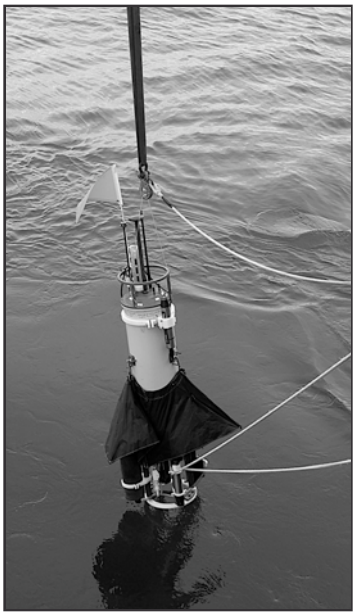
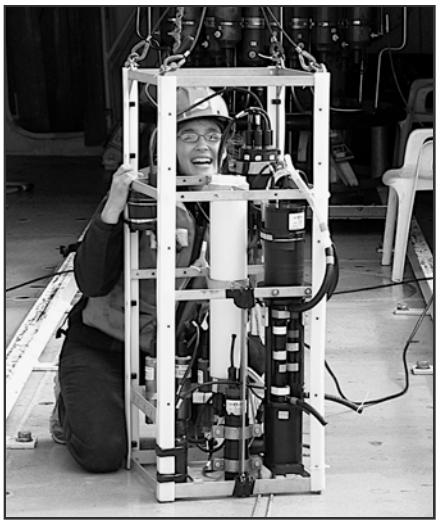
Making Waves

at the University of Maine Darling Marine Center

2008





SMS Welcomes Largest Cohort

Sixty-six students enrolled in the UMaine School of Marine Sciences undergraduate program this year – the largest incoming class since the School's inception in 1996!

Twenty-five percent of the students are from Maine and seventy-five percent hale from thirteen other states and one foreign country. SMS attributes the increase to UMaine's national reputation as an outstanding academic institution, the DMC facility and the Semester By the Sea program.

All incoming students were invited to the DMC for a weekend orientation program lead by upperclassmen, graduate students and faculty in the SMS. The overnight visit included field trips, sampling cruises aboard the R/V *Ira C.* and laboratory workshops focusing on plankton studies, aquaculture, invertebrate biology and marine ecology.

Marine science students today want hands-on learning opportunities and SMS offers that by taking advantage of the DMC facilities. Students know that they will have ample opportunity to get their hands wet while studying marine science at UMaine.

Dr. William Ellis
Assistant Director, School of Marine Sciences

Secrets of the North Atlantic Spring Bloom

Dr. Mary Jane Perry was one of four principal investigators in the North Atlantic Bloom Experiment of 2008 (NAB08). With funding from the NSF and NASA, NAB08 set out to quantify carbon flux in one of the oceans' most significant phytoplankton blooms using the newest generation of autonomous research platforms.

From April to June, state-of-the-art subsurface floats and autonomous underwater gliders, both equipped with optical and biogeochemical sensors, roamed the North Atlantic, southwest of Iceland. Directed by scientists both at sea and on shore, the autonomous platforms measured the North Atlantic spring bloom on spatial and temporal scales never before achieved.

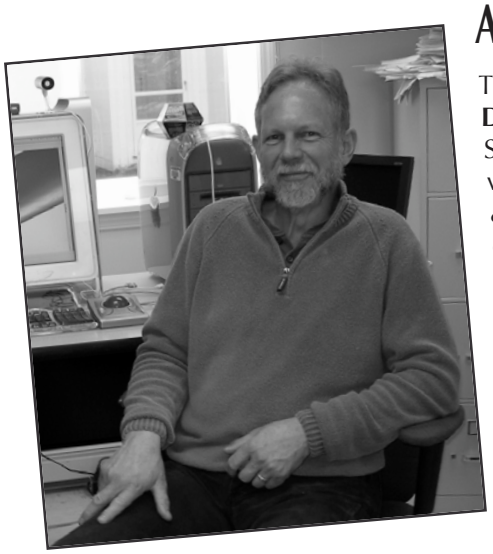
During the month of May, 26 scientists representing 13 institutions and 5 countries went to sea aboard the R/V *Knorr*. An extensive array of complementary measurements and experiments were conducted to help interpret the float and glider data. Mary Jane lead the *Knorr* mission and five DMC personnel were also on the cruise including: undergraduate **Jennifier Fortier,** graduate students **Nathan Briggs**, **Andrea Drzewianowski** and **Michael Sauer**, and research associate **Emily Kallin**.

Preliminary results suggest NAB08 was the "perfect storm" of research cruises. Oceanographers were on-site, the bloom happened on schedule, the autonomous vehicles proved invaluable and the scientists successfully captured a major carbon flux event. They observed and quantified not only the CO_2 uptake by the phytoplankton during the bloom, but also the export of carbon as dead phytoplankton sank to the ocean's depths.

More NAB08 information can be found at http://bloom.apl.washington.edu including data analysis and pictures of the biofloats, seagliders and researchers.

