

COASTAL STUDIES CENTER

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TRANSITIONS

MICHAEL KOLSTER, COASTAL STUDIES CENTER ADVISORY COMMITTEE

The Coastal Studies Center Advisory Committee is pleased to report that the CSC supported a wide range of faculty and student research during the 2006-2007 academic year. The CSC provides a nexus for multi-disciplinary and inter-disciplinary research intended to broaden our understanding of a range of issues affecting the coast. A primary goal of the CSC is to foster undergraduate involvement in field work and research as a complement to traditional classroom-based learning.

Student and faculty field work and research at the CSC has been augmented by the installation of the pier in fall 2006, which is being used extensively— from the Bowdoin Science Experience for first-year students, to lab and field work exercises for many classes and improved coastal access for student and faculty research projects. In November, the Bowdoin oceanographic sensing buoy was launched in Harpswell Sound, providing near continuous data on background conditions and unusual events in the Sound, as well as the opportunity for sampling and study at the CSC. These installations are providing Bowdoin students and faculty with state of the art observations and analysis of the coastal environment.

The year has proved to be transitional for the CSC. Anne Henshaw, our director since 2000, left her position in late August. While Anne remains associated with the College as a research associate, her leadership of the program will be missed. Anne worked with a broad constituency to develop multidisciplinary programs for the CSC. Under her guidance the

center initiated student and faculty fellowships, a variety of seminars and symposia, the Coastal Studies Scholar in Residence program, and a teacher training institute for Middle School teachers.

The Coastal Studies Center Advisory Committee wishes to thank Anne for her thoughtful and effective leadership, and to wish her every success in her new endeavors. The CSC Advisory committee will provide oversight for the Coastal Studies Center during this transitional year and will evaluate programming needs and priorities.

RESEARCH AND TEACHING

The CSC welcomed **Sherri Cooper** as Coastal Studies Scholar in Residence. Dr. Cooper is biology Program Director, and Professor at Byrn Athyn College. She is a recognized authority on the historical ecology of Chesapeake Bay and Pamlico Sound and has made seminal contributions in estuary science. Her expertise in reconstructing environmental history and her research while at Bowdoin have added to the study of the ecology and environmental history of Merymeeting Bay and the Lower Kennebec estuary. Cooper gave a public lecture on her research and taught an upper level course in Coastal Ecology while at Bowdoin. She introduced her students to algae related fieldwork, and examined current issues in coastal ecosystems, such as wetland problems in and around Louisiana, increased storm activities, and sea level changes.

Doherty Scholar **Jon Allen** spent the second year of his post doctoral position at the marine lab. He also taught a non-majors Biology course, Evolution in America, supervised three student summer research fellows and advised an independent study for **Eric Robinson ('07)** at the marine lab for two semesters.



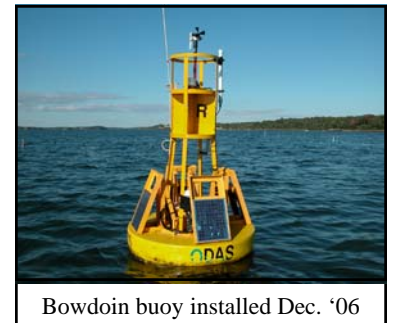
RESEARCH AND TEACHING



2007 Coastal Studies Summer Fellows at the CSC Poster Symposium

The summer research season was active in 2006-2007 with twelve students conducting a variety of projects at the marine lab and CSC and other coastal locations in Maine. **Ben Lake ('07)**, under the supervision of **Amy Johnson** (Biology) spent much of the fall measuring metabolic rate and feeding behavior in barnacles as part of his senior honors project. In the fall of 2006 and the spring of 2007, Doherty Scholar **Jon Allen** and **Eric Robinson ('07)** carried out a series of laboratory experiments measuring the palatability of marine invertebrate embryos to predators including lobsters, green crabs, and rock crabs. Also in the spring, **Nick Alcorn ('08)** followed up on his work from the summer of 2006 by setting up experiments measuring the effects of maternal investment on the development and growth of larval green sea urchins. Nick continued his research as a Doherty Fellow over the summer. Professor **Mark Wethli** (Visual Art) provided guidance for two visual arts students, **Norah Maki ('09)** (Rusack Fellow) and **Samantha Smith (Fall '07)** (Rusack Fellow). Norah created

