



**NOAA** NATIONAL OCEANIC AND  
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Contact: Shelley Dawicki  
508-495-2378  
[Shelley.Dawicki@noaa.gov](mailto:Shelley.Dawicki@noaa.gov)

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## Meet the 2010 PEP Students

### Angela Anorve

After earning an associate's degree in biological sciences at Southwestern College, Angela Anorve is attending the University of California, San Diego this fall as a junior majoring in human biology. Born to Mexican parents and a first generation American, she plans to attend medical school and pursue a career as a cardiothoracic surgeon. This summer she studied the effects of growth and feeding rates of the invasive species *Didemnum vexillum* with biologist Scott Gallager of WHOI during the research phase of the PEP internship. "Although my goal is to be a cardiothoracic surgeon, I am interested in the environment, in sea turtles and other aquatic species. One of the reasons I applied to the PEP program was to obtain research experience and learn more about marine research and environmental issues that affect marine ecosystems. The course part of PEP was very helpful to me. I haven't had any marine science classes, and it exposed me to different fields and research areas that I've never heard of. One of my favorites was physical oceanography, but I learned a lot from each of them. "

Her hometown is Chula Vista, California.

### Lane Boyer

Mapping cold water coral habitats in Alaska's Glacier Bay with research mentor Kathy Scanlon of USGS was just one of many new experiences this summer for Lane Boyer, a senior geology major at the University of Arkansas in Fayetteville. A nationally ranked distance runner, Boyer won ten state championship titles in track and cross-country while in high school, where he was also class valedictorian, and now competes for the Arkansas Razorbacks, one of the top NCAA division 1 track programs in the country. A self-described achiever from a small farming community in Kansas, he says the PEP experience has expanded his academic horizons and provided an opportunity to participate for the first time in a scientific internship program. "For me the PEP experience was much more than learning about science. I not only have a better understanding of the field... this (PEP) is going to help me with networking and has given me many new opportunities."

His hometown is Fredonia, Kansas.

### Christopher Cepero

For Chris Cepero, calibrating an acoustic backscatter system by the standard target method with fellow PEP student Dolores Toledo and research mentor Ken Foote of WHOI was a good fit with his spring 2010 physics degree from Bridgewater State University. He plans to apply

to graduate school, aspiring to be an astronaut but sure he will work in applied sciences. “The course portion of the PEP provided different perspectives on many science topics and helped me put the whole picture together. Although my major was physics and my minor was chemistry, I didn’t know much about physical or chemical oceanography and now have a much better sense of the cross-disciplinary nature of marine sciences. I’ve done research before, but I’ve never been involved with a project like this, doing something that has not been done before and could be part of a scientific publication one day. The laboratory experience and scientific knowledge I’ve gained this summer will help me to be more prepared for graduate school, and for the future.”

His hometown is East Bridgewater, Massachusetts.

### **Anna-Mai Christmas**

Conducting marine research and teaching is nothing new to Anna-Mai Christmas, a recent graduate of the University of the Virgin Islands with a major in marine biology who just began a master’s program in marine science at Western Washington University in Bellingham. Born and raised on the island of Dominica, she moved to the U.S. Virgin Islands to attend college, where she worked to improve local knowledge and awareness of marine resources by helping to create activities for a middle school science activity book. She also conducted research on the relationship between Pederson and Spotted Cleaner shrimp and sea anemones. Earlier this year she worked at Western Washington University’s Shannon Point Marine Center, developing curriculum and teaching weekly marine science classes to second grade students to build awareness of marine resources and conservation. Her PEP research project focused on ontogenetic changes affecting the American lobster (*Homarus americanus*) larvae with research mentor Scott Gallager of WHOI. Using a time lapse camera, she studied how temperature and turbulence affected vertical migration in lobster larvae at different depths. Christmas plans to attain a Ph.D. degree in marine ecology and continue doing research. “I always wanted to work with crustaceans, and improved my research skills this summer. Being able to interact with many scientists who work on different aspects of the environment was great. If you have a question you can definitely find someone who can help you.”

Her hometown is Massacre, Dominica.

