

# NEXTWAVE



RECOGNIZING EXCELLENCE IN EDUCATION

2010 Academic Programs  
Woods Hole Oceanographic Institution





*Cover: Joint Program students and summer student fellows participate in a short course on marine invertebrates at Woodneck Beach, MA.*

*Above: Joint Program student Christine Mingione (right) and Elizabeth Bonk of the Waquoit Bay Estuarine Research Reserve collect water samples from Waquoit Bay and Little River, MA. Photos by Tom Kleindinst, WHOI.*

The year 2010 was an eventful one for WHOI's Academic Programs. In June, we honored our graduates from the past five years with a Joint Program graduation ceremony on the WHOI campus. Dr. Rita Colwell, WHOI Corporation Member and commencement speaker, gave an excellent and meaningful speech to the graduates and their families.

WHOI ranked second of the ten best places to work for postdoctoral researchers, according to a survey by the magazine *The Scientist*. The rankings included 76 U.S. institutions. We strive to make WHOI a great place for our postdocs to work, and appreciate the important contributions our postdocs make to our research programs.

We had a near record number of Summer Student Fellows who spent 10-12 summer weeks at WHOI working on various research projects with WHOI scientists. This program is enthusiastically supported by our science staff who enjoy working with undergraduates and appreciate how much they too contribute to our research programs.

WHOI students and postdocs are at the crest of the next wave of oceanographic researchers. These young scientists, who bring energy and new ideas to this ever growing field of study, will continue the WHOI tradition of excellence in ocean research, exploration and learning. The success of our academic programs would not be possible without the generous support of individual donors and foundations. We are grateful for your interest in WHOI's Academic Programs.

Most sincerely,

James A. Yoder  
Vice President for Academic Programs and Dean



CHRISTINE CHARETTE, WHOI



# Joint Program Student PUBLISHED PAPERS

Left to right: Kevin Cockrell working aboard the R/V Connecticut; Andrea Burke cuts a piece of deep sea coral from the Drake Passage; Tyler Goepfert working with marine algae; Elizabeth Halliday sampling in Provincetown for beach closures; Holly Dail working in the lab aboard the USCGC Healy icebreaker out of Barrow, Alaska; Katherine French, Claire Bucholz, Scott Haven, Daniel Amrhein, Melissa Moulton, Krystin Fornace and Nicholas Macfarlane aboard the R/V Tioga for survival suit practice.



Of the forty-four publications listed here, an impressive twenty-six were first-authored by Joint Program students.

## Amalia Aruda

Urbanski, J. M., Aruda, A. & Armbruster, P. (2010). A transcriptional element of the diapause program in the Asian tiger mosquito, *Aedes albopictus*, identified by suppressive subtractive hybridization. *Journal of Insect Physiology*, 56(9), 1147-1154.

## Erin C. Banning

Banning, E.C., Casciotti, K.L. & Kujawinski, E.B. Novel strains isolated from a coastal aquifer suggest a predatory role for flavobacteria. *FEMS Microbiology Ecology* 254-270 (2010).

## Jamie W. Becker

McCarren, J., Becker, J.W., Repeta, D.J., Shi, Y., Young, C.R., Malmstrom, R.R., Chisholm, S.W., and DeLong, E.F. (2010). *Inaugural Article*: Microbial community transcriptomes reveal microbes and metabolic pathways associated with dissolved organic matter turnover in the sea. *Proceedings of the National Academy of Sciences*, 107:16420-16427.

## Erin M. Bertrand

Saito, M. A., Goepfert, T. J., Noble, A. E., Bertrand, E. M., Sedwick, P. N. & DiTullio, G. R. (2010). A seasonal study of dissolved cobalt in the Ross Sea, Antarctica: Micronutrient behavior, absence of scavenging, and relationships with Zn, Cd, and P. *Biogeosciences*, 7(12), 4059-4082.

## Maya P. Bhatia

Bhatia, M. P., Das, S. B., Longnecker, K., Charette, M. A. & Kujawinski, E. B. (2010). Molecular characterization of dissolved organic matter associated with the Greenland ice sheet. *Geochimica et Cosmochimica Acta*, 74(13), 3768-3784.

## Michael L. Brosnahan

Brosnahan, M. L., Kulis, D. M., Solow, A. R., Erdner, D. L., Percy, L., Lewis, J. & Anderson, D. M. (2010). Outbreeding lethality between toxic Group I and nontoxic Group III *Alexandrium tamarense* spp. isolates: Predominance of heterotypic encystment and implications for mating interactions and biogeography. *Deep-Sea Research Part Ii-Topical Studies in Oceanography*, 57(3-4), 175-189.

## Carolyn Buchwald

Buchwald, C. & Casciotti, K. L. (2010). Oxygen isotopic fractionation and exchange during bacterial nitrite oxidation. *Limnology and Oceanography*, 55(3), 1064-1074.

Casciotti, K. L., McIlvin, M. & Buchwald, C. (2010). Oxygen isotopic exchange and fractionation during bacterial ammonia oxidation. *Limnology and Oceanography*, 55(2), 753-762.

## Andrea L. Burke

Lomas, M. W., Burke, A. L., Lomas, D. A., Bell, D. W., Shen, C., Dyhrman, S. T. & Ammerman, J. W. (2010). Sargasso Sea phosphorus biogeochemistry: an important role for dissolved organic phosphorus (DOP). *Biogeosciences*, 7(2), 695-710.

Burke, A., Robinson, L. F., McNichol, A. P., Jenkins, W. J., Scanlon, K. M. & Gerlach, D. S. (2010). Reconnaissance dating: A new radiocarbon method applied to assessing the temporal distribution of Southern Ocean deep-sea corals. *Deep Sea Research (Part I, Oceanographic Research Papers)*, 57(11), 1510-1520.

## Phoebe Dreux Chappell

Chappell, P. D. & Webb, E. A. (2010). A molecular assessment of the iron stress response in the two phylogenetic clades of *Trichodesmium*. *Environmental Microbiology*, 12(1), 13-27.

## Kevin L. Cockrell

Cockrell, K. L. & Schmidt, H. (2010). Robust passive range estimation using the waveguide invariant. *Journal of the Acoustical Society of America*, 127(5), 2780-2789.

## Paul R. Craddock

Craddock, P.R. & Bach, W. Insights to magmatic-hydrothermal processes in the Manus back-arc basin as recorded by anhydrite. *Geochimica et Cosmochimica Acta* 5514-5536(2010).

Craddock, P.R., Bach, W., Seewald, J.S., Rouxel, O.J., Reeves, E. & Tivey, M.K. Rare earth element abundances in hydrothermal fluids from the Manus Basin, Papua New Guinea: Indicators of sub-seafloor hydrothermal processes in back-arc basins. *Geochimica et Cosmochimica Acta* 5494-5513(2010).