More cutting-edge research inside

ASLO Honors Dr. Pete Jumars



The American Society of Limnology and Oceanography (ASLO) awarded **Dr. Pete Jumars** it's Distinguished Service Award at the Society's summer meeting in St. John, Newfoundland. The award acknowledges Jumars' many years of service on a variety of fronts including: Editor-in-Chief of the society's scientific journal "Limnology & Oceanography" from 1986-1992, and as President Elect, President and Past President of the Board of Directors from 2000-2006. Jumars' contributions to ASLO paved the way to establishing "Open Access" of their scientific publications, inspired collaboration with other professional scientific organizations and increased the society's role in science education and public policy.

More information about Pete's award and his dedication to ASLO is available at www.aslo.org/meetings/stjohns2008/awards.html, scroll to the bottom of the page.

Pete is the Director of the University of Maine School of Marine Sciences and a resident faculty member at the DMC.

Recent Publications & Reports

Book, J.W., **H.T. Perkins**, R.P. Signell, and M. Wimbush. 2007. The Adriatic Circulation Experiment: Winter 2002/2003 Mooring Data Report: A Case Study in ADCP Data Processing. NRL/MR/7330-07-8999. U.S. Naval Research Laboratory, Stennis Space Center, MS 39529-5004.

Boss, E., **M.J. Perry**, D. Swift, L. Taylor, P. Brickley, R. Zaneveld and S. Riser. 2008. Three years of continuous ocean biogeochemical data from a bio-optical profiling float. EOS 89 (23). June 3.

Boss, E., D. Swift, L. Taylor, P. Brickley, R. Zaneveld, S. Riser, and **M.J. Perry**. 2008. Observations of pigment and particle distributions in the western North Atlantic from an autonomous float and ocean color satellite. Limnology and Oceanography. 53(5, part 2): 2112-2122.

Eckelbarger, K.J., C. Hand, and K.R. Uhlinger. 2008. Ultrastructural features of the trophonema and oogenesis in the starlet sea anemone, *Nematostella vectensis* (Edwardsiidae). Invertebrate Biology, 127(4):1-15.

Estes, J.A., C.H. Peterson, and **R.S. Steneck**. 2008. Direct and Indirect Effects of Apex Predators in Higher Latitude Coastal Oceans. In: The Science of Trophic Cascades. J. Terborgh, and J.S. Estes, (eds). Island Press, WDC.

Halfar, J., **R.S. Steneck**, M. Joachimski, A. Kronz, and A.D. Wanamaker, Jr. 2008. Coralline red algae as high-resolution climate recorders. Geology, 36:463-466.

Halpern, B., S. Walbridg, K.A. Selkoe, C.V. Kappel, F. Micheli, C.D. D'Agrosa, J.F. Bruno, K.S. Casey, C. Ebert, H.E. Fox, R. Fujita, D. Heinemann, H.S. Lenihan, E.M.P. Madin, M. Perry, E.R. Selig, M. Spalding, **R.S. Steneck**, and R. Watons. 2008. A global map of human impact on marine ecosystems. Science, 319:948-952.

Keller, B.D., S. Airamé, B. Causey, A. Friedlander, D.F. Gleason, R. Grober-Dunsmore, J. Johnson, E. McLeod, S.L. Miller, **R.S. Steneck**, and C. Woodley. 2007. Marine protected areas. Pages 8:1-8:131. In: Preliminary review of adaptation options for climate-sensitive ecosystems and resources. Synthesis and assessment product 4.4, U.S. Climate Change Science Program, Washington, DC. S.H. Julius and J.M. West (eds.)

McCarthy, J.F., J. Ilavsky, J.D. Jastrow, **L.M. Mayer**, E. Perfect, and J. Zhuang, 2008. Protection of organic carbon in soil microaggregates occurs via restructuring of aggregate porosity and filling of pores with accumulating organic matter. Geochimica et Cosmochimica Acta, 72:4725-4744.

Perry, M.J., **B.S. Sackmann**, C.C. Eriksen, C.M. Lee. 2008. Seaglider observations of subsurface chlorophyll maxima off the Washington coast. Limnology and Oceanography. 53:2169-2179.

Sackmann, B., **M.J. Perry**, C.C. Eriksen, and C.M. Lee. 2008.Using Seaglider to quantify variability in mid-day fluorescence quenching off the Washington coast. Biogeosciences Discussion 5:2839-2865.

Sale, P.F., M.J. Butler IV, A.J. Hooten, J.P. Kritzer, K.C. Lindeman, Y.J. Sadovy de Mitcheson, **R.S. Steneck**, and H. van Lavieren. 2008. Stemming Decline of the Coastal Ocean: Rethinking Environmental Management, UNU-INWEH, Hamilton, Canada.

Continued on page 3.

MAKING WAVES
is the annual newsletter of the University of Maine Darling Marine Center.

