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GRO Forum

Greater Research Opportunities Undergraduate Student Fellowships

Photo Credit: Jen Tracy

ISSUE 2, 2013

Where are they now?

Catching up with GRO Alumni

Annie Putman

The Arctic has long been the domain of explorers. Today, it's become a destination for adventurous scientists exploring questions about how the Earth is changing. Arctic regions are warmer today than in the past and temperatures are increasing more quickly than in other areas of the Earth. The decline of Arctic sea ice has become a touchstone for environmental protection because it affects wildlife, humans and climate both globally and regionally. Greater Research Opportunities (GRO) Fellowship alumna Annie Putman is one of the scientists working to understand this issue.

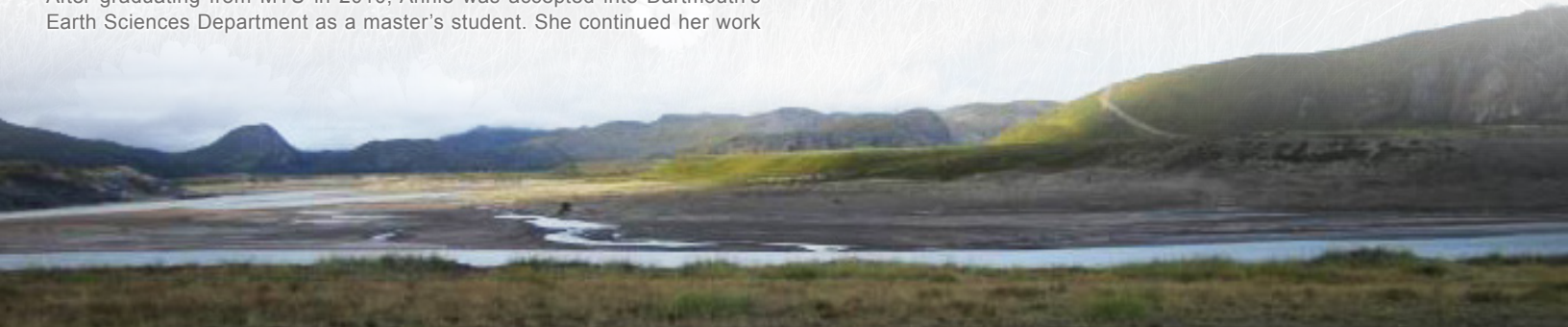
Currently completing her master's degree in earth science at Dartmouth College in Hanover, N.H., Annie studies how sea ice decline affects precipitation patterns in the Arctic. Less sea ice means that more water can evaporate from the sea surface, increasing the amount of precipitation and changing the movement of warmer air and water into the Arctic from sub-polar regions. "I'd like to better understand how this affects storm tracks and storm intensity across the Arctic," Annie writes on her website.

As a GRO Fellow at Michigan Technological University, Houghton, Mich., Annie began to work with isotopes in her research. Isotopes are different forms of the same element, such as hydrogen or oxygen. Using special techniques, it's possible to analyze a sample of a substance like air or water and detect the ratio of one isotope to another. Scientists use this information in several ways, one of which is understanding the geographic origin of a sample.

After graduating from MTU in 2010, Annie was accepted into Dartmouth's Earth Sciences Department as a master's student. She continued her work with isotopes, working on iiSPACS, the Isotopic Investigation of Sea Ice and Precipitation in the Arctic Climate System project. iiSPACS researchers analyze isotopes of hydrogen and oxygen to understand changes to Arctic precipitation that occur because of Arctic sea ice decline. They use the data in combination with weather information like storm tracks, satellite observations of sea ice and numerical models to work to understand how the extent of sea ice affects the amount of precipitation over land.

In 2012, Annie traveled to Kangerlussuaq, Greenland, in the Arctic Circle. She was able to participate in water sample collection and learned about Arctic weather patterns firsthand when a major system with 50 to 100 mph winds kept her team from traveling to the north of the island. She also came to appreciate the local environment. "Witnessing calving events at the edge of the Greenland ice sheet impressed upon me the scale of the ice sheet, and the total mass of water stored there," she says. Annie also saw Arctic wildlife like caribou and arctic fox, and enjoyed an ongoing search for musk oxen.

Annie had the chance to meet Greenland natives and learn how different their way of life is from what she's used to in the U.S. She points out that Americans expect to be able to drive to any location in the country. In Greenland, however, most towns aren't connected by roads, meaning that travel by air or boat is the norm. Despite the "green" in the country's name, Greenland's soil is infertile and rocky; "freshies," as fruits and vegetables are called locally, must be shipped in as well.



