CHEMISTRY IN PERSON

Chemist by training, explorer by heart

COURTESY OF SIERRA-SASTRE

YAJAIRA SIERRA-SASTRE

B.S.: Chemistry, University of Puerto Rico, Mayagüez
Ph.D.: Materials Chemistry, Cornell University
WHAT SHE DOES NOW: Engineering Project Manager at NASA

Yajaira Sierra-Sastre is always looking for new worlds to explore. As a young girl growing up in Puerto Rico, she gazed at stars through a clear night sky. "My first passion was for anything related to astronomy and planets and stars and space," she says. Sierra-Sastre fell in love with science during childhood, and went on to study chemistry at the University of Puerto Rico, Mayagüez."I could see chemistry all around me," Sierra-Sastre says. After graduating, she started on a path to connect her studies with the real world in as many new ways as possible. "I had this desire of just going out on an adventure."

In the 20 years since, she has used her degree to teach high school chemistry; earn a PhD making nanomaterials for space experiments; help create new types of textiles and batteries; spend months living in a Mars simulation; and oversee the research projects that keep printed money secure.

Sierra-Sastre now works for NASA, designing special wheels for Mars rovers to handle some of the most difficult terrain in the solar system. And if her path from labs to money factories to NASA isn't impressive enough, consider her hopes to fulfill a lifelong dream of becoming an astronaut. If she achieves this goal, Sierra-Sastre would become the first woman from Puerto Rico in space.

Sierra-Sastre says that what motivates her in her career has remained the same: curiosity, perseverance, and unfamiliar opportunities. Chuckling at those words, she points out, "They're names of rovers!"—*Max G. Levy*

The following is an interview with Sierra-Sastre, condensed and edited for clarity.

How did you decide to study chemistry?

When you're young, you don't know exactly what you want to become. And that's OK. For me, the key was choosing a field that was going to give me diverse opportunities in the future. The more opportunities the better, because then I could choose the paths that were more interesting to me.

Did your interest in becoming an astronaut also factor into your academic choices?

Yes, to be an astronaut, NASA requires applicants to have a degree in science, engineering, technology, or math (STEM). When I started looking at the type of astronauts that were part of the NASA astronaut program, I found many examples of chemists, and that helped me decide.

It's interesting how representation mattered for you, as a chemist. Do you think about representation in the field as a Latina?

For sure. It's a huge responsibility to want to serve as a role model. As a senior scientist, young girls have come to me and have expressed how they were inspired by my story, or how they are now interested in a career in STEM. But I will say that, more than representation, having perseverance to work hard for your dreams is important, regardless of circumstances—regardless of feeling at times that, well, maybe I don't belong. It's like, OK, if there's nobody like that, let's become that first person, so that others may follow.

Can you describe your experience in the Mars analog experiment?

We lived and worked like astronauts in a geodesic dome on the Mauna Loa volcano in Hawaii. It resembles the Martian environment because it's isolated, there are no houses or trees, and outside, it's a very reddish terrain. During those four months, we conducted a lot of research projects like astronauts will do in future missions to Mars. We had very limited use of water. Every time we stepped outside the habitat, we needed to wear a simulated space suit. It was an amazing experience!

What advice would you give high school chemistry students?

Reach out to scientists and engineers, and ask a lot of questions. Don't wait until college. It's through these interactions that you will better define what makes you passionate.

You've had a remarkably diverse career. Did you enjoy every job?

I did. I am very curious about learning. Throughout the course of my career I have reinvented myself multiple times. And every experience has brought the opportunity to learn something new, and has been exciting.

What's something about space exploration that many people don't realize?

A lot of technologies we benefit from on Earth started because of these quests. For example, freeze-dried food was developed back in the day to support space missions, and now people who go camping and on long hikes eat space food!