring the SCOPE of Benthic Biodiversity

r. Gary King traveled to Lunteren, Netherlands, in October to participate in the :ientific Committee on Problems of the Environment (SCOPE) workshop. The purpose f this meeting was to assess the state of knowledge on interactions between above-sur-:e and below-surface biodiversity for soils and freshwater and marine benthic ecosys-ms with special attention paid to: mechanisms for interactions, feedbacks between

UMaine Faculty at the Darling Marine Center

Kevin Eckelbarger (Director)
Reproductive and developmental biology of invertebrates

Gary King
Marine microbial ecology and biogeochemical cycles

Larry Mayer
Marine biogeochemistry

Warren Riess
Maritime history and archeology

Detmar Schnitker
Marine micropaleontology and paleoceanography

Robert Steneck
Benthic marine ecology

Les Watling
Benthic ecology/taxonomy and evolution of crustacea

Phil Yund
Invertebrate reproduction and life histories.

Bruce Barber *seasonal*
Bivalve disease and physiology

Daniel Belknap *seasonal*
Marine geology

Susan Brawley *seasonal*
Developmental biology and reproductive ecology of seaweeds

Ian Davidson *seasonal*
Marine macroalgae

Ione Hunt von Herbing *seasonal*
Finfish physiology & life histories

Cynthia Pilskaln *seasonal*
Biogeochemistry

Robert Vadas *seasonal*
Algal biology and marine ecology

Kenneth Fink *retired*
Coastal processes and near shore morphodynamics

Melvin Fuller *retired*
Marine mycology

Bernard McAlice *retired*
Zooplankton ecology

Dr. Phil Yund

At the Bottom of the Gulf

During the last week of August, Dr. Les Watling, his summer interns and graduate students, along with Dr. Ole Tendal, Copenhagen Museum, Dr. Ellen Lenchington, Canadian Department of Fisheries and Oceans and Dr. Rich Langton, Maine Department of Marine Resources, participated in a cruise in the Gulf of Maine investigating the impacts of fish trawling on cobble and boulder habitats. Video and 35mm photos, and samples of large rocks were obtained using the submersible *Clelia*. For several of the students, it was their first scientific shipboard experience. And, it was enjoyed by all, even when the weather produced some uncomfortable seas.

Sampling in the Swamp

Dr. Gary King led a team of three Japanese scientists on a sampling trip to the Okefenokee Swamp, Georgia, April 1998. The purpose of this trip was to obtain peats from an acidic sub-tropical wetland for a characterization of the rates and microbiology of aerobic methane oxidation. A 16S rRNA sequence library is in development and will be compared with that of an acid sub-boreal wetland in Siberia. Results will indicate to what extent populations of methane oxidizing bacteria are endemic to these globally significant ecosystems.

Welcome Dr. Phil Yund

The Darling Marine Center is pleased to welcome Dr. Phil Yund, a Research Associate Professor with the School of Marine Sciences, as its newest resident faculty member.

Phil first came to the Darling Center more than 10 years ago as a graduate student from Yale and then as a visiting investigator from Brown University and the University of New Orleans. He now has permanent space in the Center's Flowing Seawater Lab.

Phil's research interests revolve around how fertilization processes act as selective agents on life history traits. Current projects include studies of sperm competition and the effects of environmental conditions on gamete production in colonial ascidians, and an investigation of the mechanisms by which heavy metals interfere with fertilization in sand dollars and sea urchins.

Now that Phil's research program is flourishing, he is interested in more actively pursuing his other passion — teaching, especially of undergraduates. In past academic positions, he has run a primarily undergraduate lab. He considers undergraduate involvement an essential part of his research program, as well as valuable experience for the students

Dr. Les Watling (photo) and the cast of Our Lakes, Our Rivers, Our Oceans, Ourselves at the Round Top Center for the Arts. Photo by Jim Daniels.

Environmental Theater Group Preforms ....

This summer Dr. Les Watling took to the stage as a photgraphic member of the cast *Our Lakes, Our Rivers, Our Oceans, Ourselves*. The production was the culmination of the month long Young People's Environment Theater Workshop in which junior high school students, under the direction of Kelly Patton, explored the inherent connections between science and the arts. Kelly Patton contacted Dr Wating to discuss and develop the play's central theme — that the marine communities are diverse and intricate worlds within our own, and that the fate of our species is tied to the health and integrity of ecosystems and species most people never even see. A taped interview with Dr. Watling and a life size photograph of him formed one of the central organizing themes in the play.