### **Alexander DeLeon**

Alex DeLeon says his PEP experience has given him a more holistic approach to life and has strengthened his desire to pursue graduate studies in a Ph.D. program where he can enjoy his love of math to study ecosystems management. A second semester junior majoring in math at Morehouse College, DeLeon grew up in Maryland and is an avid swimmer and reader. With guidance from research mentor Ayeisha Brinson in the social sciences branch at NOAA Fisheries Service, DeLeon reviewed scientific literature and collected background information as part of a study of the an efficient catch share allocation between commercial and recreational fishing sectors. “PEP is not what I expected. It’s much more attuned to the individual student and where they are. The resources in this community can facilitate any opportunity. PEP has been an eye-opening experience for me, a lot like a thought experiment. I’ve learned that making connections between many ideas is possible, even ideas that don’t seem connected but you find out that they often are. I wanted a challenging research experience, and I’ve certainly had that, and much more. ”

His hometown is Upper Marlboro, Maryland.

## **Lucy Maria Flores**

A senior biology major at Nova Southeastern University in Ft. Lauderdale, Florida, Lucy Flores commutes to school and had never spent a summer away from home and family or participated in an internship program. When she found PEP through a Google search, she knew it was right for her. She attended a high school specializing in marine science before enrolling at the nearby Nova Southeastern University, where she is majoring in biology. Most days during the research phase of her PEP internship were spent at a computer using her math, statistics and economics knowledge from college courses to study the potential relationship between harmful algal blooms and tourism on Cape Cod. That meant gathering a lot of data from different sources by telephone or computer, entering it on a spreadsheet and analyzing the results with research mentor Porter Hoagland at WHOI's Marine Policy Center. "It was more like a dream job. I was finally able to use skills and knowledge I learned in school and see how they are applied to a relevant environmental issue." Flores says the course part of the program helped her see the big picture and corrected a lot of her misconceptions. "I learned that it was important to be able to present research to other people. I took public speaking in college, but never thought I'd be using it in science." Like other PEP students, she loved being able to ride a bike to work and around Woods Hole, and says she is very grateful for the PEP experience. "It's eye-opening, its scientific and it is motivating. You're exposed to so many areas, and you get a sense of all the opportunities. This summer confirmed that I was on the right track in terms of what I want to do: attend graduate school to study environmental science and policy."

Her hometown is Davie, Florida.

## **Victoria Morgan**

A sophomore biological sciences major at Cornell University with a concentration in ecology and evolutionary biology, Victoria Morgan grew up in Miami and has had a passion for learning about nature since she was young. For the research phase of her PEP internship, Morgan worked in the lab of MBL scientist Jim Tang on a theoretical and practical approach to measuring carbon dioxide efflux, or the expiration of carbon dioxide from the soil and trees into the atmosphere. For the theoretical portion of her research project, Morgan measured soil respiration in the lab and designed an "ideal" measurement chamber made of PVC pipe by testing how saturation time and mixing of air were affected by the area and depth of the soil chambers. For the practical approach, she then spent 12 days at Harvard Forest in Petersham, Mass., measuring stem respiration in the trunks of ten oak trees of different sizes, taking measurements every hour for seven hours in a row to see if the respiration rate changed with the time of day, or temperature. "I experienced the benefits and drawbacks of conducting field research, and learned how to analyze field data. Both parts of my project were interesting, and I learned a lot since I have never done a research project like this before. The interactions between the soil, plants and the atmosphere are very relevant to understanding the impacts of climate change." Morgan says she liked the course and research aspects of the program, going on a whale watch and other field trips, but especially liked the social aspects of the program. "We had a great group of people and everyone got along very well. I had a great summer."

Her hometown is Miami, Florida.

## **Emily Motz**

A junior marine environmental science major at the State University of New York (SUNY) Maritime College on an NROTC scholarship, Emily Motz expected to spend the summer on a U.S. Navy destroyer based in San Diego until she heard about PEP. Motz became interested in environmental issues during her freshman year at a high school focused on science. She also knew she wanted to pursue a career as an oceanographer in the U.S. Navy, where she can help find solutions to human-induced challenges in the marine environment, like the impact of sonar on marine mammals. Motz, who is minoring in oceanography and meteorology at SUNY Maritime College, says the PEP experience has broadened her scientific knowledge and taught her skills which will be helpful when she graduates and is commissioned as an ensign in the U.S. Navy. Guided by research mentor Jim Manning, an oceanographer at NOAA Fisheries Service, Motz worked with high school students at the Cohasset Center for Student Coastal Research in Cohasset, Mass., to study tidal flow in the town's harbor using surface drifters they built and deployed from kayaks. She also developed a computer animation to visualize the relationships between sea surface temperature structure and the path of the drifters. "I learned a lot of new skills, especially using computers. I have never done modeling or worked with any computer languages before, and although it was slow going at first I learned, and I really like it," she said of her research experience. "The best part was I got to go into the field and apply it."

Her hometown is Cincinnati, Ohio.

