Making Waves
At the Darling Marine Center

Totally Immersed in Ocean Science

Eight undergraduates from the University of Maine are being totally immersed in ocean science at the Darling Marine Center this fall. These students have elected to spend a semester away from the Orono campus to participate in the School of Marine Sciences' new Semester by the Sea (SBS) program — a unique educational experience with a strong emphasis on field and laboratory techniques.

SBS courses are vastly different from their Orono counterparts. As opposed to traditional marine science courses that are taught for an hour or so three times a week, with chalk on a blackboard, miles away from the ocean, the intensive SBS courses meet once a week and generally last all day.

See **SBS** on page 7.

Renee Baribault identifies a marine creature collected at Pemaquid Point during the SBS Invertebrate Zoology class.

Dr. Peter Jumars

Dr. Mary Jane Perry

A Warm Welcome

The Darling Marine Center is pleased to welcome two new professors to the University of Maine's School of Marine Sciences, Dr. Mary Jane Perry and Dr. Peter Jumars.

Professor Perry received her Ph.D. in Oceanography from the Scripps Institution of Oceanography in the area of nutrient dynamics of phytoplankton, free-floating microscopic plants. Recently she has focused on how phytoplankton affects the optical properties of seawater in remote-sensing applications.

Professor Jumars received his Ph.D. in Oceanography from the Scripps Institution of Oceanography in the area of deep-sea benthic ecology. He has specialized on animals that eat marine sediments and how they alter biological, physical, chemical and geological processes at the seafloor.

See **Peter & Mary Jane** on page 3.

In This Issue of Making Waves

Darling Marine Center • University of Maine • Walpole, Maine
Making Waves • Vol. 8, No. 2 • November 1999
http://server.dmc.maine.edu

Keith Leeman
DMC Maintenance Supervisor

Retirement

We wish a fond farewell to our Maintenance Supervisor, Keith Leeman, who will be retiring at the end of November.

Keith has worked on the DMC property for almost 45 years. In 1955, two weeks after marrying his wife Irene, Keith began working for Mr. Ira C. Darling as Caretaker. He maintained the grounds to Mr. Darling's impeccable standards; edging lawns and gardens, mowing fields and growing vegetables. In the late 1950's Mr. Darling became interested in tree farming. Over the next several years, Keith planted trees — acres of Red Pine, Norway Pine and Norway Spruce.

When Mr. Darling donated the property to the University of Maine in 1965, Keith agreed to stay on. In the years that followed, Keith helped transform the farm into a marine lab. First there were renovations to the Horse Barn. Keith helped turn the hay loft into library and dormitory space, turn the harness room into office space and the animal stalls into a kitchen. "We worked all night", he remembers, to get the barn ready for the first students, a visiting group from Bates College.

Then there were improvements to the Cow Barn, the building of the Kresge Classroom, and the development of the waterfront facilities. Keith chuckles as he remembers "shoveling poop out of the hen house" to make room for a carpenter's shop.

Today Keith keeps things humming! He oversees the rest of the maintenance crew, taking care of the buildings and grounds. He makes sure the lights are on and the water is running—both fresh and salt. In winter he keeps the drive way plowed so DMC scientists can do their thing anytime of the day or night, no matter what the weather.

We wish Keith the best of luck and hope he enjoys retirement to its fullest!

Aimee Phillippi in the Flowing Seawater Lab.

Welcome! Aimee Phillippi is the DMC's newest Ph.D. student. She recently completed her Master's degree at the University of Massachusetts, Dartmouth, where she tested a process known as surface flocking (a way to make a smooth surface fibrous) to see if it was effective at deterring recruitment of fouling algae and invertebrates. With her thesis research, Aimee worked with many different species, but enjoyed colonial ascidians the most. Here at the DMC, working with Dr. Phil Yund, Aimee plans on pursuing her interests in colonial ascidian ecology, most likely the reproductive ecology of *Botryllus schlosseri*.

Annaliese Eckhardt Pugh and advisor Dr. Les Watling.