Graduate students Anneliese Eckhardt Pugh and Pamela Sparks-McConkey visited the cast one day during a rehearsal to answer their questions about benthic communities, and participated in a panel discussion following the production.

unded Grants

ndle, J.C. and L.M. Mayer. $12,771. Maine Center for Innovation in Biotechnology, Extraction and sensor system to measure bioavailability of sedimentary mercury.

.S. Steneck. $19,200. Maine's Lobster Advisory Council. *Lobstermen and stock assessment: developing an efficient and calibrated voluntary logbook and sea sampling protocol for the State of Maine*.

.S. Steneck. $40,509. Island Institute. *Lobster dynamics surrounding Penobscot Bay: Linking lobster nursery grounds with Broodstock Populations*.

.S. Steneck. $36,349. NOAA (Sea Grant) *No-harvest Conservation Areas fro Sea Urchins in Maine: Exploring New Tools for Sustaining the Fishery*.

.S. Steneck. $70,000. Kendall Foundation. *Infusing science and information into co-management: fishing industry - university - management liaisons: Lobster Industry*

.S. Steneck. $18,167. Battelle. *Benthic juvenile lobsters in Boston Harbor*.

O. Yund. $285,000. National Science Foundation. *The effect of sperm competition on levels of sperm production in a marine invertebrate*.

O. Yund. $19,719. National Science Foundation. *The effect of in situ fertilization processes on the relationship between gamete production and reproductive success*.

ublications

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ing, G.M. and S. Schnell. 1988 Effects of ammonium and non-ammonium salt additions on methane oxidation by *Methylosinus trichosporium* OB3b and Maine forest soils. Appl. Environ. Microbiol. 64:253-257.

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Palma, A.T., R.A. Wahle, and **R.S. Steneck**,1998. Different early post-settlement strategies between American lobsters (Homarus americanus) and rock crabs (Cancer irroratus) in the Gulf of Maine. Mar. Ecol. Prog. Ser. 162:215-225.

Rich, J.R. and **G.M. King**. 1998. Carbon monoxide oxidation in bacteria associated with the roots of freshwater macrophytes. Appl. Environ. Microbiol. 64:4939-4934.

Steneck, R.S. 1998. Human influences on coastal ecosystems: Does over fishing create trophic cascades? Trends in Ecol. & Evol. 13:429-430.

Steneck, R.S., T Miller, I.G. Macintyre and P. Reid, 1998. Ecological controls on stromatolite development in a modern reef environment: a test of the "Ecological Refuge Paradigm" Carbonates and Evaporites. 13: 48-65.

Thiel, M., L. Stearns and **L. Watling**. 1998. Effects of green algal mats on bivalves in a New England mudflat. Helgoländer Meeresuntersuchungen 52: 5-28.

Thiel, M. and **L. Watling**. 1998. Effects of green algal mats on infaunal colonization of a New England mud flat - long lasting but highly localized effects. Hydrobiologia 375/376: 177-189.

Watling, L. 1998. On the identity of *Spencebatea abyssicola* (Cumacea), with additional observations on the genera allied to Procampylaspis. J. of Crustac. Biol.18:205-209.

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Weston, D. and **L. Mayer**, 1998. Comparison of in vitro digestive fluid extraction and traditional in vivo approaches as measures of polycyclic aromatic hydrocarbon bioavailability from sediments, Env. Tox. & Ch. 17:830-840.

Yund, P.O. 1998. The effect of sperm competition on male gain curves in a colonial marine invertebrate. Ecology 79:328-339.

Honors

Dr. Larry Mayer

- Elected 1997 H. Burr Steinbach Scholar (Woods Hole Oceanographic Institution).
- Invited to request Creativity Extension of $100,000 by the National Science Foundation.
- Invited to give the keynote lecture at the Organism-Sediment Symposium, South Carolina, 10/98. He presented at paper titled *Laundering sediment: contrasting digestive strategies of bacteria and deposit feeders*.

Dr. Warren Riess

- Appointed to the National Landmark Committee

Dr. Robert Steneck

- Pew Fellowship in Marine Conservation. $150,000 (3 years)

Dr. Les Watling

- Pew Fellowship in Marine Conservation. $150,000 (3 years)

Presentations & Posters

In January 1998, **Sarah Gerken**, a third year PhD candidate in the Watling lab, presented a poster at the Society for Integrative and Comparative Biology meeting in Boston. In July she traveled to Amsterdam to present a poster at the International Crustacean Congress 4, thanks to funding from the Association of Graduate Students and from the School of Marine Sciences.