Annie Putman (continued)

Annie is a great example of how scientists can stay in touch with the things they love, which for her include winter and its snow and frost. “My personal interest in outdoor activities like Nordic skiing really makes studying the Arctic a good fit for me,” she says. “Snow is intimately tied to the jet stream, which is tied to sea ice extent in the Arctic. I appreciate the link between my non-academic passions and my area of study.”

In addition to being busy with her important research, Annie is an advocate for science education. “Science benefits from balanced gender and racial representation,” she says. “We can encourage this balance by demonstrating that science has room for people of varied backgrounds and with different strengths.”

Annie has been active in programs designed to reach out to women and other groups to foster an interest in science and show young people that scientists don’t confirm to a stereotype. Not all scientists wear white lab coats like they do on popular TV shows. While working as a research assistant at the Los Alamos National Laboratory, Annie was a group leader at a conference for middle school students. She considers this opportunity to share her enthusiasm about science to be her first chance to “give back.” Most of the young women she worked with were Native Americans and Hispanic Americans, groups who are under-represented in science. “I hope that attending that conference, as well as encouragement from parents and teachers, will propel some of those women into scientific or technical careers,” she says.

Currently Annie works with the Dartmouth chapter of GWISE (Graduate Women in Science and Engineering), a national organization that seeks to develop a community of women from scientific and engineering disciplines. When the chapter president encouraged her to become a leader, Annie embraced the opportunity. This year, she participated in GWISE’s first Science Day project in which girls and boys from area middle schools visit campus labs, meet graduate student scientists, and observe and participate in learning activities – all with their parents. “Including non-scientifically oriented parents is key to fostering a new generation of scientists,” Annie says.

The GWISE event works to help children become involved in science, and to help their parents become excited about and invested in encouraging their children to follow that path. “One challenge is that for some parents, science was something they hated in high school,” Annie says. She believes that communicating scientific concepts in an informal, conversational way can help excite those parents and promote scientific literacy. Annie knows from personal experience the influence parents can have on their children’s interests. When she was in middle school, she and her mother attended a “Science Careers in Search of Women” conference at the Argonne National Laboratory in Illinois. “It’s funny,” she recalls, “because I really don’t remember that much about it. However, my mom, who also attended, remembers most things. It’s likely that if she hadn’t been so excited about opportunities in science that I might not have ended up in this field.”

What’s next for Annie? Perhaps she’ll continue her research and work toward a Ph.D. Perhaps she’ll enter the working world and add job experience to her already-impressive resume. Regardless, it’s a guarantee that she’ll stay a passionate woman scientist who loves the outdoors as much now as she did as a girl. “Being a GRO Fellow reinforced my scientific interest in the environment,” she says. “It opened my eyes to the sorts of programs and research that are necessary to ensure that we’re maintaining our natural resources for future generations.”

GRO FELLOWS AROUND THE WORLD

Among their many accomplishments, many GRO Fellows venture to far-away places that let them broaden their viewpoints on science, society and the environment.

AIDEN IRISH

Aiden Irish, who received the GRO Fellowship in 2011, says, “Living in another country is a fantastic opportunity to develop a better perspective on my own country.” While a student at the University of Portland, Portland, Ore., Aiden spent a semester studying at Germany’s Freiburg University, with a focus on environmental policy and European Union (EU) politics. Freiburg is considered an international model for sustainable urban planning. The city’s approach to urban design addresses factors including housing, infrastructure, transportation and traffic, energy and environmental protection.

Aiden reports that the combination of a class on EU environmental policy and the experience living in the city were so influential on his interests that he’s now focusing on sustainable urban planning as he pursues his master’s degree at the California State Polytechnic University (Cal Poly), in Pomona, Calif.

MARY BELIVEAU

Aiden’s work in a German city is in sharp contrast with 2012 GRO Fellow Mary Beliveau’s recent work in Madagascar, an island nation in the Indian Ocean. Mary studied a policy that focuses on providing villagers with the supplies and means necessary to grow their own eucalyptus plantations, rather than deforesting, in order to produce charcoal. “I spent two weeks living with families in two villages that have their own plantations, where I was informed that I was the only ‘vazaha’ – meaning foreigner – to ever stay in either village,”

SUMMER 2013 GRO INTERNSHIP PROJECTS

Alice Theibault
Ecological and Human Health Hazards of Growing 2nd Generation Biofuel Sources
Corvallis, Ore

Alice Zanmiller
Incorporating Green Infrastructure (GI) into Clean Water Act/ NPDES Enforcement and Compliance Assistance
Chicago, Ill.

Amanda Ballard
Pesticide Exposures to Terrestrial Amphibians
Athens, Ga.