## Holly J. Dail

Pickart, R. S., Pratt, L. J., Torres, D. J., Whitledge, T. E., Proshutinsky, A. Y., Aagaard, K., Agnew, T. A., Moore, G. W. K. & Dail, H. J. (2010). Evolution and dynamics of the flow through Herald Canyon in the western Chukchi Sea. *Deep-Sea Research Part II-Topical Studies in Oceanography*, 57(1-2), 5-26.

## Tyler J. Goepfert

Naqvi, S. W. A., Moffett, J. W., Gauns, M. U., Narvekar, P. V., Pratihary, A. K., Naik, H., Shenoy, D. M., Jayakumar, D. A., Goepfert, T. J., Patra, P. K., Al-Azri, A. & Ahmed, S. I. (2010). The Arabian Sea as a high-nutrient, low-chlorophyll region during the late Southwest Monsoon. *Biogeosciences*, 7(7), 2091-2100.

Saito, M. A., Goepfert, T. J., Noble, A. E., Bertrand, E. M., Sedwick, P. N. & DiTullio, G. R. (2010). A seasonal study of dissolved cobalt in the Ross Sea, Antarctica: Micronutrient behavior, absence of scavenging, and relationships with Zn, Cd, and P. *Biogeosciences*, 7(12), 4059-4082.

## David R. Griffith

Griffith, D.R., W.R. Martin, and T.I. Eglinton. 2010. The radiocarbon age of organic carbon in marine surface sediments. *Geochimica et Cosmochimica Acta*. 74: 6788-6800, doi: 10.1016/j.gca.2010.09.001

## Elizabeth Halliday

Halliday, E., Griffith, J. F. & Gast, R. J. (2010). Use of an exogenous plasmid standard and quantitative PCR to monitor spatial and temporal distribution of *Enterococcus* spp. in beach sands. *Limnology and Oceanography-Methods*, 8, 146-154.

## Caitlin Frame

Frame, C. & Casciotti, K. (2010). Biogeochemical controls and isotopic signatures of nitrous oxide production by a marine ammonia-oxidizing bacterium. *Biogeosciences Discussions*, 7(2), 3019-3059.

## Laura Hmelo

Hmelo, L. & Van Mooy, B. A. (2009). Kinetic constraints on acylated homoserine lactone-based quorum sensing in marine environments. *Aquatic Microbial Ecology*, 54(2), 127-133.



### Michael Holcomb

Holcomb, M., McCorkle, D. C. & Cohen, A. L. (2010). Long-term effects of nutrient and CO<sub>2</sub> enrichment on the temperate coral *Astrangia poculata* (Ellis and Solander, 1786). *Journal of Experimental Marine Biology and Ecology*, 386(1-2), 27-33.

### Yohai Kaspi

Kaspi, Y., Hubbard, W. B., Showman, A. P. & Flierl, G. R. (2010). Gravitational signature of Jupiter's internal dynamics. *Geophysical Research Letters*, 37, L01204.

### Phil Lane

Boldt, K. V., Lane, P., Woodruff, J. D. & Donnelly, J. P. (2010). Calibrating a sedimentary record of overwash from Southeastern New England using modeled historic hurricane surges. *Marine Geology*, 275(1-4), 127-139.

### Wu-Jung Lee

Au, W. W. L., Houser, D. S., Finneran, J. J., Lee, W., Talmadge, L. A. & Moore, P. W. (2010). The acoustic field on the forehead of echolocating Atlantic bottlenose dolphins (*Tursiops truncatus*).

*Journal of the Acoustical Society of America*, 128(3), 1426-1434.

### Karin L. Lemkau

Lemkau, K.L., Peacock, E.E., Nelson, R.K., Ventura, G.T., Kovacs, J.L. & Reddy, C.M. The M/V Cosco Busan spill: Source identification and short-term fate. *Marine Pollution Bulletin* 2123-2129 (2010).

### Nicholas Loomis

Tian, L., Loomis, N., Dominguez-Caballero, J. A. & Barbastathis, G. (2010). Quantitative measurement of size and three-dimensional position of fast-moving bubbles in air-water mixture flows using digital holography. *Applied Optics*, 49(9), 1549-1554.

### Kelton W. McMahon

McMahon, K.W., Fogel, M.L., Elsdon, T.S. & Thorrold, S.R. Carbon isotope fractionation of amino acids in fish muscle reflects biosynthesis and isotopic routing from dietary protein. *Journal of Animal Ecology* 1132-1141 (2010).

Elsdon, T. S., Ayvazian, S., McMahon, K. W. & Thorrold, S. R. (2010). Experimental evaluation of stable

isotope fractionation in fish muscle and otoliths. *Marine Ecology-Progress Series*, 408, 195-205.

### Maxim Nikurashin

Nikurashin, M. & Ferrari, R. (2010). Radiation and dissipation of internal waves generated by geostrophic motions impinging on small-scale topography: Theory. *Journal of Physical Oceanography*, 40(5), 1055-1074.

### Abigail E. Noble

Saito, M. A., Goepfert, T. J., Noble, A. E., Bertrand, E. M., Sedwick, P. N. & DiTullio, G. R. (2010). A seasonal study of dissolved cobalt in the Ross Sea, Antarctica: Micronutrient behavior, absence of scavenging, and relationships with Zn, Cd, and P. *Biogeochemistry*, 7(12), 4059-4082.

### Jean-Arthur Olive

Olive, J.A., Behn, M.D., and Tucholke, B.E. The structure of oceanic core complexes controlled by the depth distribution of magma emplacement. *Nature Geoscience*, 3, 491-495, 2010

### Elizabeth D. Orchard

Orchard, E. D., Ammerman, J. W., Lomas, M. W. & Dyhrman, S. T. (2010). Dissolved inorganic and organic phosphorus uptake in *Trichodesmium* and the microbial community: The importance of phosphorus ester in the Sargasso Sea. *Limnology and Oceanography*, 55(3), 1390-1399.

Wurch, L.L., Haley, S.T., Orchard, E.D., Gobler, C.J. & Dyhrman, S.T. Nutrient-regulated transcriptional responses in the brown tide-forming alga *Aureococcus anophagefferens*. *Environmental Microbiology* (2010).

### Joseph C. Papp

Papp, J. C., Preisig, J. C. & Morozov, A. K. (2010). Physically constrained maximum likelihood mode filtering. *Journal of the Acoustical Society of America*, 127(4), 2385-2391.

### Desiree L. Plata

Nessim, G.D., Seita, M., Plata, D.L., O'Brien, K.P., John Hart, A., Meshot, E.R., Reddy, C.M., Gschwend, P.M. & Thompson, C.V. Precursor gas chemistry determines the crystallinity

of carbon nanotubes synthesized at low temperature. *Carbon* 804-810(2011).

Plata, D.L., Meshot, E.R., Reddy, C.M., Hart, A.J. & Gschwend, P.M. Multiple alkynes react with ethylene to enhance carbon nanotube synthesis, suggesting a polymerization-like formation mechanism. *ACS Nano* 7185-7192(2010).

