Exploring the way things work: Marissa Morales [1]

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Dr. Marissa Morales

Ever since she was a young girl in the small town of Toa Alta, Puerto Rico, Oak Ridge National Laboratory researcher Marissa Morales has had a fascination with science.

“When I was a child- maybe 10 or 11- I would mix random ingredients. I put some samples in the freezer, other samples in the refrigerator, and I would dig a hole in the ground to bury the rest and see what would happen to the mixtures,” Marissa explained. “I have always been curious about what things are made of and how they work, which is why I decided to study chemistry.”

Marissa, who works in the Energy & Transportation Science Division, received her B.S. and M.S. in chemistry at the University of Puerto Rico at Mayagüez. Upon graduation, Marissa was a physical chemistry lecturer at Bayamón Central University in Puerto Rico. Although she already had two degrees under her belt, she decided to enroll in additional engineering classes to further expand her education and satisfy her curiosity of the world and how things work.

One of Marissa’s engineering professors from Puerto Rico conducted research at ORNL every year. The summer of 2009, he invited Marissa to join him at the lab. “Because of my professor I was able to get my foot in the door,” she said. Later, Marissa returned to the lab when she received a postmaster’s position with the Biosciences Division. “I had the opportunity to work on a project regarding the standoff detection of explosives and hazardous chemicals in order to more efficiently identify and categorize explosives and hazardous threats from a distance,” she stated. “This year, I joined a new team looking to expand my research and explore new technology areas. However, I still work on projects involving chemical sensors, laser spectroscopy, and online monitoring.”

Marissa is working on a multitude of research initiatives involving different divisions at ORNL. “One of my projects involves online measurements of materials related to nuclear processing. Another one of my roles is the fabrication of electronic sensors using an aerosol inkjet printer. After the sensors are additively manufactured I help determine what parameters work, which materials are compatible with the printer, how designs can be optimized, and finally I analyze performance characteristics.”

Exploring additive manufacturing and sensors

Currently, much of Marissa’s work takes place at the Department of Energy’s Manufacturing Demonstration Facility (MDF) at ORNL. She had no experience with additive manufacturing prior to her time at the MDF. “I had to start from scratch; I didn’t even know how to operate the printer, but I wanted to jump at the opportunity since it interested me. Doing things I’ve never done has always been my biggest challenge in research, but it’s also what makes it exciting.”

Marissa said one of her favorite things about ORNL is the multi-disciplinary teams she’s been able to work with. “I get to learn how all the different parts of a project come into play to form a device or reach the end goal. I’ve always worked on projects that involve different people from different backgrounds. Constantly learning new things has been very helpful for my career and a source of inspiration. Working with multidisciplinary teams is what ORNL is about, and I am very lucky to have this opportunity.”

The researcher works at the lab while pursuing her Ph.D. in energy sensors with a focus on climate science through the University of Tennessee’s Bredesen Center. She joined the program in 2015 and is in her fifth semester. Between coursework at the Bredesen Center and research

initiatives at ORNL, Marissa is focusing on developing faster, cheaper, and more reliable chemical sensors for applications like environmental monitoring. Although work and school take up most of her time, Marissa has many outside interests, including volunteering. “Whenever I can, I volunteer as a math tutor for adults pursuing their GED at El Centro Hispano de East Tennessee. I actually learned about the opportunity through ORNL.”

Marissa is also part of a national organization called Ciencia Puerto Rico. “The organization reached out to me. Their focus is promoting the work of Puerto Rican scientists. They have a special interest in Latinas in STEM fields who can serve as an example and a source of information for young Latina women.”

As a young girl in Puerto Rico, Marissa attended public schools with limited resources. “The first time I touched a microscope was during my first year of college. Both of my parents are physical education teachers; I am the first scientist in my family. Until recently, I was the only one in my family to leave Puerto Rico. Even though my family doesn’t fully understand what I do, they are fascinated by it and have been supportive throughout my career. I joined ORNL because I wanted to show not only my family and myself, but young people, especially women, there are opportunities and resources out there.”

Marissa said ORNL has offered her a platform to satisfy her curiosity and expand her horizons academically and professionally. “Because of my experiences at Oak Ridge, I want to do more to promote science in communities like the one I grew up in. “But before I can invest more time, I should probably finish my PhD,” she joked. *—by Nadya Ally*

The original article can be found in the following link:

https://www.ornl.gov/blog/eesd-review/exploring-way-things-work-marissa-morales [3]

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