eleven unique objects and installed them along the CSC walking trails, in part to see how the objects are reclaimed by the natural processes of decay. Printmaker Samantha Smith sketched and photographed landscapes at the CSC, then translated her etchings in the print making studio. **Mike Tillotson ('08)** (Doherty Fellow) worked with Professor **Anne Henshaw** (Sociology and Anthropology) to study the environmental and social impacts of climate change on the Casco Bay lobster industry. Mike presented his findings to the Island Institute at the end of the summer. **Ali Chase '09** (Rusack Fellow), with guidance from Professor **Ed Laine** (Geology), utilized the oceanographic buoy installed in Harpswell Sound to sample sediment from the ocean floor. She then compared the texture with those indicated on a sonar backscatter map of the area in an effort to estimate how much of the sound is mud (as opposed to sand or gravel), since mud sediments are where dinoflagellate *Alexandrium fundyense*, the algal species responsible for Harmful Algal Blooms are found in greatest abundance. Working with Doherty Scholar **Jon Allen**, **Ian Haight '08** (Howard Hughes Fellow) followed up on his work on sea stars from the summer of 2006 by measuring larval development and growth in *Asterias forbesi* and *Asterias rubens*, two sea stars common to Maine's midcoast. **Julia Kleederman**, a visiting student from Wesleyan University, worked on several projects with **Jon Allen** (Biology) including measurements of hermit crab feeding preferences. **Ike Irby ('09)** (Doherty Fellow) working with Professor **Rachel Beane** (Geology) investigated and interpreted elongated garnet microstructures at an outcrop near the Cribstone Bridge in Orr's Island. **Benjamin Stormo ('08)** (Rusack Fellow) with guidance from Professor **Barry Logan** (Biology) investigated different responses exhibited by white and red spruce when infected by the parasitic eastern dwarf mistletoe. **Molly Seaward ('09)** (Doherty Fellow) and **Scot McFarlane ('09)** (Freedman Fellow) worked with Professor John Lichter to examine the role of submerged aquatic vegetation (SAV) in restoring the Merry-meeting Bay ecosystem. Their work built on previous summer research. **Morgan MacLeod ('09)** (Rusack Fellow), with guidance from Professor **Mike Kolster** (Visual Art), explored the ability of a large format photographic process to capture the details of the landscape at the Coastal Studies Center. Morgan's project culminated with a hand built large format camera and many large format photos from the CSC property.



Bowdoin buoy installed Dec. '06



Morgan MacLeod setting up equipment to photograph at the CSC

The Faculty Research Committee awarded four Coastal Studies Research grants in support of a variety of faculty projects. **Lesley Brown Gordon** (Biology) and **Jon Allen** (Doherty Scholar), supported by a Phocas Family Award, spent much of the summer on the water between the new dock and Wyer Island measuring predation rates on a variety of larval invertebrates including crabs, mussels, brittlestars and snails.

RESEARCH AND TEACHING

John Lichter (Biology) and **Sherri Cooper** (Scholar in Residence), with support from a Rusack Faculty Award, continued research from the Spring of 2006 on the Environmental History of the Kennebec Estuary. **Barry Logan** and **Jared Reblin** (Biology) studied the “Effects of Eastern Dwarf Mistletoe on Host Water Relations in Coastal Red and White Spruce” with funding from their Rusack Faculty Award. **Amy Johnson** (Biology) received a Phocas Family Award to conduct research on “Temperature Effects of Growth Rates of Marine Animals During Global Warming”.