Pam Sparks-McConkey traveled to Crete in April to present her thesis work at the International Committee of Environmental Scientists meeting.

Graduate students **Waiki Chung**, **Kathleen Hardy** and **Jeremy Rich** of the King lab presented recent work at the 98th General Meeting of the American Society for Microbiology in Atlanta, Georgia in May 1998.

PhD candidate **Stephanie Zimsen** presented a paper at NCEAS, "Regional-scale oceanographic regulation of kelp productivity in the Gulf of Maine". She was joined by Sheri Emerson, Ian Davison, and Jill Fegley, also of the University's School of Marine Sciences.

MS candidate **Ian Voparil** presented talks at the Benthic Ecology Meeting in Melbourne, Florida; at the annual meeting of the North Atlantic Chapter of the Society for Environmental Toxicology and Chemistry in Saratoga Springs, NY and at the US EPA in Naragansett, RI.

Alvaro Palma presented his thesis work at the Benthic Ecology Meeting in Melbourne, Florida and at a meeting in Brazil in May.

Doug McNaught was awarded the best student paper at March's Northeast Algal Symposium (NEAS) in Plymouth, MA. In his presentation, "Algal community change: Sea urchins eat macroalgae, but what do macroalgae do to urchins?" Doug reported that kelp and other seaweeds harbor more micropredators than do the relatively featureless coralline communities. The indirect negative effects that fleshy macroalgae and the associated predators have on populations of urchins may be important in explaining the dynamics of the kelp bed community.

Congratulations on your Graduations!

Jeremy Rich successfully defended his MS thesis in June, which focused on his work with carbon monoxide oxidizing bacteria associated with the roots of freshwater plants.. He and his new wife Heather Leslie have moved to the west coast to pursue doctoral degrees at Oregon State University, Corvallis.

JB Pelletier completed his MA in History this spring. Based at the Darling Center and working with Dr. Warren Riess, JB concentrated in colonial maritime history with an emphasis on underwater archeology. He is now employed by the consulting firm Goodwin & Associates in Maryland as the coordinator of their underwater archeology group.

After five years of hard work, **Alvaro Palma** returned to his native Chile in September with Ph.D in hand. His research focused on the settlement driven demographic patterns of lobsters, rock crabs and Jonah crabs in the Gulf of Maine. Alvaro has started a Post Doc research position at the University of Catalina at Santiago where he is continuing his ecological and oceanographic interests.

Oceanography Minisymposium a Resounding Success

About 25 students and 13 faculty, along with several visiting scientists, gathered at the Darling Marine Center on May 14 and 15 for the 5th Annual Oceanography Minisymposium. Designed to offer Oceanography graduate students the chance to present their research in a formal, yet familiar setting — it's a perfect warm-up for future scientific meetings. Not only was the event an opportunity for both students and faculty to learn about each other's research a valuable one, but as Dr. Bob Steneck explained, "The minisymposium creates an atmosphere of sharing, learning and collegiality." Many participants suggested the event be expanded to include everyone in the School of Marine Sciences (SMS) According to minisymposium co-coordinator Dr. Dan Belknap"It is likely that there will continue to be different symposia for the several degree programs within SMS, but our goal is to achieve cross pollination and eventually the strengthening of greater SMS group identity."