Amanda Stone
Real-Time Water Quality Monitoring in Urban Rivers
North Chelmsford, Mass.

Andrew Alleman
Microbiological Treatment of Drinking Water for Pesticide, Nitrate and Ammonia Removal
Cincinnati, Ohio

Assata Thompson
Environmental Justice in Permitting
San Francisco, Calif.

Catherine Winters
Environmental Justice
Boston, Mass.

Cori Speights
Evaluating Denitrification Rates in Wetland Habitats of Pacific Northwest Estuaries
Newport, Ore

David Baltrusaitis
Genomic Indicators of Chemical and Other Stressors
Narragansett, R.I.

David Dreier
Exploring the Utility of Human Absorption, Distribution, Metabolism, and Elimination Data to Predict In Vitro Metabolism in Fish
Duluth, Minn.

Eliza Sherpa
USEPA Region 2 Community Engagement and Pollution Prevention Internship
New York, N.Y.

Ellen Bechtel
Implications of the Proposed Susitna-Watana Hydroelectric Project for the Functional Integrity of the Susitna River, Alaska
Anchorage, Alaska

Eric Kretsch
National Rivers and Streams Assessment (NRSA) (EPA Region 1)
North Chelmsford, Mass.

Erin Corrigan
Global Climate Change and Its Effects on Terrestrial Ecosystems
Corvallis, Ore.

George Grant
Sustainability of Great Lakes Coastal Ecosystems
Duluth, Minn.

Heidi Keller
Enhanced Biodiesel Production from Municipal Sewage Sludge
Philadelphia, Pa.

James Gaynor
Characterizing Effects of Engineered Nanoparticles (ENPs) in Non-human species and Terrestrial Ecosystems
Corvallis, Ore.

John Griffioen
Mechanisms of Particulate Matter (PM)-Induced Respiratory Effects
Research Triangle Park, N.C.

Kamil Khanipov
Near-Coastal Species at Risk to Climate Change
Newport, Ore.

Katy Austin
Characterizing the Effects of Urbanization and Nutrients Across Trophic Levels and Temporal Scales Using Stable Isotopes of Algae, Macroinvertebrates, and Fish in Lakes and Streams
Narragansett, R.I.

Kenneth Ruffatto
Method Detection Limit Modeling for Pharmaceutical and Personal Care Products and Hormone Analytical Methods
Denver, Colo.

Keri Caudle
Identifying and Preventing Nutrient Impairments in Pacific Northwest Estuaries
Newport, Ore.

Kessa Turnbull
Near Zero Emission Engine Technologies
San Francisco, Calif.

Kevin Dickey
Understanding Combustion Efficiency at Oil & Gas Flares
Denver, Colo.

Keyyana Blount
Global Climate Change Effects on Coastal Wetlands
Narragansett, R.I.

Kinyata Cooper
Green Chemistry
Washington, District of Columbia

Lotanna Ikeotuonye
Water Quality Monitoring
Edison, N.J.

Mary Beliveau
Evaluating the Environmental Efficacy of Biochar
Corvallis, Ore.

Megan Dalbec
Lake Chlorophyll, Light Attenuation, Water Clarity, and Nutrient Study
Golden, Colo.

Michael Enright
Characterizing Effects of Engineered Nanoparticles (ENPs) in Non□human species and Terrestrial Ecosystems
Corvallis, Ore.

Morgan Owen-Cruise
Global Climate Change Effects on Coastal Wetlands
Narragansett, R.I.

Natalie Flinn
Environmental Justice Community Leaders Institute
Atlanta, Ga.

Nick Ravotti
Keep it Clean; Storm Water in the Pacific Northwest
Seattle, Wash.

Sara Lafia
Integration of the Social Determinants of Health into Environmental Justice Analysis to Support Regional Agency Decisions
Seattle, Wash.

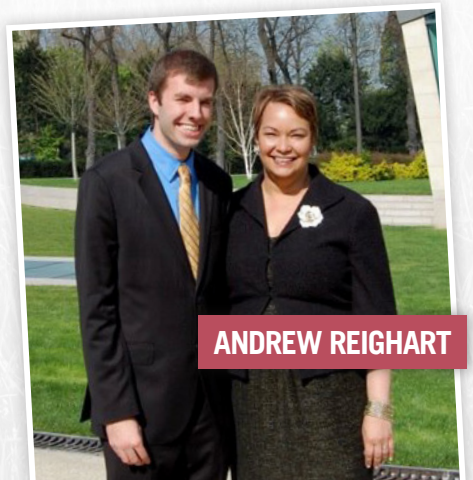
Sarah Hardy
Sustainable Water Infrastructure
San Francisco, Calif.