## **Brian Redding**

Brian Redding has lived along a river his entire life, an experience that drives his interest in the environment and making a difference. Redding spent part of his summer revisiting a photographic analysis for biomass determination of the deep-sea red crab (*Chaceon quinque-dens*) with mentor Antonie "Toni" Chute of NOAA Fisheries Service. The project reviewed how data was collected and calculations of crab biomass or stock population were made in a 1974 survey, shortly after harvesting of the fishery began, and examined differences between that survey and another conducted in 2003. An environmental studies major at Virginia Commonwealth University, Redding spent two summers volunteering with Habitat for Humanity, assisted in constructing a rock jetty, and worked as a short order cook while in high school. This past year he was a volunteer with Green Unity, the university's environmental club. "Both the course and research aspects will help me not only further my education, but have made a lasting impression of what I want to pursue professionally as well as academically." Redding's favorite part of the experience was being in the workplace and seeing what people do every day. "I got to see what the research world is really like, including the behind the scenes aspects like data analysis after a cruise and everything that goes into a project." His plans after graduation remain uncertain, but he is interested in attending graduate school, perhaps serve in the Peace Corps, or find a job in his field.

His hometown is Severna Park, Maryland.

## **Rachel Rochon**

Now a junior marine biology major at the University of New Haven, Rachel Rochon is interested in pursuing a career in marine conservation, perhaps working in rescue or rehabilitation of marine animals. Born and raised in New Orleans, Rochon loves being near and on the water. After seeing a television program on marine science and conservation when she

was in the eighth grade, she volunteered at the Audubon Aquarium of the Americas in New Orleans. Following Hurricane Katrina, Rochon's family relocated to Virginia, where she continued to pursue her interest in marine research at Bishop McNamara High School in Forestville, Maryland. She spent the research portion of her summer working on a public exhibit on ocean sounds, many from marine animals, for NOAA's Woods Hole Science Aquarium with mentor Sofie Van Parijs, a bio-acoustician at NOAA Fisheries Service. "I am not sure what I want to do after I graduate, so this experience has helped me learn more about marine biology as well as other fields of marine and environmental science, and to see the possibilities. I want to do research and love animals, and I am interested in teaching people about the environment and its marine life."

Her hometown is New Orleans, Louisiana.

## **Nam Siu**

A recent marine science and biology graduate of the University of Tampa, Nam Siu headed for graduate school in biology this fall at Western Washington University in Bellingham. Born in Hong Kong, Nam Siu moved with his family at age seven to Vancouver, B.C., and then to Tampa, Florida, where he attended high school and college. He plans to earn a Ph.D. degree and then split his time between doing research and teaching. Fascinated by the deep sea since he was young, Siu is an experienced SCUBA diver, has volunteered at an aquarium and zoo, and spent the summer of 2009 conducting research at Western Washington University's Shannon Point Marine Center through the National Science Foundation's Research Experience for Undergraduates program. He says he always wanted to work on deep-sea hydrothermal vents and their alien life forms, something he first learned about through television programs. That wish came true this summer: his research project focused on recruitment patterns of hydrothermal vent communities after a submarine volcanic eruption at the East Pacific Rise, 9°50'N, under the guidance of biologist Lauren Mullineaux of WHOI. His favorite part of the PEP program? "Being in Woods Hole. This has been an epiphany. You're immersed in science here, and it's great. Oceanography is so interdisciplinary. You can do anything. This experience has confirmed my interest in marine science and what I want to do."

His hometown is Tampa, Florida.

## **Delawrence Sykes**

A junior biology major at Morehouse College, Delawrence Sykes wants to conduct research after graduation and eventually earn a Ph.D. degree in ecology, evolutionary biology, or animal behavior. He grew up in Ohio and worked as a pet care specialist at a national chain store and as a summer intern at an automation firm while in high school. His interest in marine research led to summer research positions at the University of Washington and at Indiana University, both focused on marine fish species, during his college years and eventually to the Woods Hole PEP. His summer PEP research project was an analysis of the community structure of euphausiids, small shrimp-like animals, in Hudson Canyon off the coast of New York and New Jersey. Sykes and research mentor biologist Gareth Lawson of WHOI looked at factors like their location in Hudson Canyon, availability of food, water temperature and depth. Samples of various euphausiid species were collected with a plankton net system that also records environmental conditions called MOCNESS, for Multiple Opening Closing Net and Environmental Sensing System. "I had done research before, so I wanted a diversified research experience that related to my interests, and PEP provided that. The course work was a direct

parallel with the research I was doing in the lab, so I could connect what I was learning in class with the application. I also learned a lot about the ocean."

