

Scientist Nina Lanza shoots the lasers – *pew, pew* – at rocks on Mars

Want to know whether there's life on Mars?

Dr. Nina Lanza is a good person to ask. She's been investigating that same question herself.

It's part of her job.

Recently, she spoke about her work during a featured conversation on the "Life's Tough – Explorers are Tougher!" podcast, hosted by Richard Wiese, president of the Explorers Club. That podcast episode is now available through major podcast platforms.

Dr. Lanza is the team lead for Space and Planetary Exploration at the Los Alamos National Laboratory, a research center for strategic science that advances national security.

She's also a member of the science teams for the ChemCam – the chemistry and camera tool attached to NASA's rover vehicles that have landed on Mars.

Last month, on Feb. 18, a rover named Perseverance, or Percy for short, landed

flawlessly in the Jezero Crater on Mars. NASA had launched the rocket that dispatched the rover to Mars seven months earlier, on July 30, 2020.

"We can learn so much from literally any sample from Mars because we've never actually brought them back," Dr. Lanza said during an interview on an NPR "Morning Edition" podcast in February. "But what I'm really hoping for, and what one of the biggest goals of our mission is, is to find signs of bio-signatures, so evidence that there was life in the past on Mars, which would be incredible."

Perseverance landing

Perseverance has become the second active NASA rover on the Martian surface. Curiosity was already there, having landed onto the Gale Crater in August 2012. Curiosity is still operational after more than 3,000 Martian days on Mars. A day on Mars, called a "sol," is 38 minutes longer than a day on Earth. Last summer, in fact, NASA engineers had Curiosity drive to a higher area on Mars, known as Mount Sharp.

Perseverance was the fifth rover to arrive on Mars. The first rover to get to the red planet was Sojourner in 2004. Spirit and Opportunity followed in 2004, and then came Curiosity and now Perseverance.

NASA scientists refer to the updated ChemCam unit on the newest rover as

SuperCam and recognize it as the “Swiss Army Knife” of their instruments. Its capabilities exceed Curiosity’s ChemCam unit. Perseverance’s SuperCam has cameras that photograph in color and with higher resolution, for instance. And, it also has microphones that allow scientists to hear sounds on Mars for the first time.

Perseverance, according to NASA, will help the space agency to reach four overall goals on Mars: “determine whether life ever existed; characterize the climate; characterize the geology; and prepare for human exploration.”

The work of Dr. Lanza’s team with SuperCam is especially relevant for achieving the first three goals.

Like the earlier-generation ChemCam unit on Curiosity, SuperCam uses a laser to evaluate chemical elements in rocks and sediment. SuperCam, however, upgrades this role through its capacity to assess both the mineral content and hardness of its targets. After SuperCam zaps a target rock and heats up a small area to 18,000 degrees (Fahrenheit), it can then analyze the chemical composition of the rocks.

Recently, Dr. Lanza tweeted: “It turns out that we can learn a lot about a rock by listening to the sound it makes when we zap it. We can hear a rock coating!! That can tell us about the interaction between

the rock & the atmosphere, water, & (on Earth, at least) life.”

She was alluding to research she and others presented at last year’s Lunar and Planetary Science Conference.

Dr. Lanza goes by “@MarsNinja” on Twitter. Her Twitter intro line references one of her major responsibilities with the Mars missions by stating in her Twitter intro: “I shoot the lasers, pew pew.”

Connecting with NASA

The planetary scientist began her affiliation with NASA explorations through her work at Los Alamos. She was on the ChemCam team for Curiosity from the onset, and continues with Perseverance.

She had earned an undergraduate degree in astronomy from Smith College, then completed a master’s program in earth and environmental sciences at Wesleyan University. Next, she went to the University of New Mexico (UNM) for its doctoral program in earth and planetary sciences.

“I chose UNM because I wanted to work on a space mission—and UNM was one of the only places I could do that,” she said last year in a UNM interview. “At the time, UNM was (and still is) working in conjunction with Los Alamos National Laboratory on the ChemCam instrument,

which would ride aboard the Mars Curiosity rover.”

Dr. Lanza said she worked closely with Los Almos on the ChemCam project for her graduate studies. She then came to work at Los Almos.

Antarctica field trip

In November 2015, Dr. Lanza was selected to join an eight-member field team that would find and collect meteorites in Antarctica through the Antarctica Search for Meteorites (ANSMET) program. ANSMET operates with the support of NASA.

At the time, Dr. Lanza said: “These meteorites can help us understand the formation and evolution of our solar system. They come from planets, their moons and asteroids. Few of these solar system bodies will be visited by NASA in our lifetimes and this is a superb opportunity to collect material from across the solar system without having to leave the Earth.”

The vast white backdrop of Antarctica’s landscape makes it an ideal place to locate meteorites.

While recalling her five-week experience in Antarctica in December 2015, Dr. Lanza said during one of Science Friday’s “Undiscovered” podcasts: “It’s incredibly beautiful, but it’s also incredibly

dangerous,” she said. “It’s not like Antarctica is out to get you, but it’s like you don’t matter at all. You are nothing out there.”

Auspicious start

Dr. Lanza has also reflected on how she first became interested astronomy. Her parents, she said, took her when she was seven to an event at a university in Boston (where they lived) to get a glimpse of Halley’s Comet. She saw the comet through a telescope and immediately “space became 3-D to me,” she said. “The sky was not just this dome above me, but a vast space where things were happening. That’s when I started to wonder what else was out there.”

Looking at the state of space exploration today, Dr. Lanza, in her UNM interview, said: “By studying Mars and learning how its climate has changed—and is changing still—we can better understand our own planet’s past, present, and future. It also helps us understand how our planet and the solar system formed, and how life arose. In short, zapping rocks on a planet, 34 million miles away, tells us a lot about the ground under our very feet.”

###

Story by Gerald H. Levin

Life’s Tough, Explorers Edition