### Emily Roland

Roland, E., Behn, M.D. & Hirth, G. Thermal-mechanical behavior of oceanic transform faults: Implications for the spatial distribution of seismicity. *Geochemistry Geophysics Geosystems* Q07001-Q07001 (2010).

### James P. Saenz

Saenz, J.P. Hopanoid enrichment in a detergent resistant membrane fraction of *Crocospaera watsonii*: Implications for bacterial lipid raft formation. *Organic Geochemistry* 853-856(2010).

Bradley, A.S., Pearson, A., Saenz, J.P. & Marx, C.J. Adenosylhopane: The first intermediate in hopanoid side chain biosynthesis. *Organic Geochemistry* 1075-1081(2010).

### Julian Schanze

Lagerloef, G., Schmitt, R., Schanze, J. & Kao, H. (2010). The ocean and the global water cycle. *Oceanography*, 23(4), 82-93.

### Kelly R. Sutherland

Sutherland, K.R. & Madin, L.P. Comparative jet wake structure and swimming performance of salps. *Journal of Experimental Biology* 2967-2975(2010).

### Louie L. Wurch

Wurch, L.L., Haley, S.T., Orchard, E.D., Gobler, C.J. & Dyhrman, S.T. Nutrient-regulated transcriptional responses in the brown tide-forming alga *Aureococcus anophagefferens*. *Environmental Microbiology* (2010).

### Yu Zhang

Baker-Yeboah, S., Flierl, G. R., Sutyris, G. G. & Zhang, Y. (2010). Transformation of an Agulhas eddy near the continental slope. *Ocean Science*, 6(1), 143-159.

Students in the Joint Program have access to state-of-the-art laboratories and research vessels, as well as opportunities to travel the globe.



Michael Holcomb in the culture lab; Kelton McMahon dives on an offshore reef in the Red Sea; Toby Schneider, Kevin Cockrell and Stephanie Petillo aboard the R/V Alliance off the coast of Italy; Elizabeth Orchard working in the lab; Nick Loomis (right) and Senior Scientist Cabell Davis flank the Holcom in the Gulf of Mexico; Louie Wurch working in the lab.



# Joint Program Student AWARDS, FELLOWSHIPS, GRANTS, AND NEWS

Every year, our Joint Program students are recognized for their academic achievements and research presentations.



KARIN LEMKAU, JOINT PROGRAM STUDENT

Members of the 2010 Geodynamics Field Trip to the Alps. From front to back: Mark Behn (WHOI Associate Scientist), Ikuko Wada (WHOI postdoc), Erin Shea, Katie Pesce, Alex Evans, Alejandra Quintanilla Termini (MIT graduate students), Jean-Arthur Olive and Min Ding (Joint Program students).

## Amalia Aruda

Environmental Protection Agency STAR Fellowship. “The impacts of endocrine disrupting pollutants on copepod-*Vibrio* interactions in estuarine environments”

National Science Foundation Graduate Research Fellowship

## Rene Boiteau

National Science Foundation Graduate Research Fellowship

## Eleanor Bors

National Science Foundation Graduate Research Fellowship

## Andrea L. Burke

Best Student Paper Award at the International Conference on Paleooceanography, La Jolla, CA, 2010. Andrea Burke and Laura Robinson “Deep-sea coral reconstructions of Southern Ocean radiocarbon through the last deglaciation.”

## Alison Sara Criscitiello

U.S. Department of Energy, Office of Science Graduate Fellowship

## Veronique Dansereau

Natural Sciences and Engineering Research Council of Canada (NSERC) Graduate Scholarship in Atmospheric and Oceanic Sciences

## Andrea Dubin

Environmental Protection Agency STAR Fellowship. “Testing the hypothesis that the Paleocene-Eocene thermal maximum could have been caused by released carbon from organic-rich sediments after a magma intrusion”

## Bethanie Edwards

National Science Foundation Graduate Research Fellowship

## Erin Fischell

National Science Foundation Graduate Research Fellowship

## Katherine French

National Science Foundation Graduate Research Fellowship

## Geoffrey A. Gorman

Rear Admiral Richard F. Pittenger, USN (Ret.) Fellowship

## Kalina Gospodinova

National Science Foundation Graduate Research Fellowship

## David R. Griffith

Environmental Protection Agency STAR Fellowship. “The fate of natural and synthetic steroid estrogens in the coastal ocean”

Best Student Poster, Honorable Mention: Gordon Research Conference: Environmental Science – Water. Plymouth, NH., 2010. Griffith, D.R., P.A. Raymond, and P.M. Gschwend. *Poster*. Multiple-source heterotrophy fueled by aged organic carbon in an urbanized estuary

## Joanna Gyory

Best Student Poster Award, ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico, 2011. Gyory, J. and Pineda, J. *Poster*: Turbidity as a cue for synchronous reproduction in the barnacle *Semibalanus balanoides*

## Li Ling Hamady

National Science Foundation Graduate Research Fellowship

## Santiago Herrera

Outstanding Student Paper Award. American Geophysical Union Fall Meeting, San Francisco, 2010. Herrera, S. Munro, C. Nganro, N. Tunnicliffe, V. Wirasantosa, S. Sibert, E. Hammond, S. R. Bors, E. Butterfield, D. Holden, J. F. Baker, E. T. Sherrin, J. Makarim, S. Troa, R. Shank, T. M. “Biodiversity of the Deep-Sea Benthic Fauna in the Sangihe-Talaud Region, Indonesia: Observations from the INDEX-SATAL 2010 Expedition”

## Wu-Jung Lee

Best Student Presentation, Second Place: Acoustical Society of America, 2<sup>nd</sup> Pan-American/Iberian Meeting on Acoustics. Cancun, Mexico, November 15-19, 2010. Wu-Jung Lee, Timothy K. Stanton. “Analysis of mixed assemblages of fish using the statistics of echoes from a single beam broadband echosounder”

## Karin L. Lemkau

Best Student Poster, Honorable Mention: Gordon Research Conference: Environmental Science - Water. Plymouth, NH., 2010. Karin L. Lemkau, Emily E. Peacock, Robert K. Nelson, G. Todd Venture, Jennifer L. Kovacs, Christopher M. Reddy. *Poster*. Weathering of heavy fuel oil from the M/V *Cosco Busan* spill.

