



PALMER STATION ANTARCTICA



Educational Adventure

A few months ago, State College teacher Nell Herrmann traveled with a team of scientists to Antarctica for ongoing research on the continent. What she learned and experienced there is something she'll never forget


By Nell Herrmann



**SIGN
HERE**



PASSPORT



**US
2011 -**



Why Antarctica?

It's a question many people asked me after I had been accepted into the PolarTREC (Teachers and Researchers Exploring and Collaborating) program in January 2011. I don't have a concrete answer to that question, other than that I have a passion for the natural world and for conservation in general — this has been true for as long as I can remember.

I grew up in College Heights and used to spend hours watching squirrels and ants in my backyard. I think my love of nature crystallized at Camp Krislund during the summer after seventh grade when I saw my first black bear. In college and graduate school, I studied wildlife and conservation biology, and I've been fortunate to participate in research opportunities that have taken me to many beautiful places. I've worked in Venezuela, Costa Rica, and Greenland. But the Western Antarctic Peninsula is by far the most magical place I've been. The combination of the angle of the light, the colors of the glaciers and icebergs, and the abundant and beautiful wildlife left me completely awestruck. I fell immediately in love with the place and can't get it out of my mind.

My five weeks in Antarctica this winter gave me the experience of a lifetime. My opportunity was possible because of PolarTREC, which is funded by the National Science Foundation and coordinated by ARCUS (Arctic Consortium of the United States), located in Fairbanks, Alaska. The goal of the program is to raise awareness of polar science by

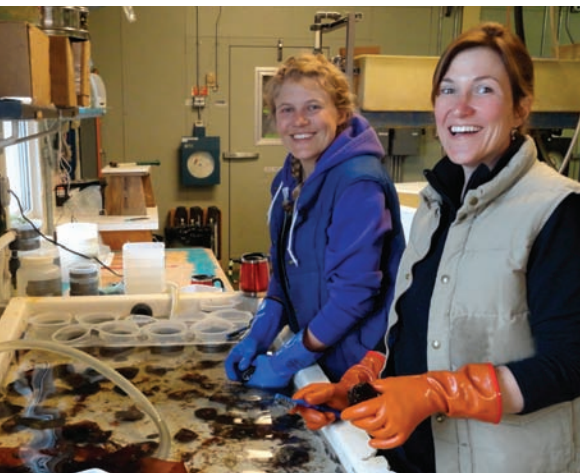


Herrmann traveled from Chile to Antarctica on the Laurence M. Gould research vessel. She took this photo from the zodiac while the group was at Cierva Point.

funding K-12 teachers from across the United States to participate in research in the Earth's polar regions. Through blogs, webinars, and other types of outreach, teachers serve as a conduit between scientists and the general public to share information about the important studies happening in the Arctic and the Antarctic. All expenses are paid for PolarTREC teachers, including the costs for substitutes, travel, food, lodging, and medical expenses incurred during the extensive battery of exams required for Physical Qualification, or "PQ," before deployment.

My friends Eric Post and Pemille Boving, Penn State scientists who do research in Greenland, told me about the program and encouraged me to apply. I figured it was a long shot, but applied in October 2010 and was surprised that I'd been selected as one of 12 US teachers for the program. I received the phone call at school during my eighth-period class and was so excited that I burst into tears. I'll never forget the reaction of the students who were there when I got the call — they gave a great cheer, which made me even more teary eyed.

In February 2011, I flew to Fairbanks for the training and met the other 11 PolarTREC teachers. This group of kindred spirits was amazing and we quickly became friends. Since 2007, PolarTREC has paired 12 teachers a year with different scientists. Each teacher travels to a different place to work on a different project. Some of my PolarTREC colleagues traveled to McMurdo Station — the largest of three US Antarctic research stations — others to the South Pole Station, and still others to Greenland, Alaska, or Norway for their expeditions. I traveled to Palmer Station Antarctica on the Western Antarctic Peninsula. I was paired with two marine biologists, Dr. Chuck Amsler and Dr. Jim McClintock, both from the University of Alabama



Herrmann with graduate student Kate Schoenrock in the aquarium room at Palmer Station. They are preparing specimens that Herrmann collected while scuba diving for an ocean-acidification experiment.