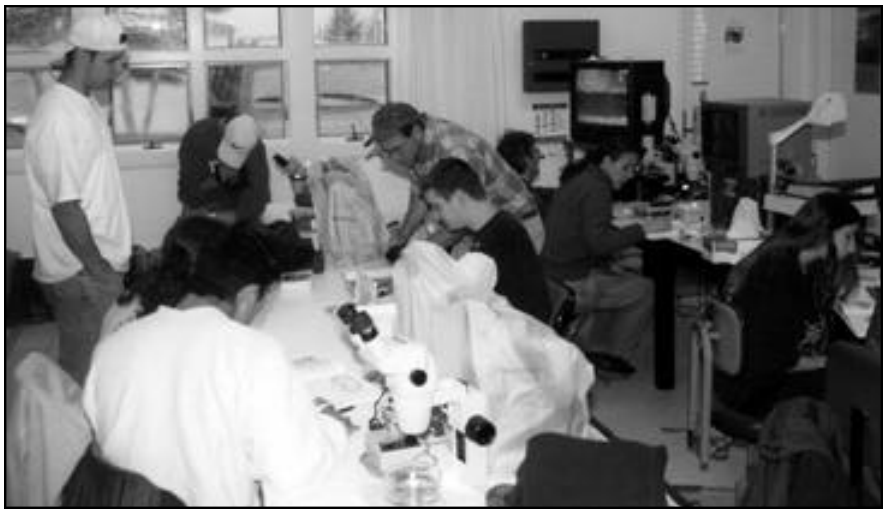
Undergrads at the Darling Marine Center

)MC's College & University Field Trip Program

his year our College and University Field rip Program brought students and faculty om more than twenty schools to the enter for in-depth studies of invertebrate iology and marine ecology. In many ases, the students come from land locked chools and this is their first real taste of ne salty marine environment.

aboratory manager Tim Miller cus- omizes each trip to the needs of the par- cipants, but a typical trip is 2 to 3 days ong. It includes a half day cruise of the amariscotta River Estuary, a tromp in the ud flats at low tide and plenty of lab me for identifying organisms in the enter's Visitor's Classroom. Housing and eals are provided.

or more information about the College nd University Field Trip Program contact im Miller at 207-563-3146 ext. 218 or by -mail at temiller@maine.maine.edu.



Following a field trip to the rocky shore, students from East Stroudsburg University take a closer look at the animals they collected in the Center's Visitor's Classroom.

bove and left: Dr. Mark Bertness and his rown University students conduct an experi- ent comparing the effects of wave energy long differnt shorelines around the Center.

Above: Dr Isidro Bosch and a student from SUNY Geneseo exam- ine benthic biota in the Visitor's Classroom.

Colleges & Universities Participating in the Field Trip Program

Bradford College, MA • Dr. John Cigliano
Westfield College, MA • Dr. David Doe
Brown University, RI • Dr. Mark Bertness
Harvard University, MA • Dr. Damhait McHugh
East Stroudsburg University, PA • Dr. Bruce Haase
SUNY Geneseo • Dr. Isidro Bosch
Quinnipiac College, CT • Dr. Ken McGeary
University of South Alabama,
Dauphin Island Marine Lab • Dr. Ken Heck
Wayne State College, NE • Dr. Mark Hammer
Unity College, ME • Dr. Emma Creaser
Smith College, MA • Dr. Paulette Pecko
St. Lawrence University, NY • Dr. Brad Baldwin

UMaine Courses at the DMC

UMaine Orono
Drs. D. Schnitker & J. McCleave • Oceanography
Dr. Seth Tyler • Invert Zoology
Drs. I. Davison & I. Kornfield • Marine Ecology

UMaine Presque Isle
Dr. Stuart Gelden • Marine Ecology

UMaine Farmington
Dr. Dan Buckley • Marine Biology

East Stroudsburg University students set a seine net.

Harvard University students examine a plankton tow.

Semester by the Sea '99

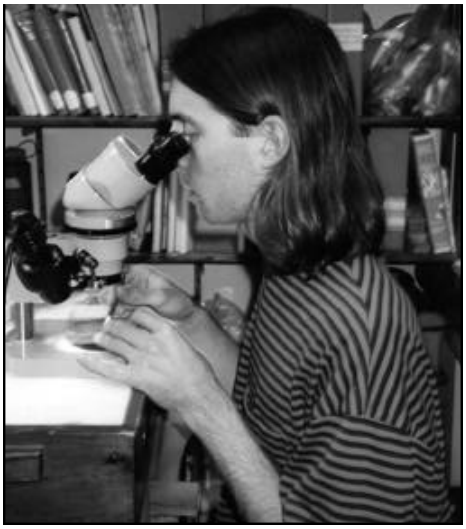
Students interested in marine biology and oceanography can enhance their undergraduate experience by enrolling in the School of Marine Science's *Semester by the Sea* program.

Participants will reside at the Darling Marine Center and take four classes designed to provide in depth study and hands-on research experience in a variety of marine ecosystems. There will be eight classes from which to choose, thereby allowing students to customize their studies to meet their specific interests. Semester by the Sea meets SMS degree requirements.

Space is limited • Sign up for today!

For more information contact the School of Marine Science at 207-581-4381.

