



WOODS HOLE  
**PEP**

[www.woodsholediversity.org](http://www.woodsholediversity.org)

PEP is a project of the Woods Hole Diversity Initiative, a multi-institutional effort to promote diversity in the Woods Hole science community. The WHDI's academic partner in PEP is The University of Maryland Eastern Shore.

**Woods Hole  
Diversity Advisory  
Initiative Partners**

Marine Biological  
Laboratory

NOAA National Marine  
Fisheries Service

Sea Education  
Association

University of Maryland  
Eastern Shore

United States  
Geological Survey-  
Woods Hole

Woods Hole  
Oceanographic  
Institution

Woods Hole Research  
Center

**Woods Hole Partnership Education Program  
(PEP) 2009, 2010, 2011 Summary Report**



In May of 2011, a diverse and talented group of 13 students came to Woods Hole to participate in the third annual Partnership Education Program (PEP). Sponsored by the Woods Hole Diversity Initiative (WHDI), PEP is a multi-institution program designed to broaden the pipeline for talent entering marine and environmental science in general, and the Woods Hole and NOAA Fisheries science communities in particular.

Designed primarily for students entering their junior or senior year, PEP consists of a four-week course and a six-to-ten week research project working with a scientific mentor in one of the partner science institutions. The Diversity Initiative launched PEP to identify talented students who might not otherwise consider careers in Woods Hole and marine or environmental science. The program is designed to provide an introduction to the science institutions in the village and to ensure

that PEP students have access to mentors and to training and skill building experiences critical to successful research careers.

PEP now has a three-year record of success in attracting bright students from minority populations under-represented in science, technology, engineering, and mathematics (STEM) – including African American, Hispanic, and Native American communities. The first three PEP cohorts (total of 44 students) come from a wide variety of undergraduate institutions, including many colleges and universities that were not previously represented in Woods Hole.

PEP is intended not merely to attract undergraduates, but to provide a pathway for these students to continue on to graduate school and to research careers in the marine and environmental science communities. Although some participants in the first three PEP classes are still undergraduates, some



*Top, from the left – Ben Gutierrez (USGS), Onji Scott (PEP Program Coordinator), George Liles (NOAA Fisheries), Jan-Alexis Barry (Univeristy of the Virgin Islands), MilesBorgen (Western Washington University), Chloe Howard (Spelman College), Adriel James (Morehouse College); On the steps, from the top – Janeea Ventour (Tuskegee University), Ann Thompson (Humboldt State University), Cassandra Ruff (Humboldt State University), Andrew Klein (University of Maryland, College Park), Kari Jackson (Morehouse College), James Lewis (University of Maryland, College Park), Alicia Perez (Humboldt State University), Lakhia Clark (Tuskegee University), Jacob Craven (Boston College), Ambrose Jearld (NOAA Fisheries).*

have returned to Woods Hole for additional programs. Others have graduated and have enrolled in programs of graduate study, in many cases with strong letters of recommendation from PEP directors and from the students' PEP research mentor.

This winter the PEP directors are conducting a survey to gather information about the 45 PEP graduates – in advance of those results, we already know that five students have returned to the Woods Hole community to participate in the Sea Education Association SEA Semester at Sea. Some of the students have participated in other NOAA career development opportunities: Two have returned as NEFSC Bradford E. Brown Internships, one has a Nancy Foster Fellowship, and one has a fellowship at the SEFSC. One 2010 PEP student is now employed with NOAA as a fisheries observer. Several PEP students have applied and been accepted as Summer Undergraduate Fellows in the Woods Hole Oceanographic Institution.

At least 82 percent (38 of 45) of the PEP graduates are continuing their careers in marine and environmental science. Seventeen of the 45 students in the first three PEP classes are still undergraduates. Of the 28 who have finished their Bachelors degree, 16 are now in graduate programs and another two have applications pending. Four others are working in science jobs.

Five students have published papers with their PEP research mentors, and at least three others have won awards from presentations at professional conferences. One is now a Knauss Fellow.