The summer is the busiest time of year for the marine lab and 2007 was no exception. Amy Johnson and Olaf Ellers continued their long-term sea urchin growth experiments with the help of marine lab technician Jane Hauptman.



CSC Marine Lab

VISITING SCHOLARS



Sherri Cooper at her CSC lab

Sherri Cooper, the Coastal Studies Scholar in Residence, spent part of the year analyzing fossil diatoms found in sediment cores from the Back River, near Arrowsic, bringing an added perspective to ongoing research on the environmental history of Merrymeeting Bay by **John Lichter** (Biology) and **Peter Lea** (Geology). Dr. Cooper gave a public lecture on her research titled: “Paleoecology, the History of Human Impacts on Coastal Ecosystems”.

Amy Johnson (Biology), **Olaf Ellers** (Biology Research Associate) and **Jon Allen** (Doherty Scholar) attended the 12th annual International Echinoderm Conference held in Durham, NH, then hosted national and international participants for a day at the CSC marine lab as part of a tour of field stations and aquaculture facilities in Maine.

Two visiting scholars gave lectures on campus then spent a day touring and exploring the marine lab.

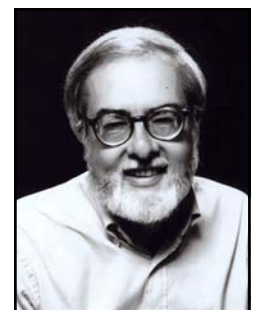
Jan Pechenik, Professor of Biology at Tufts University, gave a biology seminar on invertebrate zoology, invertebrate development and metamorphosis in the Fall. And **David Smith**, Associate Professor of Biological Sciences at Smith College, presented a Biology seminar in March on reciprocal phenotypic changes following a marine biological invasion.

Researchers from the **Wells Estuarine Reserve** made the CSC their home base for two weeks of research this summer while they conducted an inventory of fringing marsh locations in the Gulf of Maine. Teams of surveyors used GPS units and laser levels to measure the elevation and perimeter of a sampling of marshes. This information will be used to estimate the accuracy of aerial marsh identification techniques used to assess marsh extent over larger portions of the Gulf and to estimate marsh area for a new database of this important ecosystem.

SYMPOSIA AND PUBLIC LECTURES

With support of the Rusack Symposium fund, the Sociology and Anthropology department hosted a four-part lecture series “**A Watery World: Venice Past, Present and Future**” in the fall of 2006. Robert Davis, Professor of Italian Renaissance and early-modern Mediterranean history at Ohio State University, delivered the inaugural lecture “Venice Faces the Flood” to a large audience from Bowdoin and the wider community. New York University Professor of History Karl Appuhn followed at the end of October with “Public Forests, Private Wilderness: The Death of Nature in Renaissance Venice”, and Albert Ammerman, Classics Professor at Colgate University, delivered the talk: “Saving Venice by Means of Archeology” in November. Edward Muir, Professor of History at Northwestern University, concluded the series with a lecture titled “The Courtesan and the Opera Box: Venetian Society and Its Entertainments”.

In May, the College welcomed **John Gillis**, Professor Emeritus of History at Rutgers University and author of “Islands of the Mind”. Dr. Gillis met with students from Anne Henshaw’s Anthropology of Islands course and gave a public lecture on the changing meaning of islands from the fifteenth century to the present.



Author John Gillis

COMMUNITY SERVICE AND OUTREACH



BCCSI teachers and staff, summer 2007

The CSC began the year with our annual Coastal Clean up event as part of Bowdoin's Common Good Day and the Maine Coast-week program held every September. Many thanks to CSC caretaker **Mark Murray**, **Rosie Armstrong** (CSC coordinator) and Bowdoin students **Nick Alcorn ('08)**, **Ian Haight ('08)**, **Francesca Perkins ('10)**, **Rebecca Perry ('07)**, **Lauren Steffel ('07)** and **Katherine Wells ('08)** in their clean up efforts. In November, the **Harpwell Community Land Trust** visited the CSC farmhouse for a presentation about the property and research activities. This event was followed by the **second annual marine lab open house** for the Harpswell community. The event was well attended with onlookers meeting marine