Dr. Bob Steneck and his summer crew. Back row: Mason Sears, Ari Levin, Mike Straiko and Carl Wilson (grad student) Front row: Pema Kitaeff, Danielle Toole, Bob Steneck



Matt Blakely-Smith sorting samples in the Watling Lab

Undergraduate Internships

Summer is a busy season at the Darling Marine Center. It's the time when the flora and fauna of the marine environment are doing their thing — spawning, growing, eating, photosynthesizing and maintaining their ecological niche. To take full advantage of Maine's short field season, many of our researchers gladly take on the help of undergraduate summer interns to collect, sort and process data.

This summer, thirty-two interns worked alongside faculty and graduate students examining everything from benthic invertebrates to atmospheric gases. They dove in the frigid waters of coastal Maine to collect habitat data on lobsters and urchins, kept animals alive in the Flowing Seawater Laboratory, sorted plankton and sediment samples, even worked on the conservation of nine cannons from the wreck of Nottingham Galley on Boon Island (off York, Maine) that had been underwater since 1710. Their unending enthusiasm and hard work were greatly appreciated.

The funding for these internships comes from a variety of sources. Many are funded directly by a researcher's grant for a given project, others are funded by non-profit organizations, most notable the Gulf of Maine Foundation which funds six internships annually through their Summer Undergraduate Research Experience (SURE) program. For internship applications and information for the 1999 field season, please contact Linda Healy at 207-563-3146, ext. 200 or by e-mail at lhealy@maine.edu.

Above: Jim Blitch maintains experiments for Dr. Yund in the flowing Seawater Facility. Left: Thalia Robakis working in the Biogeochem Lab for Dr. Mayer

1998 Interns

Joanna Ali, University of Maine
Matt Blakely-Smith, University of San Diego
Jim Blitch, University of New Orleans
Jenna Borberg, California Polytechnic State University
Peter Canavin, University of South Carolina
Rachel Feldman, Brown University
Meredith Garey, Mt. Holyoke College
Jennifer Gross, University of Alaska-Fairbanks
Chris Harvey, Ohio State University
Pema Kitaeff, Reed College
Andrew Kopelman, Brown University
Ari Levin, Wake Forest University
Heather Lohr, College of Charleston
Danielle MacLauren-Toussaint, ME Maritime Academy
Ben McMillan, Oregon State University
Joseph Monroe, University of Tennessee
Mandy Prevost, University of New Orleans
Cheranne Roadhouse, Dalhousie University
Thalia Robakis, Barnard College, Columbia University
Robert Russell University of Maine
H. Mason Sears, University of Rhode Island
Katherine Smukler, Tufts University
Mike Straiko, Allegheny College
Heather Sullivan, Brown University
Danielle Toole, University of North Carolina
David Wells, Oregon State University
Sarah Whitford, Colby College
Megan Wright, Allegheny College

Gulf of Maine Foundation

The Gulf of Maine Foundation (GMF) is a group of private citizens organized to promote the goals of the Darling Marine Center. It is especially concerned with education and research in marine related topics and in the understanding and preservation of the Gulf of Maine. For the first time since its inception in 1986, we are making an appeal for contributions. These added funds are necessary to improve and expand our educational programs as outlined here.

If we can educate our populace, especially the students who will determine what happens in the 21st century, the quality of life that so many of us appreciate about Maine can continue to exist. Please give us a call at 207-563-3146, X252 if you want more information or wish to contribute time or money to our programs. Thank-you,

Mel Fuller, President

K-12

Many school children visit the Darling Marine Center each year. We would like to develop a program in which student visitors would ask questions and participate in designing and conducting experiments wherein they collect the necessary data to answer their questions about the marine environment. Your contribution will help us staff such a program.

SURE intern Joanna Ali, teaches marine science to grade school visitors at the Darling Marine Center

Undergraduate Scholarships

We want to expand our very successful SURE (Summer Undergraduate Research Experience) internship program. Since 1993 the SURE program has brought over fifty undergraduate students from all over the world to the Darling Marine Center. Each intern works alongside a faculty mentor on research projects related to the Gulf of Maine. The continued support of our members and friends allows us to provide scholarship for 6-10 students each summer.

Adult Education

In addition to expanding our popular summer lecture series to a year round schedule, we plan to sponsor workshops and provide a neutral forum for meetings related to the marine environment. In 1999, just such a workshop is planned to bring fishermen, government officials and academicians together to discuss self-regulation of lobster, sea urchins and elvers in Maine. Also in the planning stages are workshops organized by the GMF for K-12 teachers help the latter develop programs for introducing their students to marine research.