The PEP staff is committed to maintaining relationships with students (Once a PEPster, Always a PEPster) and continuing to mentor program participants – especially those who stay in science. PEP Director Ambrose Jearld has written more than two dozen letters of support and reference, and 43 of the 45 PEP graduates have been in contact with the PEP staff in the last 12 months. Additionally, many of the PEP graduates remain in contact with each other, holding reunions and passing along information and supporting each others' professional growth.

In its first three years, PEP has been funded in large part by NOAA's National Marine Fisheries Service, with additional funding from the United States Geological Survey. The WHDI partner institutions provide additional support, including considerable in-kind support covering course faculty, vessel time, facility use, etc. SEA has made a major in-kind contribution in providing staff time and expertise in student services and financial management. Participating labs at the member institutions also cover some student expenses.

The PEP course is a four credit course in marine and environmental science, offered through University of Maryland Eastern Shore and taught in Woods Hole by research scientists from the Woods Hole science institutions. The course ("Topics in Ocean and Environmental Sciences: Global Climate Change") consists of modules in biology, geology, chemistry, physical oceanography, and resource management. Simultaneous with the course, PEP students are introduced to their research mentors and encouraged to begin their research project, as time allows. At the

conclusion of the course, the students join research laboratories to work with mentors on projects in their areas of interest. In 2011, PEP students worked with scientists at USGS, WHOI, MBL, and NEFSC.

PEP covers tuition and fees for the course, travel to and from Woods Hole, and housing and meals throughout the summer. PEP also provides a stipend (\$3,000 in 2011) for students who complete both the course and the research project. The financial support and the stipend are essential components of the program, making the experience possible for students who would otherwise have to find summer employment in order to meet their expenses in the fall.

The program has been evaluated each year by Dr. Emorcia Hill, Director of Research and Evaluation, Center for Study of Diversity in Science, Harvard Medical School. Dr. Hill has interviewed students, research mentors, course faculty, and program staff, and her reports guide the evolution of the program. Her 2011 evaluation is pending and will guide our efforts to develop the program in 2012 and beyond.

## Colleges and Universities represented in PEP

### 2009

Arkansas State University (2)  
City University of New York  
Delaware State University  
Humbolt State University (2)  
Juniata College  
Morgan State University  
Savannah State University (2)  
Syracuse University  
University of New England (2)  
University of Maryland Eastern Shore (2)  
University of Massachusetts, Boston

### 2010

Bridgewater State University  
Cornell University  
Hampton University  
Morehouse College (2)  
Nova Southeastern University  
South Carolina State University  
Southwestern College  
SUNY Maritime College  
University of Arkansas, Fayetteville  
University of California, Berkeley  
University of California, San Diego  
University of Massachusetts, Boston  
University of New Haven  
University of Tampa  
University of the Virgin Islands  
Virginia Commonwealth University

### 2011

Boston College  
Humboldt State University (3)  
Morehouse College (2)  
Spelman College  
Tuskegee University (2)  
University of Maryland, College Park (2)  
University of the Virgin Islands  
Western Washington University

## PEP students ethnic identifies (as self-identified)

### 2009

Japanese American (1), Mixed, Indian of Guyanese descent (1), Native American (1), Hispanic (1), Mexican American (1), African American (2), Caucasian (2), Black (2), West Indian (2), Declined to identify (2)

### 2010

Mexican (1), Hispanic (3), African American (6), Caucasian (2), Asian/Chinese (1), Black (2), Declined to identify (1).

### 2011

African-American (6), Bi-Racial: African-American/Caucasian (1), White/Caucasian (2), Hispanic (2), Native American (1), Pacific Islander/Russian (1)

Three-Year Summary: African-American/Black (18), Asian/Chinese (1), Bi-Racial/Mixed (2), Caucasian/White (6), Hispanic (6), Japanese American (1), Mexican or Mexican-American (2), Native American (2), Pacific Islander (1), West Indian (2), Declined to identify (3)



