Diving into Marine Science

by JD Langert

My interest in science was sparked by a unique person I met in my taekwondo class when I was 12 years old. Sensei Kathy Holcomb was a third-degree black belt whose dedicated, no-nonsense personality appealed to me. Over time, I found that we shared many of the same opinions and interests. As a lab analyst for the City of Ketchikan Wastewater facility, Sensei works to ensure that the city stays in compliance with the Clean Water Act. Her job is essential to the city not only because of the health and environmental ramifications, but also because a violation could cost Ketchikan up to $37,500 a day in fines issued by the Environmental Protection Agency.

I loved Sensei's stories about going out on her boat to collect water samples that she would then analyze in the lab. Her enthusiasm for her work sparked an interest in me that I hadn't known existed. When I was 15, I signed up to take Chemistry I at school. My teacher, Mr. Powell, nurtured my curiosity by answering my questions on everything from chemical equations to molecular theory. With his encouragement, I quickly became immersed in the labs and the process of data collection.

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An Amazing Opportunity

Around the same time, my guidance counselor told me about a summer science program at the University of New Hampshire (UNH). The four-week program, Science and Mathematics Achievement through Research Training (Project SMART), offers three modules: Biotechnology and Nanotechnology, Space Science, and—the one that got my attention—Marine and Environmental Science.

The program focuses on environmental issues in marine, freshwater, and terrestrial ecosystems. Students explore the ecology of estuaries and stream systems and learn about issues such as water resource management and global climate change. It sounded great, but there was one problem: funds. Without the necessary financial aid, no matter how much I wanted to go, it wouldn't be possible. I applied for a scholarship and was elated and grateful to receive the funding I needed to attend the program.

In early July, my suitcase packed and anticipation filling me to the brim, I boarded the plane to begin my journey across the country. On arriving at UNH's Scott Hall dormitory, I met the other nine members of the Marine and Environmental Science (MES) group. With such a small number of participants, we soon knew each other's names, personalities, and preferences. And due to our identical schedule and homework requirements, we found ourselves spending most of our meals, study time, and free hours together.

Take Me to Wonderland

I've never been one for taking it easy, much preferring exploration over sitting in a classroom. So I loved it when Dr. Jim Haney, a professor of biological sciences who oversees the MES program, explained that our group would spend 90 percent of our time in the field and lab and only 10 percent in the classroom. On our first day of "class," we listened to a short lecture on using insects as indictors of water quality before hiking to a nearby stream to catch a variety of the very insects we had been discussing. Bringing them back to the refreshingly air-conditioned lab (New Hampshire was a very hot place for someone from Alaska), we came face to face with these creatures that—under the microscope—appeared to be from science fiction stories, with equally fantastic names like Plecoptera, Ephemeroptera, Odonata, Tricoptera, and Megaloptera.

through Project SMART

(Megaloptera would prove to be my least favorite bug due to its insistence on trying to escape the petri dish.)

During class, we also became very familiar with cyanobacteria (bacteria that produces cyanotoxins and can cause neurological diseases) and learned how to detect it using a handheld remote sensor called a hyperspectral reflectometer. When we pointed it directly at the water, it would collect data and then transcribe it as wavelengths on a graph.

On other excursions, we took a marine cruise to the Great Bay Estuary, searched for clams while canoeing on Lake Attitash, and hiked 4,800 feet to the summit of Mount Moosilauke, studying the acidity of the streams we encountered on the way up. We swam in the cool waters of the Baker River in search of insects, and we explored the lush green Harvard Forest, one of North America's oldest managed forests. At the Isles of Shoals, a small group of islands straddling the border between New Hampshire and Maine, we trekked over rocky cliffs and peered into rock pools, where we found large amounts of cyanobacteria and phycocyanin, a pigment-protein found in cyanobacteria. Throughout our travels, we dealt with aggressive sea gulls, pinching crabs, precarious rock cliffs, angry sunburns, soaking-wet clothing, and poison ivy. But I wouldn't take back a single minute of it.

A Spark Ignited

Before I knew it, the four weeks were drawing to an end. For our final project, pairs of students further explored one of the topics we had studied, from comparing cyanobacteria in oligotrophic versus eutrophic lakes to researching characteristics of an invasive crab species at Appledore Island to investigating the effects of climate change on the alpine tundra. My partner and I studied whether a handheld remote sensor could be as accurate in detecting cyanobacteria as an in-depth water study. If it was found to be a suitable method, it would save much time and effort. Based on data we obtained from the Isles of Shoals using a handheld sensor, we determined that it was indeed possible, but that the sensor would need a direct line of sight in order to work. When we presented a scientific poster on our work to students and faculty in the atrium of UNH's Morse Hall, we gave credit to every member of the module.

Although I'd come to Project SMART for the research experience, I was sad at the thought of leaving Scott Hall and my close-knit group and supportive professors. Through this program, what had begun as a spark of interest in science developed into an interest in a science career. I can truly say that the experience provided by Project SMART will stay with me for the rest of my life. ■

JD Langert is a senior at Ketchikan High School in Alaska. When she's not hard at work at her studies, you'll find her practicing taekwondo and Seibukan karate, participating in Japanese Club, or hanging out with her reading group. JD, who is fascinated by chemical equations, formulas, and procedures, plans to pursue a degree in chemical engineering.

Learn more about Project SMART at www.smart.unh.edu.