lab research faculty and students and learning about their on-going projects. Bayview Road residents were welcomed to the CSC for the **fifth annual neighbors picnic barbeque** in July. Some neighbors arrived early enough to join us for student fellowship presentations. The picnic was a great opportunity for neighbors to hear about coastal research projects taking place at the CSC and around Maine. Many thanks to the Communications office for co-sponsoring the event. The CSC also welcomed Bowdoin alumna **Deborah Schaeffer ('05)** and her 12th grade Zoology students from **Green Meadow Waldorf School** (Rockland County, NY). Deb and her students spent a week in Maine and remarked that the day learning about marine organisms at the marine lab with **Jon Allen** was the highlight of the trip. In June, 140 alumni from the **class of 1957** toured the CSC, visiting the **Marine Lab, Dock, Buoy Facility**, and the **Archeological Shell Midden**. Some alumni attended a presentation about summer art projects in the **Terrestrial Lab**. The group enjoyed lunch and a trail walk as well as hearing from students and faculty about the variety of projects and research activity that the center supports. In June, Coastal Studies welcomed ten middle school teachers from across Maine for a week-long intensive course focused on the theme of invasive species, building on the success of the program in 2005, and 2006. The **Coastal Science Institute for Middle School Teachers** emphasized hands-on learning by offering a variety of field and lab exercises to help integrate coastal science themes into their classrooms. The participating schools included Biddeford Middle School, King Middle School, Brunswick Junior High School, St. Athanasius and St. John School and the Indian Island School. Highlights of the Institute included field trips to the CSC and marine lab, Giant Stairs, and Biddeford Pool, as well as a guest presentation by teachers **Tracy Vassiliev**, and **Patricia Bernhardt** of the James Doughty Middle School, participants in last summer's Institute. With co-lead instructors **Marney Pratt** and **David Guay**, and Program Assistant **Margo Linton ('08)**, teachers learned how to collect, and analyze data on the species, sex, size and distribution of invasive crab species, have debates around the policy and economic issues surrounding invasive species, and presented



Marine Lab Open House visitor



Marine Lab Instructor Lesley Brown Gordon at the Open House

ideas of how they planned to translate what they learned into the classroom. The program hopes to create an on-line learning community of teachers using the Blackboard software as a resource tool to share and exchange ideas. The Coastal Science Institute was funded through generous grants from the **Alfred M. Senter Fund**, **Aristotle Investors Ltd.**, and **George A. Phocus and Sarah Hamilton Phocus**.

Anne Henshaw participated in a two week summer institute for the collaborative outreach program CREST "Community, Rural, Education, Stewardship and Technology" in July at the Schoodic Educational Resource Center. Student-teacher teams from 11 coastal and island schools attended. The program seeks to develop place-based curriculum integrating various technologies including GIS, web design and ethnographic film making.

Bowdoin College

Coastal Studies Center
6700 College Station
Brunswick, Maine
Phone: 207 833-8018
Web: academic.bowdoin.edu/csc/



Special thanks to a very dedicated and hardworking support staff:

Rosie Armstrong

(coordinator)

Mark Murray

(primary caretaker)

Steve Hauptman

(summer caretaker)

Jane Hauptman

(marine lab technician)

Mike Chipman, Don Brown

and Richard Johnston

(Facilities Plumbing Shop)

And to the 2006-2007

CSC Advisory Committee

for all their help and input

during the year:

Jim Mullen (Visual Arts)

Sarah McMahon (History)

Amy Johnson (Biology)

John Lichter (Biology)

Susan Kaplan (Arctic Studies)

Ed Laine (Geology)

Ta Herrera (Economics)

Mike Kolster (Visual Arts)

Peter Lea (Geology)

DeWitt John (ES/Gov)

Connie Chiang (History/ES)

Photograph credits: Selby Frame, Gerry Maraghy, Morgan MacLeod, Anne Henshaw, Ed Laine, and Jon Allen

PUBLICATIONS, HONORS, AND EXHIBITS

Faculty Publications

Allen, J.D., and R.D. Podolsky. Uncommon diversity in developmental mode and larval form in Macrophiolithix. *Marine Biology*. 151 (1): 85-97.