## Jill M. McDermott

Outstanding Student Paper Award, American Geophysical Union Fall Meeting, San Francisco, 2010. McDermott, J.M., Ono, S., Tivey, M.K., Seewald, J.S. “Evidence for deep sea hydrothermal fluid-mineral equilibrium from multiple S isotopes”

## Nathaniel C. Miller

Outstanding Student Paper Award for Tectonophysics, American Geophysical Union Fall Meeting, San Francisco, 2009. Miller, N., D. Lizarralde, A.J. Harding and G. Kent. “Constraints on early Gulf of California rifting from seismic images across the eastern margin of Guaymas Basin”

## Melissa Moulton

National Defense Science and Engineering Graduate Fellowship

National Science Foundation Graduate Research Fellowship

## Stephanie Owens

NASA Earth and Space Science Fellowship. “Investigating the spatial variability and processes controlling upper ocean particle flux on global and regional scales”

## M. Jordan Stanway

Link Ocean Engineering and Instrumentation Fellowship

## Min Xu

Outstanding Student Paper Award for Ocean Sciences, American Geophysical Union Fall Meeting, San Francisco, 2009. Xu, M., R. Stephen, J. P. Canales, S. Carbotte, M. Nedimović, J. Mutter. “Seismic waveform modeling of the reflection response from a mid-ocean ridge sill: Understanding the message behind the polarity and amplitude of waves reflected off the melt lens.” 2009.





In 2010, the Joint Program held a Graduation Ceremony for all Joint Program students who have graduated in the past five years. In attendance were:

Front row left to right: Elizabeth D. Orchard, Phoebe Dreux Chappell, Andrea L. Llenos, Ann P.M. Michel, Casey P. Saenger, Joy M. Lapsertis, Sheri L. Simmons, Emily Mary Van Ark, Annette M. Hynes. Row 2: Alexander G. Kalmikov, Yu Zhang, Lynne J. Elkins, Petra Klepac, Rachel H.R. Stanley, Mea Young Sohn Cook, Laura R. Hmelo. Row 3: James P. Saenz, Stacy L. DeRuiter, Joseph C. Papp, Kate L. Buckman, Kristen Whalen, Heather R. Hornick, Jessica A. Benthuyesen, Cara Marie Santelli, Matthew Jackson, Jonathan D. Woodruff. Back Row: Nicholas J. Drenzek, Christopher L. Waters, Katherine E. Silverthorne, Jacob R. Waldbauer, Holly V. Moeller, Eoghan Reeves, Jason Hyatt, Erin C. Banning, Jared Jeffrey Standish, Daniel R. Rogers

TOM KLEINDINST, WHOI

## JOINT PROGRAM DEGREE RECIPIENTS

### Doctor of Philosophy

#### Erin C. Banning

Biological Oceanography, *Biology and Potential Biogeochemical Impacts of Novel Predatory Flavobacteria*

#### Jessica A. Benthuyesen

Physical Oceanography, *Linear and Nonlinear Stratified Spindown over Sloping Topography*

#### Laura R. Hmelo

Chemical Oceanography, *Microbial Interactions Associated with Biofilms Attached to Trichodesmium spp. and Detrital Particles in the Ocean*

#### Michael C. Holcomb

Marine Geology, *Coral Calcifications Insights from Inorganic Experiments and Coral Responses to Environmental Variables*

#### Naomi M. Levine

Chemical Oceanography, *Understanding the Ocean Carbon and Sulfur Cycles in the Context of a Variable Ocean: A Study of Anthropogenic Carbon Storage and Dimethylsulfide Production in the Atlantic Ocean*

#### Andrea L. Llenos

Marine Geophysics, *Controls on Earthquake Rupture and Triggering Mechanisms in Subduction Zones*

#### Elizabeth D. Orchard

Biological Oceanography, *Phosphorus Physiology of the Marine Cyanobacterium Trichodesmium*

#### Beatriz Peña-Molino

Physical Oceanography, *Variability in the North Atlantic Deep Western Boundary Current: Upstream Causes and Downstream Effects as Observed at Line W*

#### Sarah Pacocha Preheim

Biological Oceanography, *Ecology and Population Structure of Vibrionaceae in the Coastal Ocean*

#### Kelly Rakow Sutherland

Biological Oceanography, *Form, Function and Flow in the Plankton: Jet Propulsion and Filtration by Pelagic Tunicates*

#### Eoghan Reeves

Geochemistry, *Laboratory and Field-Based Investigations of Subsurface Geochemical Processes in Seafloor Hydrothermal Systems*

#### Daniel R. Rogers

Chemical Oceanography, *Geomicrobiology of Nitrogen in a Coastal Aquifer: Isotopic and Molecular Methods to Examine Nitrification and Denitrification in Groundwater*

#### Tatiana Rykova

Physical Oceanography, *The Seasonal and Interannual Variability of the West Greenland Current System in the Labrador Sea*

#### James P. Sáenz

Chemical Oceanography, *Exploring the Distribution and Physiological Roles of Bacterial Membrane Lipids in the Marine Environment*

#### Katherine E. Silverthorne

Physical Oceanography, *Near-Inertial and Thermal Upper Ocean Response to Atmospheric Forcing in the North Atlantic Ocean*

#### Kjetil Våge

Physical Oceanography, *Circulation and Convection in the Irminger Sea*

#### Jacob R. Waldbauer

Chemical Oceanography, *Molecular Biogeochemistry of Modern and Ancient Marine Microbes*

#### Christopher L. Waters

Geochemistry, *Temporal and Petrogenetic Constraints on Volcanic Accretionary Processes at 9–10 Degrees North East Pacific Rise*

### Master of Science

#### Rebecca W. Dell

Physical Oceanography, *Abyssal Mixing from Bottom Boundary Effects in Mid-Atlantic Ridge Flank Canyons*

#### Legena A. Henry

Mechanical Engineering, *A Study of Ocean Wave Statistical Properties Using Nonlinear, Directional, Phase-Resolved Ocean Wave-Field Simulations*

#### Alexander G. Kalmikov

Mechanical Engineering, *Modeling Wind Forcing in Phase Resolving Simulation of Nonlinear Wind Waves*

#### Holly V. Moeller

Biological Oceanography, *On the Economic Optimality of Marine Reserves When Fishing Damages Habitat*

#### Dorene Samantha Nakata

Marine Geology and Geophysics, *Syn-eruptive Degassing of a Single Submarine Lava Flow: Constraints on MORB CO<sub>2</sub> Variability, Vesiculation, and Eruption Dynamics*

#### Kevin Richberg

Biological Oceanography, *Identification of Chemoautotrophic Microorganisms from a Diffuse Flow Hydrothermal Vent at EPR 9° North Using <sup>13</sup>C DNA Stable Isotope Probing and Catalyzed Activated Reporter Deposition-Fluorescence in situ Hybridization*



# Woods Hole Oceanographic Institution POSTDOCTORAL PROGRAM

*Ari Shapiro interviewing Nizar Hani, Scientific Coordinator at the Shouf Cedar reserve, about the impact of climate change on the cedar trees of Lebanon; Walter Cho (right) and Associate Scientist Adam Soule attach instruments for use on a towed digital camera; Mindy Richlen working the lab; Sarah Cooley leads a group of teachers through a classroom laboratory exercise exploring ocean acidification; Ilya A. Udovydchenkov in the lab; Alyson E. Santoro examining algae cultures.*



Our Postdoctoral Program was rated number two in the country in 2011 by the *Scientist* magazine.