Annaliese Eckhardt Pugh successfully completed the requirements for a Master of Oceanography degree with the presentation of her thesis *Effects of Mobile Fishing Gear on Bolder Bottom*. Annaliese's quantitative study of two sites in the Gulf of Maine showed that trawling decreases the diversity and complexity of these benthic communities. **Congratulations!**

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Tim Miller, Laboratory Manager
Linda Healy, Science Writer & Events Coordinator

Peter & Mary Jane

Continued from page 1.

Both Jumars and Perry hail from the University of Washington, and are now in residence at the DMC. Several years ago they started looking for a change. The President of the University of Maine obtained references from the National Science Foundation and the Office of Naval Research which unanimously rated the two scientists as "first class." The University of Maine seized the opportunity and hired Jumars and Perry for the School of Marine Sciences.

Dr. Bruce Sidell, Director of the University's School of Marine Sciences (SMS) is thrilled to have Jumars and Perry on board. He is particularly pleased that such high caliber scientists find the University's rapidly developing programs in marine sciences to be "attractive and exciting professional opportunities."

Dr. Kevin Eckelbarger, Director of the DMC, is also excited about their arrival. Noting that both faculty have "excellent track records" in obtaining research funding and both are committed to undergraduate and graduate-level teaching, Eckelbarger believes their presence will help "enhance and expand" the DMC's research and teaching missions.

Perry and Jumars bring the total number of resident faculty at the DMC to ten. Dr. Perry's expertise in phytoplankton and nutrient dynamics adds a new facet to the disciplines of marine science studied at the DMC. Dr. Jumars' expertise in benthic ecology makes the DMC a hot bed for this area of study.

Cutting the ribbon from left to right: Architects Lori Williams and John Weinrich from Weinrich and Burt Associates; Dr. Kevin Eckelbarger, Director of the DMC; UMaine President Dr. Peter Hoff; Amos Orcutt, President and CEO of the University of Maine Foundation; Tim Miller, DMC Laboratory Manager.

The Grand Opening

The official ribbon cutting ceremony and grand opening of the Darling Conference Center was held on August 25th. On hand for the event was University of Maine President Dr. Peter Hoff, and the Board of Directors of the University of Maine Foundation, the private non-profit organization that helped fund the project.

To schedule an educational or scientific meeting at the DMC, please contact our Events Coordinator at 207-563-3146, extension 200, or by e-mail at lhealy@maine.edu.

DMC Receives N.S.F. Facility Award

The DMC has received a facility improvement award from the National Science Foundation. Including matching funds from the University of Maine, the current award will provide $203,000 to construct a 30-student classroom on the DMC's waterfront campus and to purchase a variety of sophisticated research instruments. The new classroom will be built as a wing on a 2-story, $2 million Marine Culture Laboratory scheduled for construction next May.

Brooke's Plaque

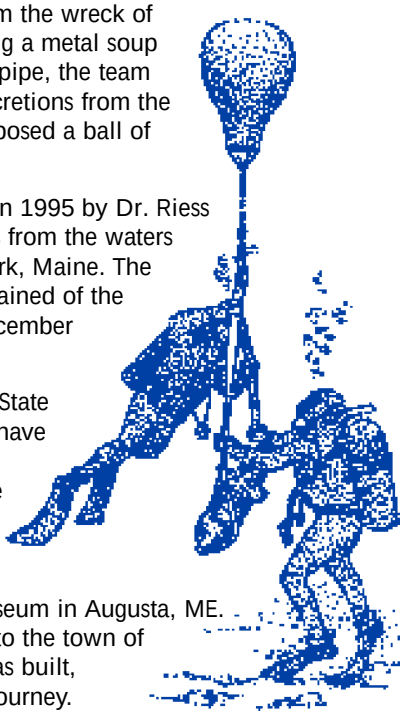
Frank and Gerry Olsen

The Darling Marine Center was a very special place to Brooke Putman Olsen, one of the 1997 summer interns. As regular readers of *Making Waves* may remember, Brooke died in a tragic automobile accident. In memory of their daughter, Frank and Gerry Olsen presented the Center with a beautiful plaque which now hangs in the Conference Center, just outside the dining room. The inscription, written in Brooke's own words speaks to people of all ages, especially to young adults like the undergraduates who will use the facility most. The dining hall is now affectionately referred to as Brooke Hall.