Guided Trails

The GMF, with the help of students, members and friends is developing nature trails on the Darling Marine Center grounds. When complete, there will be almost four miles of trails for hiking and observing nature. We already have knowledgeable volunteers to assist in interpreting the plants, fungi and animals that the visitor will encounter on the trails.

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Gulf of Maine Foundation

Above, left : SURE sponsors Mr. & Mrs. Williams and SURE intern Jennifer Gross at GMF luncheon
Left: GMF members Ann Coughlan, Herb & Edith Sears at SURE luncheon.

Conferences & Courses

tate of the River Conference

he Darling Marine Center and the Planning Alliance of the amariscotta River Estuary (PADRE) co-hosted the first State of ıe River Conference last spring. Its mission was to bring resi- ents, users, and other stakeholders in the estuary together to elebrate the marine resource conservation and management ork of the last five years and to build toward future initiatives.

rs. Bob Steneck, Larry Mayer, Les Watling and Warren Riess, nd a number of students joined municipal officials, aquacultur- lists, fishermen, water quality advocates, planners, and marine esource managers to discuss conservation efforts for the amariscotta River Estuary.

he group agreed that the creation of "no extraction zones" in ıe Damariscotta, further scientific research on the river's ecolo- y, and a compilation of the existing information about the amariscotta in a format accessible to resource users were of eat importance. Other priorities include fostering marine esource-based businesses, and more land-use planning

eMaine Wild Conference

he ReMaine Wildlife organization was back at the Center on ctober 25 for part of its annual wildlife rehabilitation work- op. The Center was the site of a hands-on laboratory session ad by Dr. Peter Merrill. Dr. Merrill demonstrated various tech- iques on harbor seal rehabilitation including basic health care nd evaluation of injured and sick seals. The group is planning nother 2 day workshop next fall.

eMaine Wild is a group of volunteers concerned with the umane treatment of injured wildlife. Their regular meetings and orkshops prepare the members for helping a variety of birds nd animals in distress.

ummer interns get their first view of the Damariscotta river during safety training session aboard the R/V Silverside.

Shinji Ueno of the Japanese company Fujitsu and Alex Fung of the Hong Kong Baptist University share lunch at the UNESCO conference.

UNESCO Conference on Computers in Schools

The Third International Working Conference on Information Technology in Education Management (ITEM) convened in July at the Darling Marine Center to share their research on integrating information for education management. Thirty participants came from 18 countries, including Australia, Japan, New Zealand, China and the Netherlands.

Their presentations responded to critical questions regarding data confidentiality, the benefits of different information systems for students and educators, and how both local school boards and national governments can use such technology. One debate revolved around the benefits of standardizing student and school information across regions. Such information systems benefit students by tracking their academic achievement, and help administrators who have individual children continually entering and leaving their schools.

School administrators, computer coordinators, and media specialists from area schools joined the conference one day to share their own experiences and learn from other participants about how to more effectively employ information technology in their schools.

In addition to exchanging research findings, participants visited Monhegan Island and enjoyed a Maine-style lobster bake on the shore of the Damariscotta River.

While hosted by the Darling Marine Center, School Union 74, UNESCO (United Nation's Educational, Scientific and Cultural Organization) and a North Carolina company, OR/ED Laboratories, also supported the event.

elly McLaughlin prepares samples in the evelopmental Biology class.

For more information about our courses, offerings, contact the Course Coordinator at (207) 563-3146 or e-mail Darling@maine.maine.edu.

Developmental Biology Workshop

The Developmental Biology Workshop has become a very popular event at the Darling Center, attracting over 59 participants since 1992. Taught by Dr. Leland Johnson, from Augustana College in South Dakota, it provides college and university faculty, post docs and graduate students with experience dealing with organisms commonly used in developmental biology classes.

"This course has been exactly what I needed to become proficient with basic experimental lab techniques. It has saved me years of trial and error failures," commented Orion Rogers of Radford University in Virginia. "I would highly recommend Dr. Johnson's course and the Darling Marine Center to my colleagues and students."

Dr. Eric Cole of St. Olaf College leads a laboratory exercise for Dr. Leland Johnson's Developmental Biology class.