Dr. Kevin J. Eckelbarger
Director

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Science Writer &
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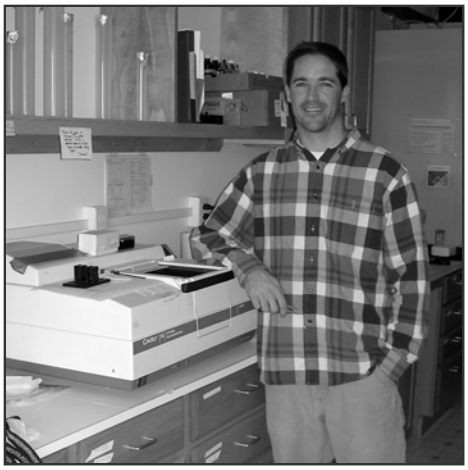


Marine Biology Student Gets ICRS-OC Fellowship

Susie Arnold received one of six Coral Reef Ecosystem Research Fellowships awarded by the International Coral Reef Society and the Ocean Conservancy.

Susie holds M.S. degrees in Marine Biology and Marine Policy and is currently a Ph.D. candidate in Marine Biology at the UMaine School of Marine Sciences. Her advisor is **Dr. Bob Steneck**.

Working on reefs in Bonaire, Honduras, Guatemala, Belize, Palau and Palmyra, Susie is interested not only in reef ecology, but also in the various strategies these countries use for fisheries/resource management. She will use the $15,000 fellowship to conduct research on the role of herbivory and productivity potential on reef resilience. Specifically, the funds will support experiments on the leeward and windward reefs of Bonaire and Belize.

Oceanography Students Receive NASA Fellowships

Meg Estapa and **Mike Sauer**, doctoral students in Oceanography at the UMaine's School of Marine Sciences based at the DMC, were recently awarded NASA Earth and Space Science Fellowships. Each received a $30,000 grant which is renewable for two more years contingent on academic performance.

Meg studies the effect of sunlight on particulate organic matter in the marine water column. It was commonly thought that organic matter (carbon) would settle out of the water column. It appears, however, that upon exposure to intense sunlight, some of this carbon forms carbon dioxide which can drift into the atmosphere to become a heat-trapping greenhouse gas. Focusing on carbon delivered from the Mississippi River to areas along the Gulf Coast, Meg uses light-measuring equipment and satellite data to determine how much carbon undergoes this process and how much becomes buried in seafloor sediments. Advising Meg on the project are School of Marine Sciences professors **Larry Mayer** and **Emmanuel Boss**.

Mike uses earth-viewing satellites to study phytoplankton biomass in the Gulf of Maine. The estimation and interpretation of satellite data is complicated by two factors (1) colored dissolved organic matter (CDOM), which is essentially indistinguishable from chlorophyll in the satellite data, and (2) seasonally variable phytoplankton communities. Mike aims to quantify the errors associated with SeaWiFS and/or MODIS satellite estimates of chlorophyll to get a better understanding of the dynamics of CDOM and phytoplankton biomass in the Gulf of Maine. Mike's thesis advisor is professor **Collin Roesler**.

Recent Publications, continued from page 2.

Steneck, R.S., R.H. Bustamante, P.K. Dayton, G.P. Jones, and A.J. Hobday. 2008. Kelp forest ecosystems: current status and future trends. Pages 226-24. In: Aquatic ecosystems: trends and global prospects. N.V.C. Polunin (ed) Cambridge University Press.

Tyler, P.A., S. Pendlebury, S.W. Mills, L. Mullineaux, **K.J. Eckelbarger**, M. Baker, and C.M. Young. 2008. Reproduction of gastropods from vents on the east Pacific Rise and the Mid-Atlantic Ridge. Journal of Shellfish Research, 27(1):107-118.

Voparil, I.M., **L.M. Mayer**, and **P.A. Jumars**. 2008. Emulsions vs. micelles in the digestion of lipids by benthic invertebrates. Limnology and Oceanography, 53:387-394.

Wagai, R., **L.M. Mayer**, K. Kitayama, and H. Knicker. 2008. Climate and parent material controls on soil organic matter storage in surface soils: A three-pool, density-separation approach. Geoderma, 147:23-33.

Weissberger, E.J., **P.A. Jumars**, **L.M. Mayer**, and **L.L. Schick**. 2008. Structure of a northwest Atlantic Shelf macrofaunal assemblage with respect to seasonal variation in sediment nutritional quality. Journal of Sea Research, 60:164-175.

Zhuang J., J.F. McCarthy, E. Perfect, **L.M. Mayer**, and J.D. Jastrow. 2008. Effect of organic matter on hysteretic characteristics of water retention in soil microaggregates, Soil Science Society of America Journal, 72:212-220.

DMC WISH LIST

The DMC's pool of common equipment gets heavy use throughout the year. Many items wear out faster than our budget can afford replacements. Can you help us purchase any of the following? We'd really appreciate it!

- **DVD/VCR recorder/player** **$350**
- **LCD projector** **$525**
- **Plankton Net** **$675**
- **Microscope Lights (8@$250)** **$2000**

To grant a wish, please contact Linda Healy at 207-563-3146 (ext. 200) for specific information on makes/models that will work with our current equipment.

MONETARY DONATIONS ARE ALSO WELCOME FOR

Louise Dean Library Fund
supports the DMC marine library.

Brooke Olsen Scholarship Fund
supports undergraduate summer internships.