His hometown is Bedford, Ohio.

## **Dolores Toledo**

A senior integrative biology major at the University of California, Berkeley, Dolores Toledo grew up in Mexico and now lives in California. She has worked at the Monterey Bay Aquarium, where she assisted guests and was a mentor in the Young Women in Science Camp, and at the East Bay Society for the Prevention of Cruelty to Animals, and was a zookeeper intern at the Oakland Zoo. Toledo and fellow PEP student Christopher Cepero collaborated on their research project: calibrating an acoustic backscatter system by the standard target method, with advisor Ken Foote of WHOI. Passionate about the environment and its conservation through research and education, Toledo plans to attend graduate school and pursue a career in conservation biology, and would love to travel to the rain forests of South America and to South Asia. She learned about PEP from a flyer sent by a former colleague at the Monterey Bay Aquarium. "PEP has definitely opened doors to the research community, which I had no experience in before this summer. Just being in the scientific community here has inspired and motivated me to continue what I'm doing."

Her hometown is Ciudad Guzman, Jalisco, Mexico.

## **Diara Townes**

A senior marine and environmental science major at Hampton University, Diara Townes grew up on New York's Long Island and began her undergraduate college experience as a communications major at nearby Marymount Manhattan College in New York City. A visit to the United Nations encouraged her to pursue her interest in marine and environmental sciences, and she transferred to Hampton University in Virginia, where she has been active in the marine and environmental science club on campus. She has also volunteered at the Virginia Aquarium and Marine Science Center, participating in their mentoring young scientists program and in informal education activities. This summer she had two research projects, one based on research and the other on observation. With mentor Kristy Owen of the Woods Hole Science Aquarium at NOAA Fisheries, Townes measured levels of dissolved oxygen in tanks holding coldwater, temperate and tropical species to determine if dissolved oxygen levels had any relationship to a common eye disease in fish. Working with mentor Amy Hancock, a veterinarian at the MBL, Townes compared a new anesthetic, Aquacalm, for use on three temperate and tropical freshwater fishes with the commonly used anesthetic, MS-222, by observing the reaction and recovery in each species. "My main objective in participating in PEP this summer was to obtain extensive experience in marine and environmental sciences while also developing a broader understanding of teamwork in the field and in the lab. This was my first research internship, and it has helped me focus on the environment and confirmed the need for more comprehensible policy and communication about the environment within the global community." Graduate school in aquatic ecosystems at Washington State University in Spokane is in her future plans, and then perhaps a career as an international environmental journalist.

Her hometown is Medford, New York.

## **Melika Uter**

A senior earth and ocean sciences major at the University of Massachusetts, Boston, Melika Uter was born in Jamaica but moved to Boston, where she attended high school and discovered her interest in science and the environment. This summer she worked with research mentor Rachel Stanley of WHOI on the impact of ocean acidification on larval shell formation for her research project. Uter took samples at different locations in Falmouth's Waquoit Bay National Estuarine Research Reserve to help determine how water chemistry was affecting shell formation and to serve as a baseline for future studies. Laboratory analyses and reading a lot of papers to see what other scientists have done on this topic were also part of the project. "I didn't know much about climate change or ocean acidification, and as a chemistry major I had little environmental science background before the PEP program. I like working in a lab, learning how to analyze data and use new instruments. I've also gained a lot of practical experience in communication and oral presentation skills." Uter would like to attend graduate school in environmental chemistry.

Her hometown is Boston, Massachusetts.

## **Zachary Williams**

A senior biology major at South Carolina State University in Orangeburg, Zachary Williams plans to apply to graduate school and study marine ecology. He grew up on Long Island but moved to South Carolina to pursue his interest in ecology and environmental science. He has worked as a summer intern in the university's chemistry department, as a middle school tutor, and with health screenings for the elderly. Williams developed a method to quickly measure the fertility of winter flounder for his PEP research project, working with mentor Rich McBride at the Woods Hole Laboratory of NOAA's Fisheries Service. "When I was younger I didn't like flatfish at all, so it is ironic that I would work on them this summer. They're actually a pretty cool fish." Williams says he was "excited to get out of the classroom and actually apply my skills and knowledge to my research." He became interested in the sciences while in high school, where he did many hands-on experiments, and decided to focus on chemistry because he was interested in what was making the environment change and what the results were of those changes. Williams plans to pursue a Ph.D. in marine or environmental science one day, but isn't yet sure where that degree will lead.

His hometown is Barnwell, South Carolina.

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