Research

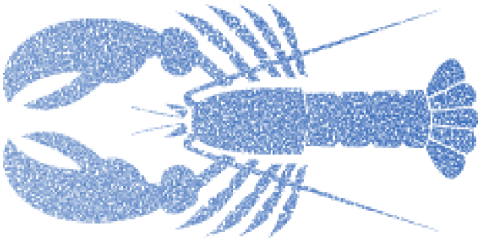
Mapping Penobscot Bay

chool of Marine Science faculty member Dr. Dan Belknap was in residence at he Center for July and August, staging eld work for student theses and writing p results from previous work. The major esearch project this summer was seismic nd side-scan sonar mapping of enobscot Bay with Joe Kelley and Steve ickson of the Maine Geological Survey.

ormer Ph.D. student Roland Gehrels, ow a Lecturer at Plymouth University in ngland, is visiting Dan for a sabbatical. hey are collaborating on continuing udies of sea-level change in coastal arshes.

n September Dan went on a National Undersea Research Program cruise with ick Wahle of Bigelow Laboratory. They sed the Johnson-Sea-Link submersible to ground truth" side-scan sonar images of otential lobster habitat along the New lampshire and Maine coast.

Monitoring Lobster Health



An ongoing study on lobster health is now partially based at the Darling Marine Center. Maya Crosby, a research associate with the University of Maine Lobster Institute (and part-time UM graduate student at the DMC) monitors lobster health in newly caught lobsters and those held in holding facilities or tidal lobster pounds.

In recent months, a small, but noticeable increase in lobster mortality in holding pounds has been noticed. Crosby and the scientists supervising the project in Orono, Dr. Deanna Prince, and Dr. Robert Bayer, are currently conducting experiments to address these reports . They are recording information from the lobster industry about the extent and severity of the problem, as well as obtaining environmental data, and collecting samples of weak lobsters to examine in terms of histopathology, bacteriology, parasitology and virology.

UMaine researchers are collaborating with scientists from Maine DMR, MicroTechnologies, UNH, New Brunswick DFA, the FDA, and the University of Arizona, as well as many sectors of the lobster industry. The study is due to end in January due to lack of funding, but the researchers are hoping to obtain funds to continue the project. The long-term goal of the project is to help reduce economic loss within the industry due to problems with lobster health and quality, and to gain more scientific information on factors affecting crustacean health. Any questions can be addressed to Maya Crosby at 207-563-3146, ext. 241.

Dr. Gary King & the Microbiology Lab

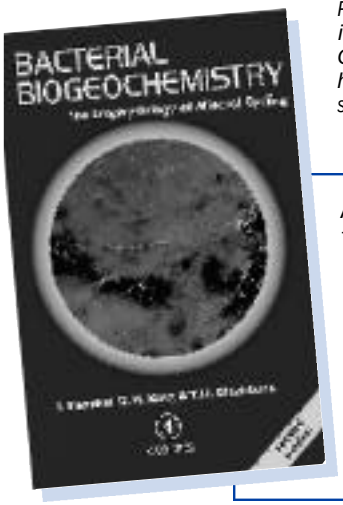
University of Maine professor Gary King is a resident faculty member at the Darling Marine Center. While his research spans many ecological systems, there is a common theme. He has a basic curiosity about how complex systems work from cellular to biospheric levels, and is particularly interested in the role microbes such as bacteria play in the cycling of elements in the environment.

Most recently, Gary and his research technician, Kathleen Hardy, have hunkered down in agricultural fields in South Bristol, tromped through cattail marsh, and swatted insects in the shaded forests while measuring the flux of atmospheric gases in these systems. This research contributes to a better understanding of what factors control the concentrations of these gases in the atmosphere, and eventually, to predicting how these processes may be influenced by human activities.

Gary not only has one foot in water and the other on land, but also has maintained his long-standing interest in microbes in the marine environment. He and PhD student Waiki Chung are investigating the degradation of polyaromatic hydrocarbons (PAHs) by bacteria living in the burrow walls of marine worms in nearby mudflats. Their research will shed light onto the fate of these pollutants in the marine environment.

In addition to advising graduate students, Gary regularly sponsors undergraduate research interns. "The internship programs have provided an extremely valuable opportunity for me since my off-campus location makes typical undergrad teaching difficult at best. Internships make it possible for me to have a routine, day-to-day research and teaching relationship," Gary explained.

In the photos, clockwise from upper left: Dr. Gary King coordinating field research. Research technician Kathy Hardy preparing sampling chamber in the field. Graduate student Waiki Chung analyzing his data. Summer intern Meredith Garey setting-up a greenhouse experiment.