Checks should be made payable to the Fund and be sent to:

Linda Healy
Darling Marine Center
193 Clarks Cove Road
Walpole, ME 04573

Mayer's Marine Project Moves Upstream

Dr. Larry Mayer and Research Specialist **Kathleen Hardy** study marine muds. Their recent work in the Mississippi delta showed that mud is vulnerable to "sunburn". Under intense light, organic matter peels off of mud particles, becoming dissolved in the water column. To test if the same reaction takes place higher in the Mississippi watershed, Larry applied for and received a seed grant from the U.S. Department of Agriculture to study this reaction in Midwestern soils.

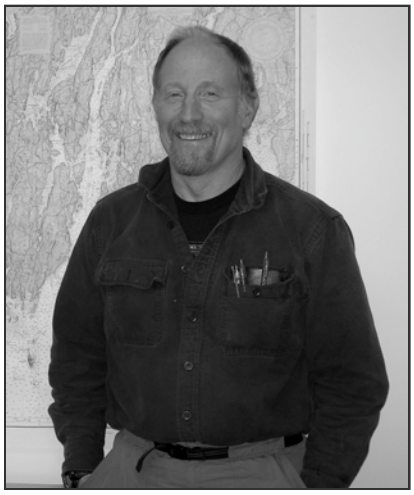
Organic matter, as any gardener knows, is critical for soil performance; it helps to retain water and nutrients and gives the soil structure that many plants thrive on. Thus any loss of organic matter has implications for soil fertility, not to mention the implications for the global carbon cycle. By subjecting soil samples to calibrated light sources in a solar simulator and investigating the chemical reactions that follow, the Mayer lab will be able to follow the progress of this sunburning reaction from source to sink – from the origination point in soils all the way to burial in the ocean.

Improved Algal Production Capability

2008 brought the construction of a new greenhouse and the installation of Seasalter Continuous Algal Production System (SeaCAPS) to our Marine Culture Laboratory. The project was made possible with a $94,000 grant from the Maine Technology Institute awarded to **Dr. Chris Davis** (Maine Aquaculture Innovation Center), **Dr. Paul Rawson** (UMaine School of Marine Sciences) and **Scott Feindel** (DMC Shellfish Hatchery Manager).

The SeaCAPS system brings algal production at the DMC to new level; increasing our algal production 6-fold and thereby improving our capacity to raise larval and juvenile shellfish. The system is energy-efficient and requires less intensive oversight by the hatchery manager. It maintains a steady state (log phase) production of phytoplankton and can automatically dispenses the algae to tanks as needed.

UMaine researchers, visiting scientists, and small business entrepreneurs will benefit from the increased algal production. Current and proposed projects include: oyster broodstock program, copepod feeding/production experiments, algal physiology studies, bivalve nutrition studies and biofuel research.



Scientists and Politicians Work to Improve Fisheries

Dr. Bob Steneck is a member of the Fish Task Force. The group of bipartisan politicians and scientists with expertise in marine ecology and natural resource management is developing a new federal policy for managing US fisheries. Based on the concept that fisheries sustainability is job security for fishermen, the new management plan will give fishermen ownership rights in the form of "catch shares." When a plan is finalized, the task force will work with the fishing community and the transition team for the new President of the United States to work towards this new way of fishing.

The Fish Task Force includes: Secretary Bruce Babbitt, Governor Christine Todd Whitman, Secretary Norm Mineta, Senator Connie Mack, Dr. Jane Lubchenco (Oregon State University), Dr. Steve Gaines (University of California, Santa Barbara) Dr. Andy Rosenberg (University of New Hampshire), Dr. Les Kaufman (Boston University) and Dr. Bob Steneck (University of Maine).

Looking for Red Tide Warning Signs

Every summer the coast of Maine experiences harmful algal blooms known as red tides caused by a toxic phytoplankton called *Alexandrium sp*.. Even during a bloom, *Alexandrium* is never abundant in the water column and can be hard to detect. Rather than look for *Alexandrium*, per se, researchers are now focusing on the whole phytoplankton community for signs of a pending red tide. When *Alexandrium* is present, the phytoplankton assemblage is dominated by dinoflagellates and this dinoflagellate community has an optical signature (based on their color pigments) that can be identified in satellite and buoy data.

With funding from the NASA-ECOHAB project, **Dr. Collin Roesler** and colleagues, **Dr. Neal Pettigrew**, UMaine School of Marine Sciences; **Dr. Ed Laine**, Bowdoin College; and **Dr. Greg Teegarden**, St. Joseph's College; will take advantage of a hi-tech buoy moored in Harpswell Bay that gathers nutrient, hydrographic and optical data in an effort to create an early warning system for red tide. During the three-year study, the researchers will hone the dinoflagellate optical signature, evaluate the oceanographic conditions under which the bloom occurs and track the bloom along the Maine coast from satellites.

The Ocean Climate Interactive

The newest COSEE-OS resource is now available online. The **Ocean Climate Interactive** (OCI) delivers high-quality ocean science resources and uses concept mapping techniques to show how scientists integrate fundamental physical, chemical and biological science concepts into the context of climate and ocean studies. The OCI site includes concept maps, teaching resources, downloadable images and videos clips, and news articles that link science concepts to current events. Check it out at: http://cosee.umaine.edu/cfuser/index.cfm.