Moran, A.L. and **J.D. Allen**. 2007. How does metabolic rate scale with egg size? An experimental test with sea urchin embryos. *Biological Bulletin*. 212:143-150.

Allen, J.D. and J.S. McAlister. 2007. Testing rates of planktonic versus benthic predation in the field. *Journal of Experimental Marine Biology and Ecology*. 347 (1-2): 77-87.

Allen, J.D. and B. Pernet. 2007. Intermediate modes of larval development: bridging the gap between planktotrophy and lecithotrophy. *Evolution and Development*. 9 (6): 643-653.

Johnson, A.S., Ellers, O., Butler, M.* (2006). Barbs of a feather bend (and twist) together. *Integr. Comp. Biol.* 46 (1): e70 ; doi : 10.1093/icb/icl056.

Lake, B.* **Johnson, A.S.** Mauck, R.A. (2006) Influence of orientation and flow speed on feeding behavior and metabolism of the barnacle *Semibalanus balanoides*. *Integr. Comp. Biol.* 46 (1): e219; doi:10.1093/icb/icl056.

Johnson, A.S., Ellers, O. (2006) A new fluorochrome-based identification tag for sea urchins for use in a hatchery and lease-site aquaculture. Northeast Aquaculture Conference and Exposition. Mystic, Connecticut. December, 2006.

Ellers, O., Johnson, A.S. (2006). Temperature determines size and time-to-size in urchins: calibration of size-temperature effects in marine ectotherms. International Echinoderm Conference, University of New Hampshire, August 2006.

Johnson, A.S., Ellers, O., *Wright, M., *Selden, R., *Stranges, B. (2006). Is there an oxygen-limited lag phase in early growth in sea urchins, *Strongylocentrotus droebachiensis*? International Echinoderm Conference, University of New Hampshire, August 2006.

Ellers, O. 2006. Flow, temperature and the speed of life. *Integr. Comp. Biol.* 46(1): doi:10.1093/icb/icl056. Society of Integrative and Comparative Biology, Phoenix, Arizona, January 2007.

Student honors

Rebecca **Selden**, '06 Beckman Fellowship. "Growth and Metabolism of the Green Sea Urchin, *Strongylocentrotus droebachiensis*: Flow environments and predation pressure" Becca was the recipient of the James Malcolm Moulton Prize in Biology, "awarded annually to the outstanding junior majoring in biology" in her junior year, and the Sumner Increase Kimball Prize awarded to that member of the senior class who has "shown the most ability in the field of Natural Science" in her senior year.

Ben **Lake**, '07 Kent Island Fellow. Influence of orientation and water current speed on feeding behavior and metabolism of *Semibalanus balanoides*. Ben was the recipient of the Donald and Harriet S. Macomber Prize in Biology, given annually to the most outstanding senior biology student.

COASTAL STUDIES CENTER PIER PROJECT



Bowdoin Science Experience Aug. '07

The construction of the new pier was completed in November! After five years of planning, permitting and fundraising the pier and dock are providing greater water access for faculty and student research as well as much improved access for the marine lab maintenance crew through the addition of a new pump-house and in-take/outflow lines.

The project would not have been possible

without the financial support of **Geoff**

Rusack ('78) and **Alison Wrigley Rusack**, and the **National Science Foundation**. Many thanks also go to Bowdoin's Facility Department staff including **Greg Hogan**, (project manager) **Don Borkowski**, **Don Brown**, and CSC caretaker **Mark Murray**, for overseeing all the details of the project and making it happen.



Geo students Ivy Blackmore ('07), Julia Smith ('07), and Meghan Detering ('07)