Danica Crosby, Dr. Warren Riess and Aaron Taylor with artifacts from the Nottingham Galley.

Powder and Twine

Dr. Warren Riess and summer interns Aaron Taylor, University of New Mexico, and Danica Crosby, Erskin Academy in Jefferson, Maine, carefully unloaded a cannon from the wreck of the British ship *Nottingham Galley*. Using a metal soup can secured to the end of a long plastic pipe, the team slowly removed centuries' worth of concretions from the gun tube. Patience and gentle prying exposed a ball of twine and two bags of gunpowder.



The cannon was one of nine recovered in 1995 by Dr. Riess and a team of UMaine staff and students from the waters near Boon Island, seven miles east of York, Maine. The cannon and munitions were all that remained of the *Nottingham Galley*, which sank in a December storm in 1710.

Working in conjunction with the Maine State Museum, Dr. Riess and several students have spent the past four years conserving and analyzing the cannon and artifacts at the Darling Marine Center. Later this fall, eight of the nine cannon and all of the artifacts will then be transported to their permanent home in the Maine State Museum in Augusta, ME. The remaining cannon will be returned to the town of Nottingham, England, where the ship was built, thereby completing its nearly 300 year journey.

Recent Publications

Bock, M. and **L. Mayer**. 1999. Digestive plasticity of the marine benthic omnivore *Nereis virens*. J. of Exp. Mar. Biol. and Ecol. 240:77-92.

Chen, Z. and **L. Mayer**. 1999. Sedimentary metal bioavailability determined by the digestive constraints of marine deposit feeders: gut retention time and dissolved amino acids. Mar. Ecol. Prog. Ser. 176:139-151.

Chen, Z. and **L. Mayer**. 1999. Assessment of sedimentary Cu availability: A comparison of biomimetic and AVS approaches. Env. Sci. Tec. 33:650-652.

Dudgeon, S., **R.S. Steneck**, I.R. Davison. and R.L. Vadas. 1999. Coexistence of similar species in a little-disturbed, space-limited intertidal zone. Ecol. Monogr. 69:331-52.

Eckelbarger, K.J., P.A. Tyler, and R.W. Langton. 1998. Gonadal morphology and gametogenesis in the sea pen *Pennatula aculeata* (Anthozoa: Pennatulacea) from the Gulf of Maine. Mar. Biol. 132:677-690.

Findlay, R.H. & **L. Watling.** 1998. Seasonal variation in the structure of a marine benthic microbial community. Microb. Ecol. 36:23-30.

Folino, N. and **P.O. Yund**. 1998. The distribution of *Hydractinia* sibling species on hermit crabs in estuaries in the Gulf of Maine. Estuaries 21:829-836.

Gerken, S. and **L. Watling.** 1998. *Diastylis tongoyensis*, a new diastylid (Crustacea: Cumacea) from the northern central coast of Chile, with an amendment to the description of *Diastylis crenellata* Watling & McCann 1997. Proceedings of the Biological Society of Washington 111:857-874.

Hessler, R.R. & **L. Watling**. 1999. Les Péracarides: un groupe controversé. Traité de Zoologie, Anatomie, Systematique, Biologie. Tome VII, Fascicule III A, Crustacés Péracarides. Mémoires de l'Institut Océanographique, Monaco, 19: 1-10.

Lawrence, A.L., K.M. McAloon, R.P. Mason, and **L.M. Mayer**. 1999. Intestinal solubilization of particle-associated organic and inorganic mercury as a measure of bioavailability to benthic invertebrates. Env. Sci. Tec. 33:1871-1876.

Leonard, G.H., M.D. Bertness, and **P.O. Yund**. 1999. Crab predation, water-borne cues and inducible defenses in the blue mussel, *Mytilus edulis*. Ecology 80:1-14.