The OCI website compliments COSEE's other efforts to improve ocean and climate literacy in K-16 teaching environments including online curriculum resources and teacher workshops throughout New England. The COSEE-OS program is headed by **Annette deCharon** and is made possible with funding by NSF and NOAA.

Porphyra Genomics

An international group 30 scientists convened at the DMC in May for a National Science Foundation-sponsored conference on algal genomics. The meeting focused on a marine red alga, *Porphyra umbilicalis* (also known as "nori" or "laver") whose genome is being sequenced in a project led by **Dr. Susan Brawley** of the UMaine School of Marine Sciences. It is expected that the *Porphyra* genome will make contributions to studies of plant stress tolerance, photosynthesis and UV protection mechanisms, and development of integrated polytrophic aquaculture.

The conference opened with the scientists going to area schools with genome related projects. They also hosted a well-attended open forum at the DMC for the general public "Vignettes and Conversation with Scientists Using Genomics in Studies from the Coast of Maine to Yellowstone National Park."

Conference & Workshop Venue

The Darling Marine Center is the perfect venue for your next scientific conference, educational workshop or staff retreat. We have comfortable meeting space as well as flowing seawater classrooms and laboratories suitable for hands-on workshops. In the immediate vicinity we have a wide variety of marine ecosystems; everything from calm mudflats to exposed rocky headlands. To top it off, we offer a variety of housing options, great food and beautiful scenery. For more information contact our Conference Coordinator at 207-563-3146, ext 200 or by e-mail at lhealy@maine.edu.

Future Teachers Academy

Maine high school students interested in science and a career in teaching participated in the 7th annual Future Teachers Academy (FTA). Sponsored by the UMaine College of Education and Human Development and School of Marine Sciences, the program brought 13 students to the DMC for a week of intensive marine science and career exploration. The aim of program organizers, **Dr. O.J. Logue** and **Dr. William Ellis**, was to "wow" the students with marine science, introduce them to UMaine academic programs and get them thinking about an exciting career in education. FTA '09 is scheduled for June 22-26.
www.dmc.maine.edu/courses.html.

Supercomputing Teachers

With funding from the National Science Foundation's ITEST program, **Dr. Bruce Segee** and UM faculty in the departments of Electrical & Computer Engineering, Earth Science, Mathematics and Education taught middle school teachers from across Maine how to bring supercomputing into their classroom. The program took advantage of the fact that every 7th and 8th grade student and teacher in the state of Maine has an Apple laptop computer. Teachers learned how to network the laptops and use NETLogo software to create large-scale interactive models that are especially useful for teaching earth science concepts like climate change, glaciation patterns and sea-level rise.
http://arch.eece.maine.edu/ideas/index.php.

Advanced Diving Techniques Taught at DMC

The UMaine School of Marine Sciences now offers a semester-long, advanced diving course. **Introduction to Research Diving** will be offered annually during the fall semester to provide graduate and undergraduate students with the skills, training and experience needed to pursue scientific diving in their academic careers and beyond.

Taught by **Chris Rigaud**, UMaine Diving Safety Officer, and selected UMaine faculty with scientific diving experience, the three credit course covers advanced SCUBA skills, dive rescue, oxygen administration and underwater research techniques. Practical diving activities are the focus of the course and complement the classroom session. Following successful completion of course objectives, students are eligible to participate in underwater research projects as a scientific diver-in-training or scientific diver.

K-12 Marine Science Education

The **Gulf of Maine Foundation** (GMF) continues to offer marine science classes for K-12 students from Maine; averaging six to seven classes per week in the spring and fall, and 800 student visits per year. The GMF program supplements each school's science curriculum in a way few if any schools in Maine could manage on their own. Field trips to the DMC include classroom instruction, field experiments, laboratory work and research cruises on the R/V *Ira C.*

Jan Faulkner, GMF Education Coordinator, often enlists the help and expertise of DMC staff and students to assist with school groups and community events. Graduate and undergraduate students, in particular, inspire and connect with the young learners. This fall, **Celeste Mosher** worked with high school-aged home school students giving them the equivalent of a college-level class, and **Semester By the Sea students** manned the touch tank at the Damariscotta Oyster Festival.

Summer Lecture Series

Almost 300 people attended Thursday evening lectures at the DMC this summer. Hosted by the **Gulf of Maine Foundation**, the annual lecture series offers stimulation, interest and insights covering a broad range of marine and maritime topics. This year the lectures included historical overviews of marine biology and the Spanish Armada; natural history of lobsters, alewifes and coral reefs; and a photographic tour of the Damariscotta River. The GMF expects to offer a comparable feast of knowledge and interest next summer, so stay tuned and keep those midsummer Thursday evenings free!

www.Gulf of Maine Foundation.org

GMF's Informational brochure is included in this edition of Making Waves!

School of Marine Sciences Grads Complete Degrees

Congratulations all!

Living Organically: Investigating the effects of organic ligands on Fe and Cu availability to phytoplankton using continuous cultures.

by **Lisa Pickell**, Ph.D. Oceanography

Lisa completed her Ph.D. in September. Her advisor was **Dr. Mark Wells**. Using a novel continuous culture system at sea, Lisa exposed coastal and offshore phytoplankton populations to different forms of naturally occurring ligand-bound iron and copper. She found different algal assemblages in the different treatments suggesting that phytoplankton species have evolved various systems to maximize their uptake of these micronutrients. *Pseudo-nitzschia*, appears to have evolved a highly specialized iron uptake system powered by copper and domoic acid. In the presence of these compounds, the uptake of ligand-bound iron increases and *Pseudo-nitzschia* thrives, out competing other phytoplankton species in coastal environments.