## Postdoctoral Investigators

### Erin Banning

Marine Chemistry & Geochemistry, MIT/WHOI Joint Program, Postdoctoral Investigator

### Steven R. Beaupre

Geology & Geophysics, University of California, Irvine, Postdoctoral Investigator

### Kate Buckman

Biology, MIT/WHOI Joint Program, Postdoctoral Investigator

### Paulo Calil

Marine Chemistry & Geochemistry, University of Hawaii, Postdoctoral Investigator

### Neal Cantin

Geology & Geophysics, James Cook University, Postdoctoral Investigator

### Shih-Nan Chen

Applied Ocean Physics & Engineering, University of Maryland, College Park, Postdoctoral Investigator

### Walter Cho

Biology, MIT/WHOI Joint Program, Postdoctoral Investigator

### Sarah Cooley

Marine Chemistry & Geochemistry, University of Georgia, Postdoctoral Investigator

### Xujing Jia Davis

Physical Oceanography, University of Rhode Island, Postdoctoral Investigator

### Stacy DeRuiter

Biology, MIT/WHOI Joint Program, Postdoctoral Investigator

### Elizabeth M. Douglass

Physical Oceanography, Scripps Institution of Oceanography, University of California, San Diego, Postdoctoral Investigator

### Valier Galy

Marine Chemistry & Geochemistry, Institut National Polytechnique de Lorraine (INPL), Postdoctoral Investigator

### Andrea D. Hawkes

Geology & Geophysics, University of Pennsylvania, Postdoctoral Investigator

### Katharine R. Hendry

Marine Chemistry & Geochemistry, Oxford University, Postdoctoral Investigator

### Laura Hmelo

Marine Chemistry & Geochemistry, MIT/WHOI Joint Program, Postdoctoral Investigator

### James W. Holte

Physical Oceanography, Scripps Institution of Oceanography, University of California, San Diego, Postdoctoral Investigator

### Annette Hynes

Marine Chemistry & Geochemistry, MIT/WHOI Joint Program, Postdoctoral Investigator

### Akira Kubota

Biology, Ehime University, Postdoctoral Investigator

### Andrea Llenos

Geology & Geophysics, MIT/WHOI Joint Program, Postdoctoral Investigator

### Yawei "Wayne" Luo

Marine Chemistry & Geochemistry, Brown University, Postdoctoral Investigator

### Kanchan Maiti

Marine Chemistry & Geochemistry, University of South Carolina, Columbia, Postdoctoral Investigator

### Tufail Malik

Biology, Arizona State University, Postdoctoral Investigator

### Tetsuo Matsuno

Geology & Geophysics, Kobe University, Postdoctoral Investigator

### Anna McIntyre-Wressnig

Geology & Geophysics, University of Technology, Sydney, Australia, Postdoctoral Investigator

### Travis Meador

Marine Chemistry & Geochemistry, Scripps Institution of Oceanography, University of California, San Diego, Postdoctoral Investigator

### Eric Mittelstaedt

Geology & Geophysics, University of Hawaii, Manoa, Postdoctoral Investigator

### Paul J. Morris

Marine Chemistry & Geochemistry, University of South Hampton, Postdoctoral Investigator

### David "Roo" Nicholson

Marine Chemistry & Geochemistry, University of Washington, Postdoctoral Investigator

### Julie A. O'Leary

Geology & Geophysics, California Institute of Technology, Postdoctoral Investigator

### Elizabeth Orchard

Biology, MIT/WHOI Joint Program, Postdoctoral Investigator

### Beatriz Pena-Molino

Physical Oceanography, MIT/WHOI Joint Program, Postdoctoral Investigator

### Mindy Richlen

Biology, Boston University, Postdoctoral Investigator

### Irina I. Rypina

Physical Oceanography, University of Miami, Postdoctoral Investigator

### Sevrine Sailley

Marine Chemistry & Geochemistry, University of Bremen, Postdoctoral Investigator

### Alyson E. Santoro

Marine Chemistry & Geochemistry, Stanford University, Postdoctoral Investigator

### Ananya Sen Gupta

Applied Ocean Physics & Engineering, University of Illinois at Urbana-Champaign, Postdoctoral Investigator

### Ari Shapiro

Academic Programs Office, MIT/WHOI Joint Program, Postdoctoral Investigator



**Kenneth Alex Shorter**  
Biology, University of Illinois, Urbana-Champaign, Postdoctoral Investigator

**Katherine Silverthorne**  
Physical Oceanography, MIT/WHOI Joint Program, Postdoctoral Investigator

**Juliette L. Smith**  
Biology, State University of New York, Postdoctoral Investigator

**Oliver Sun**  
Physical Oceanography, Scripps Institution of Oceanography, University of California, San Diego, Postdoctoral Investigator

**Masako Tominaga**  
Geology & Geophysics, Texas A&M University, Postdoctoral Investigator

**Larissa M. Williams**  
Biology, North Carolina State University, Postdoctoral Investigator

**Becky L. Woodward**  
Biology, University of Maine, Postdoctoral Investigator

**Hongfeng Yang**  
Geology & Geophysics, Saint Louis University, Postdoctoral Investigator

**Sachiko Yoshida**  
Physical Oceanography, Kyushu University, Postdoctoral Investigator

## Postdoctoral Scholar and Fellowship Appointments

**Monica Cordeiro Almeida Silva**  
Biology, University of St. Andrews, Portuguese Foundation for Science and Technology Postdoctoral Fellow

**Neelakanteswar Aluru**  
Biology, University of Waterloo, Postdoctoral Scholar

**Linda Berquist Ampel**  
Marine Chemistry & Geochemistry, Stockholm University, Swedish Research Council Postdoctoral Fellow

**Magdalena Andres**  
Physical Oceanography, University of Rhode Island/ Graduate School of Oceanography, Ocean and Climate Change Institute Postdoctoral Scholar

**Amy Apprill Mooney**  
Marine Chemistry & Geochemistry, University of Hawaii at Manoa, Ocean Life Institute Postdoctoral Scholar

**Shawn M. Arellano**  
Biology, University of Oregon, Postdoctoral Scholar

**Kyungmin Baik**  
Applied Ocean Physics & Engineering, Washington State University, Ocean Life Institute Postdoctoral Scholar

**Sébastien L. Bertrand**  
Marine Chemistry & Geochemistry, University of Liège, European Union Marie Curie Postdoctoral Fellow/ Flemish Research Foundation Postdoctoral Fellow

**Sean P. Bryan**  
Marine Chemistry & Geochemistry, University of Colorado at Boulder, Ocean and Climate Change Institute Postdoctoral Scholar

**Shih-Nan Chen**  
Applied Ocean Physics & Engineering, University of Maryland, College Park, United States Geological Survey Postdoctoral Scholar