Mayer, L.M. 1999. Extent of coverage of mineral surfaces by organic matter in marine sediments, Geochimica et Cosmochimica Acta. 63:207-215.

Mayer, L., E. Druffel, M. Bender, E. Boyle, R. Jahnke, W. Jenkins, C. Lee, G. Luther, and W. Moore. 1999. Even more interdisciplinary future lies ahead for ocean chemistry. EOS 80:207-210.

Visit the Darling Marine Center on the web http://server.dmc.maine.edu

King & Mayer Honored

When Ira C. Darling donated his mid-coast Maine property to the University of Maine as a marine lab, he also endowed two professorships in memory of his wives Clare and Agatha.

This fall University of Maine President Dr. Peter Hoff approved the appointments of Dr. Gary King as the Clare S. Darling Professor of Oceanography and of Dr. Larry Mayer as the Agatha B. Darling Professor of Oceanography.

Dr. Mayer is “grateful for the honor” and notes the accomplishment shared in part with “all in the biogeochemistry lab.” Dr. Gary King views the Professorship as a “special honor and privilege” because it is based on recognition from colleagues, among whom are many “equally or even more deserving.”

Each appointment comes with an annual monetary award of approximately $25,000. Both recipients believe the monetary support will allow them to further the goals of Mr. Darling's bequest—research, teaching and service.

Dr. Larry Mayer, the Agatha B. Darling Professor of Oceanography

Dr. Mayer plans to use the funds to develop a new course for the Semester by the Sea program dealing with human influences on the ocean, and to pay for outreach materials he uses with a South Bristol school group. In terms of research, the award will provide him with the “financial flexibility” to explore new research directions.

Dr. Gary King, the Clare S. Darling Professor of Oceanography

Dr. King plans to use support from the endowment to maintain productive research, teaching and service efforts and to support in part "high risk" research that can ultimately be leveraged into long-term programs.

Mayer, L.M., R.G. Keil, S.A. Macko, S.B. Joye, K.C. Ruttenberg, and R.C. Aller. 1998. The importance of suspended particulates in riverine delivery of bioavailable nitrogen to coastal zones, Global Biogeochem. Cycles 12:573-579.

Mayer, L.M., **L.L. Schick**, and T. Loder. 1999. Dissolved protein fluorescence in two Maine estuaries. Mar. Chem. 64:171-179.

Norse, E. and **L. Watling**. 1999. Impacts of mobile fishing gear: the biodiversity perspective. Pp. 31-40, in L. Benaka, editor. Fish habitat: essential fish habitat and rehabilitation. American Fisheries Society Symposium 22, Bethesda, Maryland.

Palma, A.T., **R.S. Steneck** and **C. Wilson**. 1999. Settlement-driven, multiscale demographic patterns of large benthic decapods in the Gulf of Maine. J. Exp. Mar. Biol. Ecol. 241: 107-136.

Pilskaln, C.H., J.H. Churchill and **L.M. Mayer**, 1998. Resuspension of sediment by bottom trawling in the Gulf of Maine and potential geochemical consequences. Journal of Conservation Biology 12:1223-1229.

Stewart-Savage, J., Wagstaff, B.J., and **P.O. Yund**. 1999. The developmental basis of phenotypic variation in egg production in a colonial ascidian: Primary oocyte production versus oocyte development. Biol. Bull. 196:63-69.

Watling, L. (Guest Editor). 1998. Special section "Effects of mobile fishing gear on marine benthic communities." Conservation Biology.

Watling, L. and E. Norse. 1998. Disturbance of the seabed by mobile fishing gear: a comparison to forest clear-cutting. Conservation Biology 12:1180-1197.

Watling, L. 1999. Toward understanding the relationships of the peracaridan orders: the necessity of determining exact homologies. Pp. 73-89, In F.R. Schram & J.C. von Vaupel Klein (editors). Crustaceans and the Biodiversity Crisis. Proceeding of the Fourth International Crustacean Congress, Amsterdam. Brill, Leiden, The Nether lands.