Lisa is now an Assistant Research Scientist at Cellana Biofuels in Kona, Hawaii. The company, a subsidiary of British Dutch Shell, is developing techniques to culture phytoplankton rich in oil that can be converted into diesel fuel.

Temporal Changes in Phytoplankton Variable Fluorescence (Fv/Fm) and Absorption as a Result of Daily Exposure to High Light

by Andrea Drzewianowski, M.S. in Oceanography

Working with **Dr. Mary Jane Perry**, Andrea studied the diel patterns of ultra-violet absorption by phytoplankton in the Gulf of Maine. Phytoplankton need light for photosynthesis, but too much UV radiation is known to inhibit photosynthesis. MAAs (mycosporine-like amino acids) are believed to act as sunscreens, providing some protection to phytoplankton during periods of intense light. Andrea measured how much light is absorbed by MAAs and, in her thesis, reported that UV absorption was low in the morning and evening and high at midday. Her data suggest that phytoplankton can respond very rapidly to changes in UV radiation. Upon completing her thesis, Andrea participated in the NAB08 cruise, page 1, and is currently working at the University of Rhode Island for Dr. Tatiana Rynearson.

Commensalism and Reproductive Biology of the Brittle Star *Ophiocreas oedipus* Associated with the Octocoral *Metallagorgia melanotrichos* on the New England and Corner Rise Seamounts

by **Celeste Mosher,** M.S. Oceanography

Working with **Dr. Les Watling**, Celeste studied the symbiotic relationship between an octocoral and a brittle star found on seamounts between 1500 and 3000 feet below sea level. On each octocoral specimen, Celeste found a solitary brittle star. She found evidence that the the brittle stars settle on the octocorals when both are young and that they continue to live together as they grow. Though the octocoral appears to neither benefit nor be disadvantaged by the brittle star, she believes the brittle star is likely obligate to the octocoral, gaining feeding and protective benefits.

Celeste's research shows that there is still much to be learned about seamount communities and reminds us that deep-sea trawling and other human impacts can cause irreparable harm, not to just one species, but to a host of others.

Celeste works for the Gulf of Maine Foundation (page 7) and enjoys time with her husband Jason and little girl Torren.

Visiting Students

Dr. Rick Wahle is a long-time DMC Visiting Investigator. Much of his research focuses on larval and post-larval life history of the American lobster, *Homarus americanus*. This fall, graduate students with similar interests joined Rick and his team at the DMC to collaborate on various lobster projects.

Jana Deppermann is a graduate student at the Carl von Ossietzky Universitaet in Oldenburg, Germany. She is part of a large group of researchers looking at small scale genetic differences in lobster populations. Here in Maine, Jana is collaborating with Dr. Rick Wahle to genetically identify wild and hatchery-reared populations of lobster to determine the success of a "seeding" project Downeast. She will also be looking at genetic differences which may indicate the prevalence of lobster shell disease in localized populations.

Victoria Burdette-Coutts is a graduate student at Memorial University, Newfoundland, Canada. She is interested in the settlement phase of young lobsters. Historical data to date have shown a correlation between recently settled lobsters and juvenile 'teenage' lobsters. In an effort to determine if there is a biological/behavioral mechanism at play here, she conducted settlement experiments in the DMC's Flowing Seawater Lab. Victoria is also involved in a regional larval settlement project (RI-Newfoundland) aimed at improving fisheries models by improving recruitment estimates.

Josh Lord and **Emily Lyczkowski**, seniors from Colby College, spent January '08 in residence at the DMC working on their honors theses. Their subject was the tortoise shell limpet, *Acmaea testudinalis*, a commonly found mollusc in Maine's rocky intertidal. Despite it's ubiquitous nature on Maine's rocky coast, relatively little is known about the mollusc. Josh and Emily studied limpet movement and substrate preference. They tagged and numbered hundreds of limpets at several sites around Pemaquid Point, and then systematically relocated the limpets and tracked their movements back home.

Visiting Graduate Student Awards

$3,400 annually for 1-4 years

The DMC helps graduate students conduct marine biology and oceanography research at our world-class marine laboratory by offering in-kind awards that make field research logistically and financially possible. The awards provide housing, lab space, microscope use, boat time and SCUBA support to qualified graduate students.

The DMC grants up to $3,400 annually for 1-4 years, allowing graduate students to plan long-term projects. Eligible students must be currently enrolled in a graduate program and preference is given to students who have had limited marine lab or field station experience and whose thesis research is field-oriented.