## PEP Research Projects and Mentors 2009

Name Institution	Project Title (advisor)
<b>Christina Guidoboni</b> University of New England	<i>Technology &amp; Methodology of Image Analysis as it Relates to Atlantic Goosefish</i> (Lophius americanus) (Jay Burnett, NOAA Fisheries)
<b>Zak Balmuth-Loris</b> Syracuse University	<i>The Effects of Internal Waves Down in Panama</i> (Scott Gallager, WHOI)
<b>Reaz Kahn</b> University of Massachusetts, Boston	<i>Developing Low Cost and Practical Devices to Measure Surface/Bottom Ocean Currents</i> (Jim Manning, NOAA Fisheries)
<b>Stephanie Hayes</b> University of New England	<i>Behavioral Implications of the Addition of Housing on Various Crustaceans</i> (Rachel Metz, NOAA Fisheries)
<b>Shamgan Perkins</b> Savannah State University	<i>Seasonal Trends Present at Isla Canales de Tierra, Panama Using the Marine Observatory PLUTO</i> (Scott Gallager, WHOI)
<b>Jordan Aoyama</b> Juniata College	<i>Sounds of the Deep</i> (Sofie Van Parijs, NOAA Fisheries)
<b>Samara Lawrentz</b> University of Maryland Eastern Shore	<i>Fecundity and Histology of the Monkfish</i> (Anne Richards, NOAA Fisheries)
<b>Sam Matulich</b> Humbolt State University	<i>Age/Growth Analysis of Yellowtail Flounder from Mark-Recapture Study</i> (Larry Alade, NOAA Fisheries)
<b>Adrienne George</b> Delaware State University	<i>Ecology of Deep-Sea Hydrothermal Vents</i> (Lauren Mullineaux, WHOI)
<b>Joe'Ella Caddle</b> University of Maryland, Eastern Shore	<i>Eel Pond: A Brief Historical and Ecological View</i> (Joel Sohn, Harvard)
<b>Rosalinda Gonzalez</b> Humbolt State University	<i>Enhanced N<sub>2</sub>O Fluxes in Coastal Wetlands Due to Nitrogen Enrichments</i> (Serena Moseman, USGS)
<b>Amias Polk</b> Arkansas State University	<i>Nitrogen Cycling in the Northeastern Amazon of French Guiana as Assessed by Stable Isotopes</i> (Maureen Conte, MBL and J.C. Weber, MBL)
<b>Myrna Gatica</b> City University of New York	<i>Glacier-Derived Dust as an Iron Source to the Gulf of Alaska: A Satellite Perspective</i> (John Crusius, USGS and Andrew Schroth, USGS)
<b>James Shelton</b> Arkansas State University	<i>Soil Respiration Analysis on Martha's Vineyard</i> (Jim Tang, MBL)
<b>Melissa Pinard</b> Morgan State University	<i>Ocean Acidification Impacts on Larval Shell Formation</i> (Anne Cohen, WHOI and Dan McCorkle, WHOI)
<b>Sanya Compton</b> Savannah State University	<i>Estimating the Economic Effects of Shoreline Change Due to Sea Level Rise in Coastal Massachusetts</i> (Porter Hoagland, WHOI)