**Herrmann's first view
of Palmer Station.**



at Birmingham. I also worked with Dr. Amsler's wife, Maggie, and two graduate students, Julie Schram and Kate Schoenrock. All were outstanding and will be lifelong friends. I am lucky.

Getting to and from Palmer Station was no small feat. I flew from State College to Detroit and then to Atlanta.

From there, I flew to Santiago, Chile, and next was to go to Punta Arenas, Chile, but I missed my connection in Santiago, which was a bit stressful. At that point I'd been awake for about 30 hours. I was much too excited to sleep! I eventually caught a plane to Punta Arenas.

From there, I boarded the American Science Research Vessel (ASRV) the Laurence M. Gould (LMG) and departed for Antarctica. As I look back at my journals recorded on the PolarTREC site, I can hear the enthusiasm in my "voice" increasing with each journal entry. On the day we pulled out of Punta Arenas I wrote a journal entry titled *Adios Patagonia!* My first words were, "Yahoo! We are underway! We left the dock at 8 a.m. and I am SO EXCITED I can barely contain myself!" I remember how I felt that



day — ready to burst at the prospect of seeing a place I'd only dreamed about before. I spent much of the day on the deck of the ship jumping up and down and telling everyone how happy I was. Most of the people on the LMG had been to Antarctica multiple times and found my excitement somewhat amusing, but I didn't care!

It took a day to travel through the Strait of Magellan and three more days to travel through the Drake Passage, the body of water between the tip of South America and the Western Antarctic Peninsula. Spending time in such close quarters and in such an unusual environment breeds camaraderie quickly. I was pleased that all of the scientists were willing to talk with me about their research, often providing images and journal articles for me to share with my students in the

Learning Enrichment and Gifted Support Program at State High. Before the trip, I was worried that I'd find the scientists intimidating, but they weren't at all.

While on my journey I posted a photo-journal entry each day. State College students in grades 3 to 12 wrote to me through a tab on the Web site called "Ask the Team." I was impressed by the questions they asked and was particularly touched that several of my high school students wrote to me every day.

Before I had left for Palmer Station, Dr. Amsler, the principal investigator with whom I was paired, came to speak with about 500 students at State High, focusing primarily on the marine-biology research he does at Palmer Station. The feedback I received from students who attended the presentation was tremendous. Dr. Amsler's pictures of penguins, seals, underwater marine life, glaciers, and icebergs were captivating. Before leaving, I also developed a club at State High called the Polar Ambassadors. The group includes 20 students in grades 9 to 12 who meet with me weekly after school to talk about polar science. So far we've done outreach to both Park Forest Elementary and Park Forest Middle School, and we have plans to do even more outreach in the future.

Some of the lesson plans we've developed are about ocean acidification, the focus of the research

I took part in at Palmer Station. Dr. McClintock refers to ocean acidification as the "other CO₂ problem." Most people are aware that the increase in carbon-dioxide emissions since the beginning of the Industrial Revolution has been linked to climate change, but fewer realize that carbon-dioxide emissions also have caused the ocean to become increasingly acidic. Ocean acidification has a negative impact on organisms that have calcium carbonate in their tissues, including some types of algae, some plankton, any animals with shells, sea stars, sea urchins, and many others. The project I worked on at Palmer Station focused on the effects of changing pH and temperature on four different organisms: a limpet, a snail, a crustose coralline algae, and a fleshy algae, which are all important parts of the Southern Ocean food web. Changes to populations of these organisms could have potentially catastrophic effects on other organisms that rely on them for food or habitat.