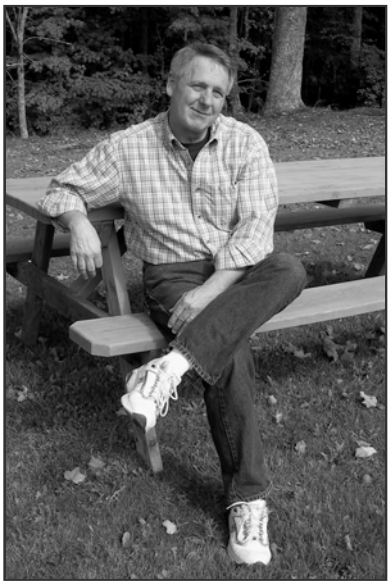
The fact that the DMC now awards multi-year awards allows me to complete an entire Ph.D. thesis here! It also allows me to address seasonal and annual fluctuations in my system and makes for a more complete story.

Thanks, Rachel Lasley
Georgia Institute of Technology
Visiting Graduate Student Award Recipient

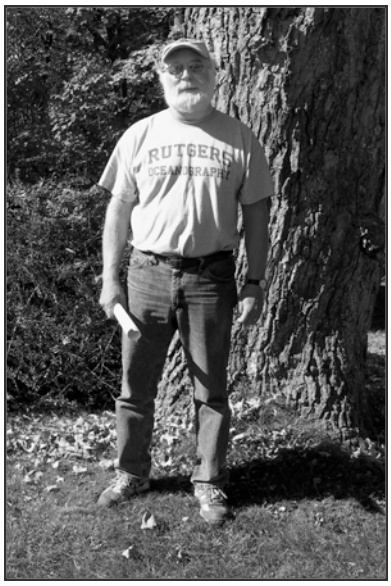
Application information is available at **www.dmc.maine.edu/gradawards.html**. Application deadline is February 15, 2009.

DMC Hosts FSU Lab Directors

As the marine laboratory of the University of Maine, the DMC supports the research and educational efforts of our faculty and students. But we are well known beyond the State of Maine for welcoming visiting scientists from across the country and around the world. This fall, DMC director **Dr. Kevin Eckelbarger** hosted **Dr. Felicia Coleman**, Director, and **Dr. Todd Engstrom**, Associate Director, from the Florida State University Coastal and Marine Laboratory. Felicia and Todd secured funding from the NSF for strategic planning purposes. Their mission is to revamp and renew the FSU marine lab for the 21st century and they are looking to the DMC for innovative insight to that purpose.



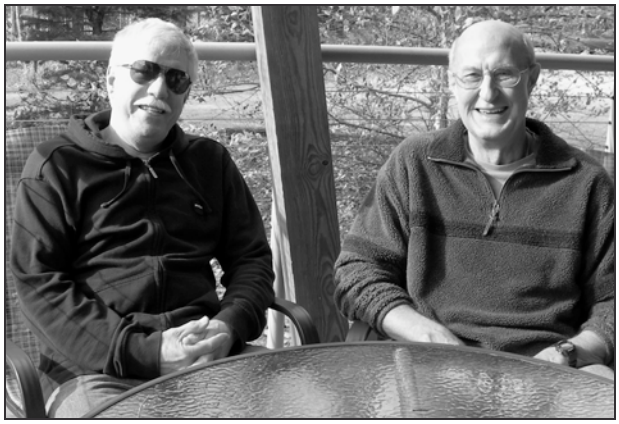
Sabbatical Retreats



On sabbatical from Rutgers University's Institute of Marine and Coastal Sciences, **Dr. Ken Able** (left) collaborated with co-author Mike Fahay (formerly of the National Marine Fisheries Service and currently living in midcoast Maine) on a book titled *Fishes of Temperate Estuaries*. The book is a summary and synthesis of what is known of the life history and ecology of approximately 100 fish species. It will reflect the vast personal knowledge of the subject as well as a literature review.

Dr. Scott See (right) is a Professor of History specializing in Canadian studies at the University of Maine and colleague to DMC resident faculty, **Dr. Warren Riess**. Having just completed a 5-year stint as Chairman of the department, Scott was anxious to delve back into historical research and continue work on two books. One book looks at rioting and group conflict in 19th century Canada examining religious and ethnic conflicts as well as immigrant, labor and political struggles of the time. The other examines persistent myths of US and Canadian nationalism.

Culturing Nematostella for the Classroom



Dr. Leland Johnson spent several weeks at the DMC this fall to collect, culture and experiment with the starlet sea anemone, *Nematostella vectensis*, in collaboration with **Dr. Kevin Eckelbarger** *Nematestella* is a small estuarine anemone native to the east coast of the Unites States. It is currently in the limelight of evolutionary developmental biology (evo-devo) researchers because it has a simple body plan and its genome has been sequenced. This has made *Nematostella* a very useful organism for evolutionary comparisons of developmental regulation in animals. Leland plans to develop simple culture techniques for breeding and maintaining the anemonies, as well as experiments and curricula that can be used in undergraduate teaching laboratories. Kevin intends to continue his ultrastructural investigation of *Nematostella* reproduction.

Leland is a Professor Emeritus at Augustana College, SD, and instructor of the Developmental Biology Teaching Workshop. He and co-instructor **Dr. Eric Cole**, St. Olaf's College, plan to include a *Nematestella* teaching unit in the 2009 workshop.