Academic press has recently released Dr. Gary King's first book, *Bacterial Biogeochemistry: The Ecophysiology of Mineral Cycling*. Along with co-authors Tom Fenchel and T. Henry Blackburn, Gary offers one of the few available syntheses of microbial biogeochemistry. As microbes are solely responsible for many of the elemental transformations upon which the biosphere depends, the book is an essential reference for all those pursuing microbial ecology and global change research.

)r. Alan Hodgson, Visiting Investigator from South Africa

)n sabbatical from Rhodes University, Grahamstown, South Africa, ır. Alan Hodgson has come to the Darling Marine Center to work 'ith Dr. Kevin Eckelbarger and learn more about egg development of)uth African limpets and gastropods. Since very little is currently nown about oogenesis in limpets and marine snails the two are com- ıg up with new and fundamental information about the reproductive iology of these mollusks.

oncerned about the sustainability of South Africa's marine life, Dr. odgson's research focuses on several marine shellfish which are cur- ntly being exploited by impoverished communities as a readily vailable and free food source. The uncontrolled removal of these ani- ıals is not only leading to serious declines in the shellfish populations ut is changing the community composition of the intertidal zone.

ır. Hodgson uses comparative gametogenesis, specifically sperm mor- hology, to learn more about the fecundity and life history strategies f these marine invertebrates. Here at the Darling Center, and in con- ınction with Dr. Eckelbarger, he will expand his work to and look at)genesis and comparative egg structure.

ır. Hodgson and his wife Valerie and two children are living in resi- ence at the Darling Center until mid-December. Valerie is working as part-time research technician on the project while their children :tend South Bristol Consolidated School.

Dr Kevin Eckelbarger and Dr. Alan Hodgson at the transmission electron microscope examining reproductive tissues.

Visiting Investigators

Visiting investigators come to the Darling Marine Center to teach classes, converse with collegues and conduct field research and laboratory experiments relating to the marine environment. We offer a flowing seawater facility, a fleet of small research vessels, wet and dry lab space, an extensive marine library, classrooms and much more. Our land-based support facilities are staffed year round to provide assistance with specimen collection, equipment use, lab set-up, housing and meals. For more information contact: Tim Miller at 207-563-3146 ext. 218 or by e-mail at temiller@maine.maine.edu.

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Ocean Science

Alan Young
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Cumacean Collectors Cruise the Gulf of Mexico

Sailing from Galveston, Texas, Dr. Les Watling and a team of eleven graduate and undergraduate students collected samples from 38 stations across the Gulf to the west Florida shelf from March 1-10, 1998. Their mission was to determine the distribution and abundance of small crustaceans belonging to the order Cumacea within the Gulf of Mexico.

Above:
Les Watling recovers samples.

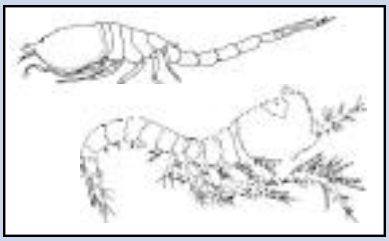
Left and below:
Students and ship's crew prepare to deploy a sled and process sediment samples.

Bottom left:
Summer intern Jenna Broberg enumerates samples.

Interns Jennifer Gross, Jenna Borberg and Matt Blakely-Smith processed the sediment samples in the Watling lab this summer. Their preliminary sorting of the samples produced cumaceans in the 4 large families, Bodotriidae, Nannastacidae, Diastylidae, and Leuconidae. Though the material (so far) seems to be pretty diverse, cumaceans are not overly abundant in the samples. Another interesting observation is that the cumaceans found in the samples tend to be tiny, in the very few mm range.

What's a Cumacean?

Cumaceans are small crustaceans (1mm-3cm) living in the benthos of marine and littoral environments. Many species inhabit the surface layer of sediment, partially burying themselves and pursuing a deposit feeding lifestyle, while other species can be found clinging to algal turf on rocks. Plankton samples occasionally contain cumaceans, particularly night samples, because males move up into the water column in search of mates.



The general body plan of cumaceans consists of a relatively large and bulbous carapace and a slender abdomen, hence one common name for the group is *comma shrimp*. Within these constraints, carapace design and overall body form can vary widely, with some species sporting carapaces that resemble medieval battlements while others are dorsoventrally flattened to such an extent that they almost resemble flatworms rather than crustaceans.

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