**Sylvia T. Cole**  
Physical Oceanography, University of California San Diego, Devonshire Postdoctoral Scholar

**Bibiana Gomez Crespo**  
Biology, University of Vigo, Spanish Ministry of Work and Social Affairs Postdoctoral Fellow

**Kristen A. Davis**  
Physical Oceanography, Stanford University, Postdoctoral Scholar

**Elizabeth M. Douglass**  
Physical Oceanography, Scripps Institution of Oceanography, University of California, San Diego, Ocean and Climate Change Institute Postdoctoral Scholar

**Xiaojuan Yvonne Feng**  
Marine Chemistry & Geochemistry, University of Toronto, Postdoctoral Scholar

**Matthew R. First**  
Geology & Geophysics, The University of Georgia, Ocean Life Institute Postdoctoral Scholar

**Isabelle Martins Gil**  
Geology & Geophysics, University of Bremen, Portuguese Foundation for Science and Technology Postdoctoral Fellow

**Donglai Gong**  
Physical Oceanography, Rutgers University, Ocean and Climate Change Institute Postdoctoral Scholar

**Andrea D. Hawkes**  
Geology & Geophysics, University of Pennsylvania, National Ocean Sciences Accelerator Mass Spectrometry Facility Postdoctoral Scholar

**Katharine R. Hendry**  
Marine Chemistry & Geochemistry, Oxford University, Doherty Postdoctoral Scholar

**Kuo-Fang Denner Huang**  
Geology & Geophysics, National Cheng Kung University, National Science Council of Taiwan Postdoctoral Fellow

**Katherine A. Hubbard**  
Biology, University of Washington, Doherty Postdoctoral Scholar

**Molly W. Jacobs**  
Biology, University of Washington, Devonshire Postdoctoral Scholar

**Stéphanie Jenouvrier**  
Biology, Université Pierre et Marie Curie, European Union Marie Curie Postdoctoral Fellow

Postdoctoral Scholars and Investigators contribute tremendously to the ongoing research at WHOI.



*Matthew R. First working in the field; Steven R. Beupre speaking with scientists and staff on WHOI's R/V Tioga; Becky L. Woodward working in Marion Harbor, MA with a new whale harness system; researchers, including Sébastien L. Bertrand, take sediment samples in the fjords of Chilean Patagonia; Neal Cantin drills into a massive starlet coral for a core sample on a reef north of St. Thomas, US Virgin Islands.*



**Nicole S. Keller**

Geology & Geophysics, Australian National University, Swiss National Science Foundation Postdoctoral Fellow

**Frieder Klein**

Geology & Geophysics, University of Bremen, Deep Ocean Exploration Institute Postdoctoral Scholar

**Akira Kubota**

Biology, Ehime University, Japan Society for the Promotion of Science Postdoctoral Fellow

**Nina Nikolaevna Lebedeva-Ivanova**

Geology & Geophysics, Uppsala University, Sweden, United States Geological Survey Postdoctoral Fellow

**Joel K. Llopiz**

Biology, University of Miami/RSMAS, Cooperative Institute for the North Atlantic Region Postdoctoral Scholar

**Brice Loose**

Marine Chemistry & Geochemistry, Columbia University, LDEO, NOAA/UCAR Climate and Global Change Postdoctoral Fellow

**Tetsuo Matsuno**

Applied Ocean Physics & Engineering, Kobe University, Deep Ocean Exploration Institute Postdoctoral Scholar

**Kais J. Mohamed Falcon**

Geology & Geophysics, University of Vigo, European Union Marie Curie Postdoctoral Fellow

**Terrence Aran Mooney**

Biology, University of Hawaii, Postdoctoral Scholar

**Filipa Naughton**

Geology & Geophysics, Bordeaux1 University/France and Lisbon University Portugal, Portuguese Foundation for Science and Technology Postdoctoral Fellow

**Nadja Neubert**

Marine Chemistry & Geochemistry, University of Bern, Swiss National Science Foundation Postdoctoral Fellow

**Nicholas J. Nidzieko**

Applied Ocean Physics & Engineering, Stanford University, United States Geological Survey Postdoctoral Scholar

**Pradeep Nalaka Ranasinghage**

Geology & Geophysics, Kent State University, Coastal Ocean Institute Postdoctoral Scholar

**Adam M. Reitzel**

Biology, Boston University, National Institutes of Health NRSA Postdoctoral Fellow

**Alyson E. Santoro**

Marine Chemistry & Geochemistry, Stanford University, Postdoctoral Scholar

**Indra S. Sen**

Marine Chemistry & Geochemistry, Florida International University, Postdoctoral Scholar

**Ananya Sen Gupta**

Applied Ocean Physics & Engineering, University of Illinois at Urbana-Champaign, Doherty Postdoctoral Scholar

**Sunita R. Shah**

Geology & Geophysics, Harvard University, National Ocean Sciences Accelerator Mass Spectrometry Facility Postdoctoral Scholar

**Jeremy D. Shakun**

Geology & Geophysics, Oregon State University, NOAA/UCAR Climate and Global Change Postdoctoral Fellow at Boston University

**Emily L. Shroyer**

Physical Oceanography, Oregon State University, Ocean and Climate Change Institute Postdoctoral Scholar

**Juliette L. Smith**

Biology, State University of New York, Coastal Ocean Institute Postdoctoral Scholar

**Christoph Stegert**

Biology, University of Hamburg, Germany, DFG Postdoctoral Fellow

**Alicia R. Timme-Laragy**

Biology, Duke University, National Institutes of Health NRSA Postdoctoral Fellow

**Masako Tominaga**

Geology & Geophysics, Texas A&M University, Postdoctoral Scholar

**Ilya A. Udovydchenkov**

Applied Ocean Physics & Engineering, University of Miami, Office of Naval Research Postdoctoral Fellow

**Ralf Emil Vahtera**

Biology, University of Helsinki, Academy of Finland Postdoctoral Fellow

**Ikuko Wada**

Geology & Geophysics, University of Victoria, BC, MARGINS Postdoctoral Fellow

**Philip J. Wallhead**

Applied Ocean Physics & Engineering, National Oceanography Centre, Southampton, Cooperative Institute for Climate and Ocean Research Postdoctoral Scholar

**Virginia Dorsey Wanless**

Geology & Geophysics, University of Florida, Deep Ocean Exploration Institute Postdoctoral Scholar

**Kakani K. Young**

Applied Ocean Physics & Engineering, California Institute of Technology, Devonshire Postdoctoral Scholar

**Weifeng "Gordon" Zhang**

Applied Ocean Physics & Engineering, Rutgers University, Coastal Ocean Institute Postdoctoral Scholar

Many of our postdoctoral researchers join our scientific staff and may eventually mentor future postdocs.