Sarah Huang
Support of R10 EPA Programs' Meaningful Planning for Climate Change Impacts to Tribes
Anchorage, Alaska

Sergio Gonzalez
Mobile Workspace Impact Study
Denver, Colo.

Tanya Bulock
Helicopter Monitoring Program
Edison, N.J.

she says. Mary is interested in the applications of environmentally-conscious techniques to Third World sustainable development. "The program fit my desire to learn both about the policy behind conservation and the science driving the policy," she says. "I learned about how much goes into creating an effective policy, both from an environmental and social standpoint." Those insights should serve her well as she pursues her B.S. in international relations at Seton Hall University, South Orange, N.J.


ANDREW REIGHART

Andrew Reighart, a 2011 GRO Fellow, spent his first semester abroad at James Cook University (JCU) in Townsville, Australia. He says that his time there eased him into living abroad because many of his fellow students from St. Mary's College of Maryland, St. Mary's City, Md., were also there, and, of course, there wasn't a language barrier. Most importantly, during his time there he was able to take classes relevant to his two majors, international public policy studies and political science, and three minors, environmental studies, biology and French. Next, Andrew challenged himself to put his French language skills to the test through a political science program in Paris. "The more you put yourself in new and uncomfortable situations, the more personal growth you will experience and the happier you will ultimately be with your experience," he says.

Cara Mayo, a 2011 GRO Fellow, spent two semesters abroad, ultimately ending up more than 13,000 miles from Juniata College in Huntingdon, Pa. Cara started with a semester in France's Catholic University of Lille's well-regarded environmental program. She subsequently traveled some 5,000 miles further to Pondicherry (also known as Puducherry), India, a city on the Indian Ocean. There she pursued her personal interest in marine science at the Foundation for Ecological Research, Advocacy and Learning. Cara brought her marine science training back to the U.S. and applied it to her GRO summer internship at EPA's Pacific Coast Ecology Branch in Newport, Ore., where she studied the effects of climate change on coastal ecosystems. Through

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September 2013
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her experiences, Cara came to a realization that's applicable to all her studies, whether in France, India, or the U.S. "There's no right or wrong, especially when it comes to environmental issues," Cara says. "We don't live in a black and white world, yet there are many extreme parties pulling us to either side."

Robert Reynolds, a recent graduate of Loyola Marymount University in Los Angeles, studied environmental economics and politics at the London School of Economics (LSE). Robert, who received the GRO Fellowship in 2010, says, "I learned to think about solving environmental issues through understanding incentives, trade-offs and cost-benefit analyses." Robert's insights are relevant to his planned graduate studies of how to model the way individuals make decisions and then to apply those results to seeking solutions to environmental problems. He'll be focusing on the use of behavioral science in improving energy policy as he works toward his master's in public policy at the Harvard Kennedy School, Cambridge, Mass.

ROBERT REYNOLDS

Studying "abroad" doesn't necessarily mean studying on dry land. 2012 GRO Fellow Eric Kretsch, who's majoring in marine affairs and environmental and natural resource economics participated in marine field research, gaining an added dimension to his education. Eric, a student at the University of Rhode Island, Kingston, R.I., spent six weeks aboard the SSV Corwith Cramer, a 135-foot-long tall ship, in the Caribbean Sea. Tall ships are sailing ships, which gave Eric some exciting opportunities, despite the occasional episode of seasickness. "On this particular ship and with this particular program you are required to be a crewmember of the ship," he says. In this Sea Education Association program, students take part in the daily operation of the ship, ultimately becoming junior watch officers. "I was required to take on all the responsibilities of mate on board the vessel," Eric says. "This allowed me to develop my leadership skills by putting me in the position to make decisions and motivate my fellow watch members."

A bonus of studying abroad is the opportunity Fellows have to experience different cultures and make friends from around the world. Robert says, "My favorite part was being in a classroom with students from all over the world. Hearing citizens from dozens of countries express their opinions and values opened my eyes." Aiden shared an apartment with five German college students. He particularly enjoyed his conversations with them about culture, politics and philosophy. "They really welcomed me into their life and their home," he says, "and that really started to make me feel at home in Freiburg."

Cara recalls sitting at a café with some friends shortly after arriving in France. "We were all from different countries with varying levels of French, English, Spanish, German, Korean and Japanese," she says. "We successfully had a conversation about culture and politics without sticking to one language. It reminded me that the drive to communicate is much stronger than the language barriers we create." Mary had the special experience of staying with five Malagasy families during her time in Madagascar and plans to keep in touch with them. "Each family I stayed with proved that Malagasy hospitality cannot be rivaled," she says. "I now can say I have family in Madagascar! How cool is that?"