Wilbur, A.J. and **R.S. Steneck**. 1999. Polychromatic patterns of *Littorina obtusata* on *Ascophyllum nodosum*: are snails hiding in intertidal seaweed? Northeastern Naturalist 6:189-198.

Mick Devin with the fiberglass trays in which he rears urchins in the FSL.

DMC Researcher Wins Challenge Grant

Mick Devin, founder and president of Acadia Seafood International (ASI) and Ph.D. candidate in residence at the DMC, is the recipient of a $52,279 Challenge Grant from the Maine Science and Technology Foundation to establish an experimental hatchery for marine invertebrates at the DMC.

Specifically, Devin is interested in developing culture techniques for the green sea urchin, *Strongylocentrotus drobachiensis,* that will enhance the quality of their roe for the Japanese sushi market. He plans to investigate the effects of physical parameters such as light and temperature, and diet on roe growth and quality. His research could dramatically affect the value of Maine sea urchins by improving quality and volume of urchin roe shipped to Japan for the sushi market.

Devin holds a Master's degree in Marine Biology from Florida Institute of Technology where he worked under Dr. Craig Young at the Harbor Branch Oceanographic Institution. He has recently begun work on his Ph.D. through the University of Maine's School of Marine Sciences. His co-advisors are Dr. Bruce Barber and Dr. Kevin Eckelbarger.

GMF hosts a luncheon for SURE interns. Seated from left to right, SURE supporters Dr. John German, Anne Ramsey, Dr. Mel Fuller and SURE intern Jarod Rollins from the University of Maine

GMF Summer Wrap-up

❖ The GMF lecture series was once again very successful. It included seven evening talks on marine biology, maritime history, and maritime art.

❖ In July and August GMF volunteers gave biweekly tours of the DMC.

❖ The volunteer trail blazing team led by Elsie Morse and Dr. John German finished a series of trails through the Center's property this summer.

❖ The GMF awarded ten Summer Undergraduate Research Experience (SURE) internships to students from across the country. There was a SURE intern in every DMC lab pursuing research interests in marine biology, microbial ecology, geochemistry and maritime history

❖ GMF's new President is Dr. Warren Riess, a long-time member of the Board of Directors and Research Associate Professor of Maritime History and Marine Sciences at the Darling Marine Center. Members know Warren from interesting summer lectures, his involvement with workshops at the DMC, and PBS's Quest television program, *Shipwreck!* During his one year term he plans to help continue the lecture series and intern scholarship program and strongly support GMF's special K-12 education committee.

❖ Sarah Crosby, GMF board member and Principal of Bristol Consolidated School, is now chairing a special GMF committee to develop a K-12 marine science program at the DMC. This program is GMF's major project for the beginning of the new millennium!

The Gulf of Maine Foundation (GMF) is a non-profit corporation founded in 1986 to foster the growth and development of marine studies at the Darling Marine Center. They provide funds for facilities, equipment and undergraduate research scholarships. GMF is also developing a program to enrich the exposure of the area's young people to science and the marine environment. Membership material may be obtained by writing:
The Gulf of Maine Foundation,
P.O. Box 185, Damariscotta, ME 04543

GMF Board of Directors

SBS continued from page 1.

The specially designed classes explore coastal geology, marine ecology, invertebrate biology, fish biology and natural resource economics while taking advantage of the DMC's research vessels, wet and dry laboratories, and proximity to the Gulf of Maine. A weekly seminar ties together the interdisciplinary facets of all the courses.

In many ways "SBS resembles an internship program," notes Center Director, Dr. Kevin Eckelbarger, whereby students spend less time in the classroom and more time studying the marine realm first hand. He fully expects the SBS model to become "commonplace" at other universities because it better prepares students for marine careers.

The DMC has long supported the University of Maine's marine research and educational efforts, though primarily at the graduate level. Newly expanded dormitory and dining facilities now make it possible for the DMC to accommodate long term programs such as SBS, thereby expanding the Center's overall mission of teaching, research and service the University's School of Marine Sciences.