Pradeep Nalaka Ranasinghage (right) and summer student Zach Bailey empty a CTD rosette; Ralf Emil Vahtera working in Salt Pond, Eastham, MA; Science crew, including Nicholas J. Nidzieko, along with the crew of the R/V Endeavor on a cruise to the northwestern side of Georges Bank and the southern Gulf of Maine; Adam M. Reitzel collecting a starlet sea anemone at Great Sippewissett Marsh, MA; Nicole S. Keller and Associate Scientist Alison M. Shaw hike to Poas volcano in Costa Rica.



# Woods Hole Oceanographic Institution

## SUMMER STUDENT AND MINORITY FELLOWS



Each summer, approximately 30 undergraduates come to WHOI for 10-12 weeks to work on a broad spectrum of research projects with our faculty.

### Isabella B. Arzeno

Stanford University, *Analysis of a 1999 Eulerian time series from the Georges Bank GLOBEC project*

Advisor: Kenneth H. Brink, Physical Oceanography

### Spencer B. Backus

Franklin W. Olin College of Engineering, *Flip wing turbine*  
Advisor: Richard Camilli, Applied Ocean Physics & Engineering

### Bhaskar

Indian Institute of Technology, Kharagpur (India), *Foot wall – hanging wall seismic velocity variations at the TAG hydrothermal field on the Mid-Atlantic Ridge, 26°8'N*  
Advisor: Robert Sohn, Geology & Geophysics

### Angela K. Boysen

Stanford University, *A preliminary analysis of water column samples from the Deepwater Horizon oil spill*

Advisor: Elizabeth B. Kujawinski, Marine Chemistry & Geochemistry

### Camrin D. Braun

The College of Idaho, *Identification and movement of whale sharks (Rhincodon typus) in the Red Sea*  
Advisor: Simon R. Thorrold, Biology

### Michele E. Dufault

Yale University, *Measuring vertical velocity in the water column using autonomous underwater vehicles*  
Advisor: David M. Fratantoni, Physical Oceanography

### Jonathan R. Fincke

University of New Hampshire, *Calibration of the WHOI Broad Band Acoustic System for the characterization of scattering from microstructure generated by interfacing water masses*

Advisor: Andone C. Lavery, Applied Ocean Physics & Engineering

### Alexis D. Fischer

Wellesley College, *Physiological and transcriptional response of Nematostella vectensis to environmental contaminant exposures*

Advisor: Ann M. Tarrant, Biology

### Rachel C. Harbeitner

Eckerd College, *Altered responsiveness to oxidative stress in killifish from a Superfund site*

Advisor: Mark E. Hahn, Biology

WHOI staff aboard the R/V Tioga teach summer student and minority fellows and Partnership Education Program (PEP) students the basics of oceanographic sampling and imaging techniques; Jacob S. Izraelevitz and Isabella B. Arzeno deploy a Niskin bottle; a PEP student uses a sextant. The PEP program was launched in 2009 by a consortium of Woods Hole institutions committed to increasing diversity.

### Katherine R. Heal

The Colorado College, *Concentration of dissolved organic phosphorus (DOP) in seawater using Mg(II)-Mn(III) layered double hydroxide*

Advisor: Daniel J. Repeta, Marine Chemistry & Geochemistry

### Victoria R. Hore

Oxford University, UK, *Nonlinearity in the oceanic internal wavefield*

Advisor: Kurt L. Polzin, Physical Oceanography

### Jacob S. Izraelevitz

Franklin W. Olin College of Engineering, *Optimal trajectory generation for draped AUV gravity surveys*  
Advisor: James C. Kinsey, Applied Ocean Physics & Engineering

### Kyle M. List

Clarkson University, *Swash run-up observations and model comparison using terrestrial LIDAR*

Advisor: Britt Raubenheimer, Applied Ocean Physics & Engineering

### Cristin F. Luttazi

Kingston University, UK, *You CAN have your Lobster and your Right Whale, Too! Evaluation of satellite monitored radio tags as proxy for North Atlantic Right Whale (Eubalaena glacialis) activity*

Advisor: Hauke Kite-Powell, Marine Policy Center

### Sarah A. Makenbach

University of Manitoba, Canada, *The effect of elevated carbon dioxide levels on benthic foraminiferal survival*

Advisor: Joan M. Bernhard, Geology & Geophysics



**Cherie R. Meyer**

Columbia University, *Studying shoreline dynamics of the U. S. Atlantic coast using directional wave data*  
Advisor: Andrew D. Ashton, Geology & Geophysics

**Tanner M. Miller**

Depauw University, *Investigation of the presence and impact of quorum sensing induced hydrolytic activity on particulate carbon flux attenuation in marine environments*  
Advisor: Tracy J. Mincer, Marine Chemistry & Geochemistry

**Emily A. Moberg**

Massachusetts Institute of Technology, *Phytoplankton carbon to chlorophyll variation off the New England shelf*  
Advisor: Heidi M. Sosik, Biology

**Sujata A. Murty**

Oberlin College, *A high-resolution calibration of Sr/Ca to SST from a coral in the Red Sea*  
Advisor: Konrad A. Hughen, Marine Chemistry & Geochemistry

**Diana Ponce- Morado**

University of California, San Diego, *Studying the search patterns of a sperm whale from an acoustic recording tag*  
Advisor: Peter L. Tyack, Biology

**Eric A. Rozell**

Rensselaer Polytechnic Institute, *A framework for integrating oceanographic data repositories*  
Advisors: Andrew Maffei, Ruth Curry and Stace E. Beaulieu  
Computer Information Services, Physical Oceanography and Biology

**Alejandra Sanchez**

Universidad Autónoma de Baja California, *Observations of inner shelf convergence processes: Processes that maintain Diamond Shoals*  
Advisor: John C. Warner, U. S. Geological Survey

**Sara C. Sanchez**

University of Arizona, *A Brazilian response to Northern Hemispheric cooling*  
Advisors: William B. Curry and Delia W. Oppo, Geology & Geophysics

**Analissa F. Sarno**

California State University, San Marcos, *Cellular responses to phosphorus deficiency in the brown tide-forming alga, Aureococcus anophagefferens*  
Advisor: Sonya T. Dyhrman, Biology

**Elizabeth C. Sibert**

University of California, San Diego, *A new species of vesicomyid clam (Bivalvia: Vesicomidae) at the Chile Margin as considered by the mitochondrial COI gene*  
Advisor: Timothy M. Shank, Biology

**Laura E. Sofen**

Carleton College, *Increased phosphatase activity among Trichodesmium epibionts mediated by quorum sensing signaling molecules*  
Advisor: Benjamin Van Mooy, Marine Chemistry & Geochemistry

**Laurel E. Stephenson Haskins**

Reed College, *Sensitivity of ENSO to anthropogenic SST pattern formations*  
Advisor: Kristopher B. Karnauskas, Geology & Geophysics