## PEP Research Projects and Mentors 2010

Name Institution	Project Title (advisor)
<b>Nam Siu</b> University of Tampa	<b><i>Recruitment Patterns of Hydrothermal Vent Communities After a Submarine Volcanic Resurfacing Event at the East Pacific Rise, 9°50'N</i></b> (Lauren Mullineaux, WHOI)
<b>Zachary Williams</b> South Carolina State University	<b><i>Development of the Autodiametric Method to Rapidly Measure Fecundity of Winter Flounder</i></b> (Richard McBride, NOAA Fisheries)
<b>Diara Townes</b> Hampton University	<b><i>The Evaluation of a New Anesthetic in Temperate and Tropical Freshwater Fishes</i></b> (Amy Hancock, MBL/NOAA Fisheries)
<b>Dolores Toledo</b> University of California, Berkeley	<b><i>Calibrating an Acoustic Backscatter System by the Standard Target Method</i></b> (Kenneth Foote, WHOI)
<b>Victoria Morgan</b> Cornell University	<b><i>Measuring CO<sub>2</sub> Efflux: A Theoretical and Practical Approach</i></b> (Jim Tang, MBL)
<b>Alex DeLeon</b> Morehouse College	<b><i>Efficient Catch Share Allocation Between Commercial and Recreational Sectors</i></b> (Ayeisha Brinson, NOAA Fisheries)
<b>Anna-Mai Christmas</b> University of the Virgin Islands	<b><i>Ontogenetic Changes Affecting the American Lobster (Homarus americanus) Larvae</i></b> (Scott Gallager, WHOI)
<b>Angela Anorve</b> Southwestern College/ University of California, San Diego	<b><i>Growth and Feeding Response of <i>Didemnum vexillum</i> to Flow and Food Level</i></b> (Scott Gallager, WHOI)
<b>Emily Motz</b> SUNY Maritime College	<b><i>Cohasset Drifter Study and Plotting Drifter Tracks on Satellite Sea-Surface Temperature Images</i></b> (Jim Manning, NOAA Fisheries)
<b>Lane Boyer</b> University of Arkansas, Fayetteville	<b><i>Glacier Bay Cold-Water Coral Project 2010</i></b> (Kathy Scanlon, USGS)
<b>Melika Uter</b> University of Massachusetts, Boston	<b><i>Gross Primary Production in Waquoit Bay from Measurements of Triple Oxygen Isotopes</i></b> (Rachel Stanley, WHOI)
<b>Lucy Flores</b> Nova Southeastern University	<b><i>The Potential Relationship Between Harmful Algal Blooms and Tourism on Cape Cod</i></b> (Porter Hoagland, WHOI)
<b>Delawrence Sykes</b> Morehouse College	<b><i>Analysis of Hudson Canyon (Northwest Atlantic) Euphausiid Community Structure</i></b> (Gareth Lawson, WHOI)
<b>Brian Redding</b> Virginia Commonwealth University	<b><i>Photographic Analysis Revisited for Biomass Determination of Deep Sea Red Crab</i></b> (Toni Chute, NOAA Fisheries)
<b>Chris Cepero</b> Bridgewater State University	<b><i>Calibrating the AQUAscatter 1000</i></b> (Kenneth Foote, WHOI and Marinna Martini, USGS)
<b>Rachel Rochon</b> University of New Haven	<b><i>The Ocean Sound Kiosk</i></b> (Sofie Van Parijs, NOAA Fisheries)



## PEP Research Projects and Mentors 2011

Name Institution	Project Title (advisor)
<b>Jan-Alexis Barry</b> University of the Virgin Islands	<b><i>Resolving Transport Pathways of New England's Coastal Waters</i></b> (Jim Manning, NOAA Fisheries)
<b>Janeeva Ventour</b> Tuskegee University	<b><i>Determination of Biogenic Silica Concentrations in Suspended Marine Particles</i></b> (Phoebe Lam, WHOI)
<b>Ann Thompson</b> Humboldt State University	<b><i>Nature vs. Nurture: the Relative Influence of Genetics and Environment on Scale Morphology of Striped Bass <i>Morone saxatilis</i></i></b> (Ann Richards/Ruth Haas-Castro, NOAA Fisheries)
<b>Adriel James</b> Morehouse College	<b><i>The Effects of Fish Behavior on Their Catchability in Fish Traps</i></b> (Gary Shepard, NOAA Fisheries)
<b>Miles Borgen</b> Western Washington University	<b><i>Propulsion Mechanisms of Lobster Larvae Through Ontogeny</i></b> (Scott Gallager, WHOI)
<b>Kari Jackson</b> Morehouse College	<b><i>Ageing Impression Simulation Study for <i>Limanda ferruginea</i> (yellowtail flounder)</i></b> (Larry Alade/Chris LeGault, NOAA Fisheries)
<b>Alicia Perez</b> Humboldt State University	<b><i>Biological Carbon Sequestration Capacity of Forests and Soils: Implications for Climate Change Mitigation Reductions in California</i></b> (Eric Sundquist, USGS)
<b>Lakiah Clark</b> Tuskegee University	<b><i>Carbon Fractions Among Different Ecosystems</i></b> (Jim Tang, MBL)
<b>Chloé Howard</b> Spelman College	<b><i>The Effect of Salinity on Lipid Production by Haptophyte Algae</i></b> (Linda Amaral Zettler, MBL)
<b>James Lewis</b> University of Maryland, College Park	<b><i>Description and Classification of Humpback Whale Social Sounds</i></b> (Sofie Van Parijs, NOAA Fisheries)
<b>Cassandra Ruff</b> Humboldt State University	<b><i>Underwater Cultural Resource Management</i></b> (Porter Hoagland, WHOI)
<b>Andrew Klein</b> University of Maryland, College Park	<b><i>Sediment Transport: Nepheloid Layer Measurements and Floc Model for OASIS</i></b> (Marinna Martini, USGS)
<b>Jacob Cravens</b> Boston College	<b><i>Echinoderm Larvae Responses to Food Fluctuations and Predators</i></b> (Shawn Arellano/Lauren Mullineaux, WHOI)