My responsibilities at Palmer Station included working as a dive tender on a zodiac, or small inflatable boat, for Dr. Amsler and Dr. McClintock's project. The divers were Dr. Amsler, his wife, and the two graduate students. Being a dive tender is serious business, especially in Antarctica where water temperatures



AURUM
JEWELERS & GOLDSMITHS

Mother's Day Special
May 7th -12th

FREE LEATHER BRACELET
with the purchase of a
Bonn Bons Charm

132 S Allen St, State College, PA 16801 814-237-1566 www.aurumjewelers.net



Now Renting for 2012

Free Heat • Free Cooking Gas • Free Parking • Free Basic Cable
Furnished or Unfurnished Apts. • On CATA Bus Route R
Grocery Shopping Across the Street • 24-hour Maintenance
On-Site Laundry & Management Office • Tennis and Basketball


LIONS GATE
APARTMENTS

238-2600 • 424 Waupelani Drive
Open Mon.-Fri. 9-5, Sat. 10-3 • www.lionsgateapts.com
lionsgateapts@lionsgateapts.com

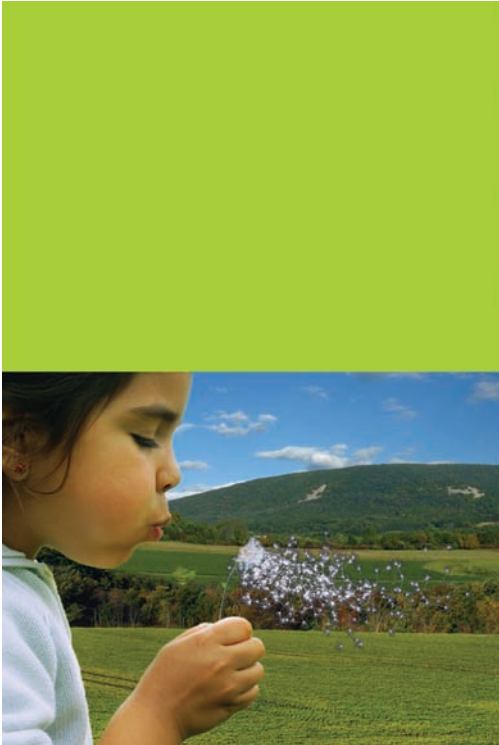
are dangerously low and aggressive leopard seals are abundant. Leopard seals are solitary ambushing predators, which have been known to attack scuba divers, at times fatally. Dr. Amsler spent a couple hours on the LMG showing me a PowerPoint presentation and explaining my role as a tender while we traveled through the Drake Passage. Although I was confident I could fulfill my duties, I was somewhat nervous about the different aspects of the job. As one of two tenders, I either drove the zodiac or assisted the divers as they put on their gear and got into and out of the water. I also had to watch for leopard seals — if I saw one, I needed to put an alarm in the water to alert the divers to come to the surface. Because they were diving at depths up to 110 feet, ascending quickly involves a risk of getting the bends. To counteract this, a Divers Alert Network (DAN) kit containing an oxygen tank was always on board the zodiac. During my time at Palmer Station, we had only one leopard seal recall, but it was scary.

I was tending that day with Julie Schram and we noticed a third set of bubbles near the bubbles of Kate Schoenrock and Maggie Amsler, who were underwater at the time. Shortly thereafter, a leopard seal surfaced and made frighteningly direct eye contact with me. The seal had extremely bloodshot eyes and was intimidating. We got the divers back

into the boat successfully, but my heart was racing for about an hour afterward.