**Lillian K. Steponaitis**

University of North Carolina, Chapel Hill, *Negotiating ocean space: The siting of offshore renewable energy facilities in Massachusetts and Rhode Island*  
Advisors: Porter Hoagland and Hauke Kite-Powell, Marine Policy Center

**John M. Swartz**

University of Pittsburgh, *Controls on uranium isotope variability within central Chilean river waters*  
Advisor: Laura F. Robinson, Marine Chemistry & Geochemistry

**Jennifer A. Thomas**

Old Dominion University, *Hypoxia in Buzzards Bay: Determining physical processes responsible for the distribution of dissolved oxygen in Buzzards Bay*  
Advisor: Neil Ganju, U. S. Geological Survey

**Julie van der Hoop**

Dalhousie University, *Estimating swimming paths of tagged baleen whales using an acoustic tracking system*  
Advisor: Mark F. Baumgartner, Biology

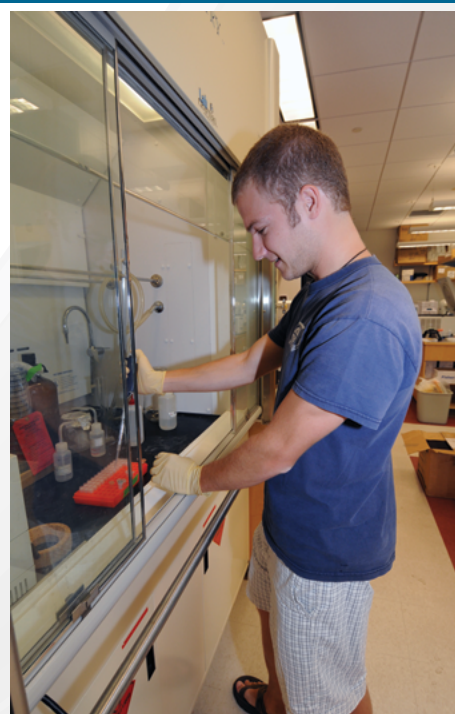
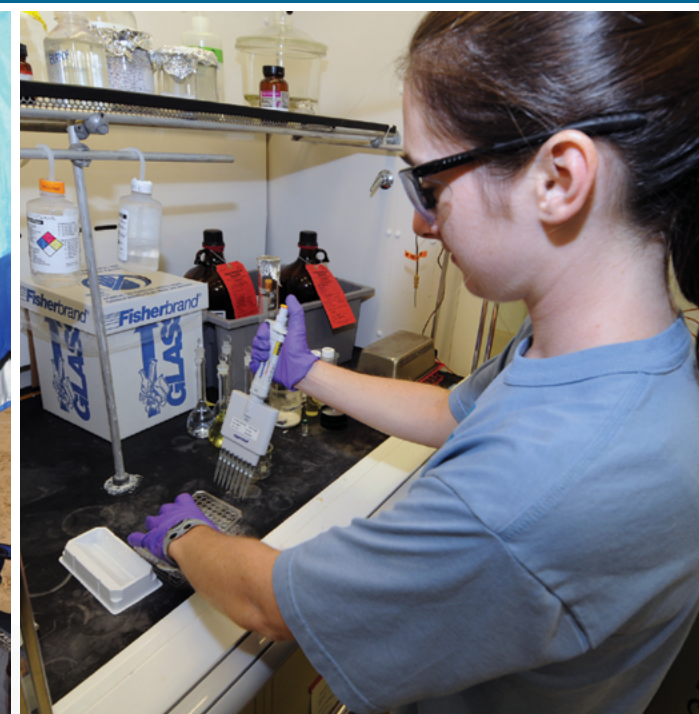
**Anna E. Wargula**

Grove City College, *Oyster larvae behavioral response to turbulence*  
Advisors: Karl R. Helfrich and Lauren S. Mullineaux, Physical Oceanography

**Eleina M. Zaitsev**

Columbia University, *Investigating the role of nitric oxide and oxidative stress in Symbiodinium spp. heat sensitivity*  
Advisor: Matthew D. Johnson, Biology

Summer fellows enjoy sea-going opportunities, and participate in lecture series, departmental seminars, and an ethics workshop.



A PEP student aboard the R/VTioga expedition to Buzzards Bay; Cristin F. Luttazi doing field work in Waquoit Bay, MA; Laura E. Sofen and Tanner M. Miller each works in their respective labs.



# Endowed Funds

## SUPPORTING WHOI'S EDUCATION ACTIVITIES

The generous contributions of individual donors and foundations are crucial to the success of our education programs.

The John M. Alden Fund

The AOP&E and G&G Alumni Fund

The Edna McConnell Clark Foundation Fund

The Robert H. Cole Endowed Ocean Ventures Fund

The Arthur Vining Davis Foundations Fund for Summer Student Fellows

The Arthur Vining Davis Foundations Graduate Student Fellowships

The Ducommun and Gross Family Foundation Education Endowment

The Henry L. and Grace Doherty Professor of Oceanography

The Doherty Postdoctoral Scholars

The Kenneth O. Emery Fellowship in Marine Geology & Geophysics

The Homer Ewing Fund

The C. Russell Feldman Fund

The Christopher Haebler Frantz Fund

The Paul McDonald Fye Graduate Fellowship in Oceanography

The Ruth and Paul Fye Award for Excellence in Oceanographic Research

The William D. Grant Fund

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The Jake Hornor Fund

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The J. Seward Johnson Fund - B

The Henry J. Kaiser Family Foundation Ocean Ventures Fund

The Arthur E. Maxwell Graduate Student Fellowship

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Elisabeth W. Morss Ditty Bag Fund

The Pavia-Fornari Endowed Fund in Support of Graduate Students

The A. Lawrence Peirson, III Student Opportunity Endowed Fund

The Carl and Pancha Peterson Endowed Fund for Support of Summer Student Fellows

The Lawrason Riggs, III Memorial Fund

The Virginia Rudolph Endowed Student Loan Fund for Women

The Edward and Erla Schwarm Family Fund

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The John H. Steele Endowment in Support of Postdoctoral Research

The H. Burr Steinbach Fund

The Alfred G. Mayor and Katharine M. Townsend Memorial Fund

The Richard Vanstone Fund

The Karen L. Von Damm Graduate Student Fellowship

The F. Thomas Westcott Fund

*Right, from top: WHOI Joint Program graduates Jessica A. Benthuisen, Naomi M. Levine, James P. Sáenz, Laura R. Hmelo and Beatriz Peña-Molino spell out 'WHOI' at the 2010 DISCO XXII conference in Honolulu, HI; students collect samples during a biological oceanography course; Joint Program student David Griffith in the lab.*



TOP PHOTO COURTESY OF JAMES SAENZ. BOTTOM PHOTOS LEFT TO RIGHT: TOM KLEINDINST, KEN KOSTEL



*Joint Program students on the sailing vessel  
Corwith Cramer are ready to depart on the 2010  
Jake Peirson summer cruise.*



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