## Instructors

<i>Module</i>	<i>Instructor</i>
<b>2009</b>	
Physical Oceanography	Beatriz Peña-Molino (WHOI, JP Student)
Chemical Oceanography	Kristin Pangallo (WHOI, JP Student)
Biological Oceanography	Serena Moseman (USGS, Post-doc)
Geological Oceanography	Ben Gutierrez (USGS, Geologist)
Ecosystem Management	Mike Fogarty (NOAA Fisheries, Scientist)
<b>2010</b>	
Physical Oceanography	Magdalena Andres (WHOI, Post-doc) Emily Shroyer (WHOI, Post-doc)
Chemical Oceanography	Erin Bertrand (WHOI, JP Student) Stephanie Owens (WHOI, JP Student)
Biological Oceanography	Elisa Maldonado (Harvard, Post-doc)
Geological Oceanography	John Bratton (USGS, Scientist) Erik Zettler (SEA, Assoc. Dean)
Special Module: Forest Carbon Cycle and Aboveground Biomass Estimates	Kathleen Savage (WHRC, Scientist)
Ecosystem Management	Mike Fogarty (NOAA fisheries, Scientist)
<b>2011</b>	
Climate Change Workshop	Kathleen Savage (WHRC)
Physical Oceanography	Magdalena Andres (WHOI) Emily Shroyer (WHOI)
Chemical Oceanography	Kathleen Munson (WHOI)
Biological Oceanography	Elisa Maldonado (Harvard)
Geological Oceanography	Erik Zettler (SEA) Linda Amaral-Zettler (MBL)
Ecosystems Management	Michael Fogarty (NOAA Fisheries)

## Invited Speakers and Guest Lecturers

### 2009

Larry Alade, NOAA National Marine Fisheries Service  
Brad Barr, NOAA National Marine Fisheries Service  
Pieter Beck, Woods Hole Research Center  
Heather Benway, Woods Hole Oceanographic Institution  
Erin Bertrand, Woods Hole Oceanographic Institution  
Amy Bower, Woods Hole Oceanographic Institution  
John Bullard, Sea Education Association  
Steve Cadrin, NOAA/University of Massachusetts, Dartmouth  
Eric Davidson, Woods Hole Research Center  
Shelley Dawicki, NOAA National Marine Fisheries Service  
Jane Denny, U.S. Geological Survey  
Scott Doney, Woods Hole Oceanographic Institution  
Hugh Ducklow, Marine Biological Laboratory  
R. Max Holmes, Woods Hole Research Center  
Naomi Levine, Woods Hole Oceanographic Institution  
Jason Link, NOAA National Marine Fisheries Service  
Andrew McDonnell, Woods Hole Oceanographic Institution  
Toby McGrath, Woods Hole Research Center  
Bob Pickart, Woods Hole Oceanographic Institution  
Jesus Pineda, Woods Hole Oceanographic Institution  
Dan Repeta, Woods Hole Oceanographic Institution  
Gary Shepherd, NOAA-National Marine Fisheries Service  
Marie-Louise Timmermans, Woods Hole Oceanographic Institution  
James Weinberg, NOAA-National Marine Fisheries Service  
Richie Williams, U.S. Geological Survey