Above: Jasanna Spaulding learning to make beach profiles during a field trip to Popham Beach State Park

Below: Dr. Detmar Schnitker (right) instructs Curtis Johnson in beach profiling at Popham Beach State Park.

Above left: Andrew Johnston goes in over his hip boots for the sake of science! Above right: Stuart Goldberg taking a closer look at specimens in an Invertebrate biology lab.

Have we sparked your interest?

Semester by the Sea meets SMS degree requirements. The program is open to students from any University of Maine campus, as well as other academic institutions.

For more information about Semester by the Sea 2000, contact Dr. Jim McCleave at the School of Marine Sciences at mccleave@maine.edu, or by phone at 207-581-4392.

Above: Dr. Douglas Morse and summer intern, Deepa Iver.

The Spider People

Dr. Douglas Morse, Professor and Chairman, Department of Ecology & Evolutionary Biology, Brown University and a team of graduate and undergraduate students have been studying the crab spider, *Misumena vatia* in the fields of the Darling Marine Center for the past five years. This summer the team was interested in two lines of inquiry: hunting site selection and sexual selection.

Misumena is a tiny spider that does not build webs, but rather is a sit-and-wait hunter. It also portrays an interesting twist on sexual dimorphism. *Misumena* males are dwarfs, often only 1/100 the size of a female, and are commonly outnumbered by females at ratios up to 5:1. Though the males do not appear to use pheromonal cues to find and follow the females, they do recruit to the same flower sites. At these sites, males seldom find prey small enough to eat, but they do find the females.

In the coming summers, Dr. Morse hopes to combine these lines of inquiry and compare how selection for certain traits associated with choosing flowers might operate similarly in both sexes, even though the rewards are different: food for females, females for males.

Right: Sara Brunner observing young crab spiders on golden rod.

Above: Dr. John Stewart-Savage, University of New Orleans.

Right: UNO graduate student Bill Newlon collecting ascidians.

The Hermaphroditic Nature of Tunicates

Botryllus scholsseri is a colonial ascidian, or tunicate, commonly found subtidally on mooring chains, pilings, rocks, and the underside of floats. An interesting aspect of ascidian biology is that it is hermaphroditic — each individual has both male and female reproductive structures.

Ascidian reproductive biology is what brings Dr. John Stewart-Savage to the DMC. A reproductive physiologist at the University of New Orleans, Stewart-Savage also works on frogs, wallabys and hampsters. He has spent four of the past seven summers at the DMC collaborating with Dr. Phil Yund. Stewart-Savage examines the issue on a small scale, studying the mechanics of ascidian reproduction. Yund then tries to explain how the reproductive strategies have made these hermaphroditic organisms so successful on an evolutionary scale.

This summer, Stewart-Savage and his graduate student Bill Newlon conducted experiments to determine how much egg and sperm were produced, and the relative rates of fertilization. They were particularly interested in how the hermaphroditic, colonial *Botryllus scholsseri* deals with self/non-self recognition and self/non-self fertilization.

The DELTA System

DELTA (DEscription Language for TAxonomy) is a flexible and powerful method of recording taxonomic descriptions for computer processing. Among the many facets of the DELTA system is the *Intkey* package for interactive identification and information retrieval.

The DELTA system is in use worldwide for many kinds of organisms, including viruses, corals, crustaceans, insects, fish, fungi, plants, and wood. Data sets have been produced in Chinese, Dutch, French, German, Greek, Indonesian, Italian, Portuguese, and Spanish. The Intkey program itself is currently available in English, French, German, Italian, and Spanish versions.

DELTA has been adopted as a standard for data exchange by the International Taxonomic Databases Working Group.

For more information visit the website: www.biodiversity.uno.edu/delta/

Dr. Blythe Nilson, Okanagan University College, British Columbia, Canada; a guest lecturer for the DMC's Developmental Biology Workshop.

Workshop Benefits 1000's of Students

Taught by Dr. Leland Johnson from Augustana College in Sioux Falls, SD, the Developmental Biology Teachers Workshop has been one of the most popular summer workshops at the DMC. The workshop now has over seventy alumni, which together instruct over 1400 students per year. In total, Dr. Johnson estimates "over ten thousand" undergraduate students have benefited from the techniques these instructors have learned and incorporated into their lesson plans since 1992.