Field Guide to Bryozoans

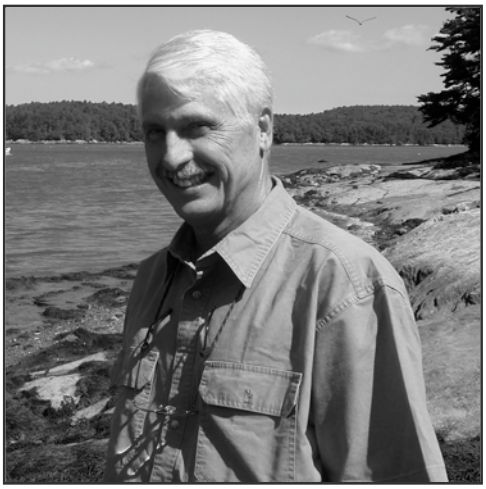
This summer **Dr. Judy Winston** put the finishing touches on a project she started in 1993 with **Dr. Peter Hayward** (Swansea University, Wales, UK): A Field Guide to Bryozoa from Maine to Virginia. Peter and Judy originally sampled 100 sites along the mid-Atlantic and New England coasts describing 105 species. This trip to Maine was to collect and digitally photograph ctenostomes, an order of bryozoans with no calcified skeletons and several undescribed species from the Northeast US coast. *Flustrellidra*, *Alcyonidium* and *Bowerbankia* species, were among the ctenostome specimens Judy found in the intertidal area surrounding the DMC.

Judy is the Curator of Marine Biology at the Virginia Museum of Natural History. The field guide is due for publication this winter.

I had most comfortable accommodations, lab space was great, and everyone was really helpful in making sure I got what I needed to finish work — even the bryozoans cooperated. I will be back!

Dr. Judy Winston
Virginia Museum of Natural History

Lobsters & Pesticides



Dr. Michael Horst has been studying the effects of methoprene on the American lobster, *Homarus americanus*, since the 1999 lobster die-off in Long Island Sound.

Methoprene was a suspect agent in the die-off as it had been sprayed in the New York metro area to control mosquitoes carrying the West Nile Virus. In laboratory experiments, Mike found the pesticide to accumulate in specific lobster tissue. He also discovered that methoprene suppresses the ability of lobsters to make the proteins needed to regrow shells after molting and that short-term exposure methoprene affects genes in lobsters' digestive glands. His findings suggest methoprene may have been one factor in the massive die-off.

Mike is a Professor of Biochemistry at the Mercer University School of Medicine in Macon, GA. He has been studying crustacean shell formation in residence at the DMC each summer since the early 1990's.

Visiting Investigators

The DMC is a user-friendly field station for marine researchers. Competitive rates and easy access to diverse intertidal habitats and the Gulf of Maine have drawn hundreds of scientists to the DMC in the last decade. Our professional support staff can provide assistance with specimen collection, equipment use, laboratory set up and housing. For more information, contact Tim Miller, Laboratory Manager, at temiller@maine.edu.

Visiting Scholars

The DMC invites senior-level faculty and researchers to work in residence during the academic year, September to May. Selected Scholars will receive free furnished housing and office space. Preference will be given to applicants who will collaborate or interact with resident faculty and students in a way that will be mutually beneficial. Interested applicants should submit a letter of interest to Dr. Kevin Eckelbarger, DMC Director, at kevine@maine.edu

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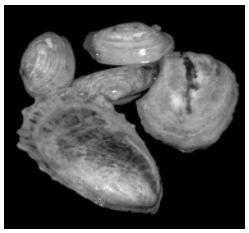
Educational Programs

The DMC offers field trips for undergraduate marine biology and ecology classes. B.Y.O. boots! We've got lots of marine habitats to explore! Interested faculty can get more information at **www.dmc.maine.edu/viscolleges.html**

Educational opportunities for K-12 classes are provided in the spring and fall by the Gulf fo Maine Foundation, page 7.

Courses & Workshops



Shellfish Mariculture Techniques
May 18-22
A five-day course exploring the theory and practice of marine bivalve aquaculture in the Northeastern United States. SMS 309/598, 2 credits.

Developmental Biology Teaching Workshop
June 2-5
A four-day hands-on teaching workshop for college-level developmental biology teachers wishing to diversify their laboratory lessons.

Future Teachers Academy
June 22-26
A five-day workshop for high school juniors and senior who excel in Math and science and would like to explore a career in teaching.

Introduction to Research Diving
Fall semester. Date and time TBA.
A semester course for divers who want to hone their SCUBA skills in preparation for underwater research projects. SMS 491, 3 credits.

Workshop information available at
www.dmc.maine.edu/courses.html

Semester by the Sea

Semester By the Sea is a program for college/university juniors and seniors interested in marine science. During the fall semester, SBS students live at the DMC and explore the organisms, habitats and maritime history of the Gulf of Maine in field-oriented classes including:

Marine Ecology
Design of Marine Organisms
Biology of Marine Invertebrates
Zooplankton & Ichthyoplankton
Maritime History & Archaeology
Introduction to Research Diving
Human Impacts on the Ocean
Undergraduate Seminar

Read what the students are saying about SBS at
www.umaine.edu/marine/programs/sbs1.php

Detailed program description and application form available at
www.dmc.maine.edu/sbs.html