### 2010

Matt Arsenault, U.S. Geological Survey  
Heather Benway, Woods Hole Oceanographic Institution  
John Bullard, Sea Education Association  
Anne Cohen, Woods Hole Oceanographic Institution  
Shelley Dawicki, NOAA National Marine Fisheries Service  
Hugh Ducklow, Marine Biological Laboratory  
Kevin Friedland, NOAA National Marine Fisheries Service  
John Hare, NOAA National Marine Fisheries Service  
R. Max Holmes, Woods Hole Research Center  
Skee Houghton, Woods Hole Research Center  
Janet Nye, NOAA National Marine Fisheries Service  
Jesus Pineda, Woods Hole Oceanographic Institution  
Andy Solow, Woods Hole Oceanographic Institution  
Wayne Walker, Woods Hole Research Center  
Adam Bausch, Woods Hole Research Center  
Kathleen Savage, Woods Hole research Center  
Nora Greenglass Woods Hole Research Center

### 2011

Skee Houghton, Woods Hole Research Center  
Alessandro Baccini, Woods Hole Research Center  
Shelley Dawicki, NOAA National Marine Fisheries Service  
Bill Curry, Woods Hole Oceanographic Institution  
Scott Doney, Woods Hole Oceanographic Institution  
Andrew Solow, Woods Hole Oceanographic Institution  
John Bullard, Sea Education Association

Guest speakers are fewer in 2011 in response to student feed-back from 2009 and 2010 suggesting that we adjust the schedule to include more hands-on activities and fewer lectures and seminars.



Laurel Col, NOAA National Marine Fisheries Service  
 Bill Waite, U.S. Geological Survey

*Weekly Writing Workshop*  
 George Liles, NOAA Fisheries

*WHOI Ethics Seminar for Summer Student Fellows*

Field Research aboard the *R/V Tioga*

**2011**

*Public Speaking Workshops*  
 John Bullard Sea Education Association  
 Ben Gutierrez, U.S. Geological Survey

*Lab Safety Orientation*  
 Woods Hole Oceanographic Institution

*WHOI Ethics Seminar for Summer Student Fellows*

Field Research aboard the *R/V Tioga*

*Graduate School Question and Answer Session*  
 Woods Hole Oceanographic Institution Joint Program Students

*Weekly Writing Workshop*  
 George Liles, NOAA Fisheries

**PEP Calendar 2012 (draft)**

<b>December 1</b>	Call for 2012 applicants
<b>February 15</b>	Deadline for applications for priority consideration
<b>March 1</b>	2012 class announced
<b>April 2</b>	Students register with UMES for course
<b>April 16</b>	Match students with research projects/mentors
<b>May 31</b>	Students arrive
<b>June 1, 2</b>	Orientation (includes meeting research mentors)
<b>June 4</b>	Course begins
<b>June 29</b>	Course ends
<b>August 10</b>	PEP Symposium and Graduation

**Panel Discussions/Workshops**

**2009**

*What do Scientists do Everyday?*  
 Bill Waite, U.S. Geological Survey  
 Chris Reddy, Woods Hole Oceanographic Institution;  
 Mak Saito, Woods Hole Oceanographic Institution

*Public Speaking Workshops*  
 Ben Gutierrez, U.S. Geological Survey

*Pursuing Graduate School*  
 Aeyisha Brinson, NOAA Fisheries  
 David Walsh, The Woods Hole Group  
 Ben Gutierrez, U.S. Geological Survey

*Weekly Writing Workshop*  
 George Liles, NOAA Fisheries

WHOI Ethics Seminar for Summer Student Fellows

Field Research aboard the *R/V Tioga*

**2010**

*The Daily Life of a Scientist*  
 Neil Ganju, U.S. Geological Survey  
 Phoebe Lam, Woods Hole Oceanographic Institution  
 Chuck Lea, Sea Education Association  
 Jian Lin, Woods Hole Oceanographic Institution

*Public Speaking Workshops*  
 Ben Gutierrez, U.S. Geological Survey

*Pursuing Graduate School*  
 Sheri White, Woods Hole Oceanographic Institution