Front row: Ruben Rios, VIMS; Pilar Haye, DMC; Sarah Gerkin, DMC; Les Watling, DMC; Sara LeCroy, University of South Mississippi; David Camp, Editor of the Journal of Crustacean Biology. Back row: Jim Lowry, Australian Museum; Cees Hof, University of Bristol, U.K.; Exequiel Gonzalez, DMC; Terry McFarlane, Western Australian Herbarium; Jim Thomas, Nova University.

Crustacean Taxonomists Create Interactive Key

Crustacean biologists from around the world met at the DMC to begin the process of developing an interactive taxonomic key using the DELTA (DEscriptive Language for TAxonomy) system. Dr. Les Watling of the DMC invited workshop leaders Dr. Jim Lowry and Dr. Terry MacFarlane to the United States to stir-up enthusiasm

Dr. Lowry, of the Australian Museum, wants to get crustacean biologists up to speed with the DELTA program and develop a large website at the Australian Museum where people can go to identify any crustacean from anywhere in the world (assuming its been described). It is a project that will take several years, but step one is preparing databases.

Dr. MacFarlane,a botanist with the Western Australian Herbarium, has been using DELTA since its inception. He instructed the group on the finer points of developing the database, explaining what the program did with the data they entered.

The work continues in the Watling lab. Dr. Watling and his Ph.D. student Pilar Haye (pictured right) are working at the genus level in several families of cumaceans and Ph.D. student Sarah Gerkin is doing all the species in the primarily austral family gynodiastylidae.

Summer Science

The "Dream Team" from left to right: Andrew Altiere, University of California, Santa Cruz, David Huang, Bigelow Laboratory, Amy Winkle, Cornell University, Julien Gaudette, Laval University, Dr. Rick Wahle, Bigelow Laboratory.

Greg Welch, University of New Hampshire, was one of five summer interns diving for Dr. Bob Steneck on the most comprehensive lobster survey every conducted along the coast of Maine.

Juvenile Lobster Research

On a regular basis, Dr. Rick Wahle, research scientist at the Bigelow Laboratory for Ocean Sciences uses the DMC as home base for his summer research projects, taking advantage of the Center's SCUBA facilities and research vessels.

This summer Dr. Wahle, four undergraduate interns Amy Winkle, Andrew Altierre, Carin Poeschel and Julien Gaudette, and his technician David Huang worked on the first leg of a two-year Sea Grant-funded lobster research project designed to study what happens to young lobsters as they emerge from their cobble nursery grounds. Wahle's study will help refine models of lobster population dynamics by describing how many young lobsters emerge from cobble nursery grounds, how many succumb to predation or some other form of mortality and how many emigrate to other habitats. A daunting task!

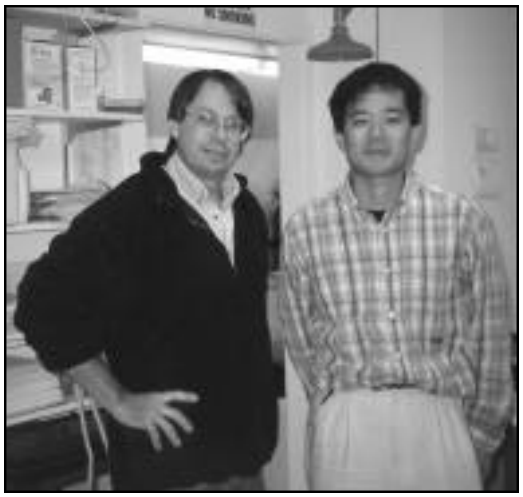
This summer, Wahle's crew collected data from 11 sites in the coastal waters of Maine, New Hampshire and Rhode Island. Dr. Wahle describes his crew as "the dream team." And it is no wonder, according to DMC Safety Officer Robbie Downs, these six divers logged over 700 hours of dive time during the summer!