In addition to working as a dive tender, I also had the opportunity to go in the field with geologists, entomologists, ornithologists, and a physicist who studies phytoplankton by using Autonomous Underwater Vehicles (AUVs) called Slocum gliders. The gliders are used to collect data about phytoplankton abundance near Palmer Station, and are valuable because they allow real-time data collection. They fly near a submarine canyon responsible for nutrient-rich water that results from upwelling. This water is responsible for causing phytoplankton blooms, which provide food for krill. Small crustaceans that eat phytoplankton, krill form the base of the Southern Ocean food chain and are eaten by penguins and some seals, the top predators in the area around Palmer Station. Collecting data about the upwelling from the submarine canyon allows scientists to test various food-web interaction hypotheses as well as providing information about how those interactions are being impacted by changing climate, which is all part of a 20-year-old study called the Palmer Long Term Ecological Research (LTER) Program.

Data from the LTER has shown that the Western



**BUY
LIVE** **HERE**
Support Your Local Businesses

THE
CHAMBER
OF COMMERCE





Herrmann (back row, far left) with the group of scientists and support staff that she worked with on her trip. They called the day “Operation Fun Haul.” They hauled drilling equipment and other supplies up the hill for the permafrost drilling project being done by the geologists from University of Wisconsin and the University of Lisbon (in Portugal).

Antarctic Peninsula is changing rapidly because of warming air and sea temperatures. A 2009 issue of the journal *Nature* included an article describing the Western Antarctic Peninsula as the most rapidly warming place on Earth. I didn't realize this before leaving for my PolarTREC expedition, and after falling deeply in love with the region I was beyond distressed to learn this. The warming trend has caused dramatic changes to the peninsula in the past 50 years. The Marr Glacier, behind Palmer Station, is breaking up, or “calving,” at an increasingly rapid rate. Aerial photos and GPS data show that the glacier has retreated more than 500 meters since 1963. Dr. McClintock told me that when he first started working at Palmer Station in the 1980s, glacial calving, which sounds like thunder or a cannon being fired, was a rare occurrence. When it happened, he said, “everyone would get up, leave their offices, and go outside to look.”

That's not the case nowadays. While I was at Palmer Station, the loud crashing of a calving glacier left the experienced “Palmerites” unfazed. I had to ask the people I was in the field with what the sound was the first time I heard it. Nobody made a big deal about it.

Warming trends also are responsible for changes in penguin populations on the Western Antarctic Peninsula. Adelie penguins, which are dependent on sea ice for breeding areas, are experiencing increased mortality rates. In parts of Antarctica, the population of Adelies has fallen by almost 90 percent. The mean winter air temperature of the Western Antarctic Peninsula has risen 10.8 degrees Fahrenheit in the past 50 years, delivering more snowfall that buries the rocks the Adelie penguins use as nesting sites each spring. Gentoo penguins, which prefer areas of more

open water, are replacing Adelie penguins in the areas around Palmer Station. Increased glacial melting also adds more freshwater to the ocean, changing the salinity of seawater. This shift is responsible for changes in phytoplankton communities, which are having detrimental effects on krill. Changes in the krill population affect all the animals that eat krill, including penguins and seals.

My five weeks in Antarctica seem a bit like a dream now. I was truly sorry to leave, but despite the magic and beauty of the place, I was happy to get home. I am completely readjusted to being home and am glad to see trees! There are no trees in Antarctica, only two low-growing species of plants. I also am thrilled to see my students and to share what I've learned with them.

Many people have asked me if my PolarTREC expedition to Antarctica has “changed” me. My answer is a resounding Yes. I am incredibly motivated to share what I've learned about the Western Antarctic Peninsula and the threats it faces with anyone and everyone who will listen. Conservation of this part of the world is at the forefront of my mind. **T&G**

Nell Herrmann is a Learning Enrichment and Gifted Support Specialist at State College Area High School. Before assuming this position, she taught seventh-grade science in rural Maine and at Park Forest Middle School. She is the coach of several of State High's academic quiz teams, including National Ocean Sciences Bowl, National Science Bowl, and Knowledge Masters. She also is the creator and advisor of the Polar Ambassadors Club. She lives in State College with her husband, Jeff Beck, a visual art teacher in the State College Area School District.