Summer Interns

This summer 26 undergraduate students from 20 different colleges and universities held internships at the DMC. They came from 17 states across the United States and 3 Canadian provinces. Financial support for DMC internships comes from the Gulf of Maine Foundation (see page 6) and faculty grants.

Internships will again be available for the summer of 2000. If you are interested, contact our Internship Coordinator at 207-563-3146, extension 200, or by e-mail at lhealy@maine.edu. Internship information and applications will be available on line later in the year. Check out our website for details: http://server.dmc.maine.edu

Lisa Onaga, Brown University, worked in Dr. Phil Yund's lab studying the reproductive ecology of colonial tunicates.



Dr. Gary King and visiting investigator Dr. Kenji Nanba in the microbial ecology lab.

Visiting from Japan

Dr. Kenji Nanba of the University of Tokyo is a visiting Investigator at the DMC this fall. He came to Maine to work with Dr. Gary King in the microbial ecology laboratory for two months. King and Nanba are examining the impact of aluminum in soils on atmospheric methane consumption by soil microbes. These microbes play a significant role in the global methane budget. Aluminum that occurs naturally or that can be mobilized by acid rain appears to inhibit methane utilization, which in turn can exacerbate global climate change. King and Nanba will continue their collaboration after Nanba returns to Japan and extend the work to include other important trace gases (nitrous oxide, carbon monoxide, hydrogen).

Dr. Betty Twarog (left) and Dr. M. Patricia Morse (right) on the deck of the DMC Conference Center.

Dr. Jim Wilson with visitors Dr. Carl Simon, Dr. Bobbi Low and Thorin from the University of Michigan.

Ecology and Economics Mix at the DMC

For the month of October, Dr. Bobbi Low and Dr. Carl Simon were at the DMC on sabbatical leave to collaborate with Dr. Jim Wilson, Graduate Coordinator of Marine Policy at the University of Maine's School of Marine Sciences (SMS).

Drs. Low and Simon are both from the University of Michigan. Dr. Low is a Professor of Resource Ecology and a Faculty Associate at the Institute for Social Research. She is interested in the behavioral ecology of humans, especially in resource applications, and population-environment dynamics. Dr. Carl Simon is the Director of the Center for Study of Complex Systems and Professor of Mathematics and Public Policy. Dr. Jim Wilson works on fisheries and economic issues.

The three researchers pooled their expertise in resource management, ecology and economic theory and worked cooperatively to develop dynamic models of human-ecosystem interactions, specifically modeling the relative sustainability of "one-species-in-several-ecosystems" versus "multiple-species-in-a-single-ecosystem".

Dr. Simon also presented a three hour seminar on "game theory" at the DMC. Game theory was developed principally within the economics profession, but now has many applications and practioners in other disciplines, especially biology. Applications range from evolutionary biology to industrial organization to the behavior of flocking animals to common property problems such as those that arise in fisheries.

Stopping by for a Visit

Dr. M. Patricia Morse, Acting Professor of Zoology from the University of Washington was in Maine this summer to to attend a meeting of the Board of Trustees at Bates College. While she was in the neighborhood, she stopped by for a visit. Dr. Morse toured the new Conference Center and caught up with one of her former advisees, Dr. Kevin Eckelbarger, and good friend Dr. Betty Twarog.

DMC Open House

In August the DMC hosted it's first Open House in almost ten years. The Open House provided the local community with a great opportunity to learn how the Center functions as the marine laboratory for the University of Maine and to learn about the research and education being conducted here. Almost 300 visitors toured the campus, explored a touch tank, examined microscopic critters, and watched underwater video footage. Colorful demonstrations and posters described current research, and faculty, staff and students were on hand to answer questions. Photographs by Tom Arter.

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Clockwise from upper left: DMC Safety Officer, Robbie Downs, preaches the importance of underwater safety to a captivated audience. Future marine biologists laugh at a joke told by a sea scallop at the touch tank. Dr. Bob Steneck (right) explains his lobster research. Graduate Student Steff Zimsen shows how underwater sampling gear works.