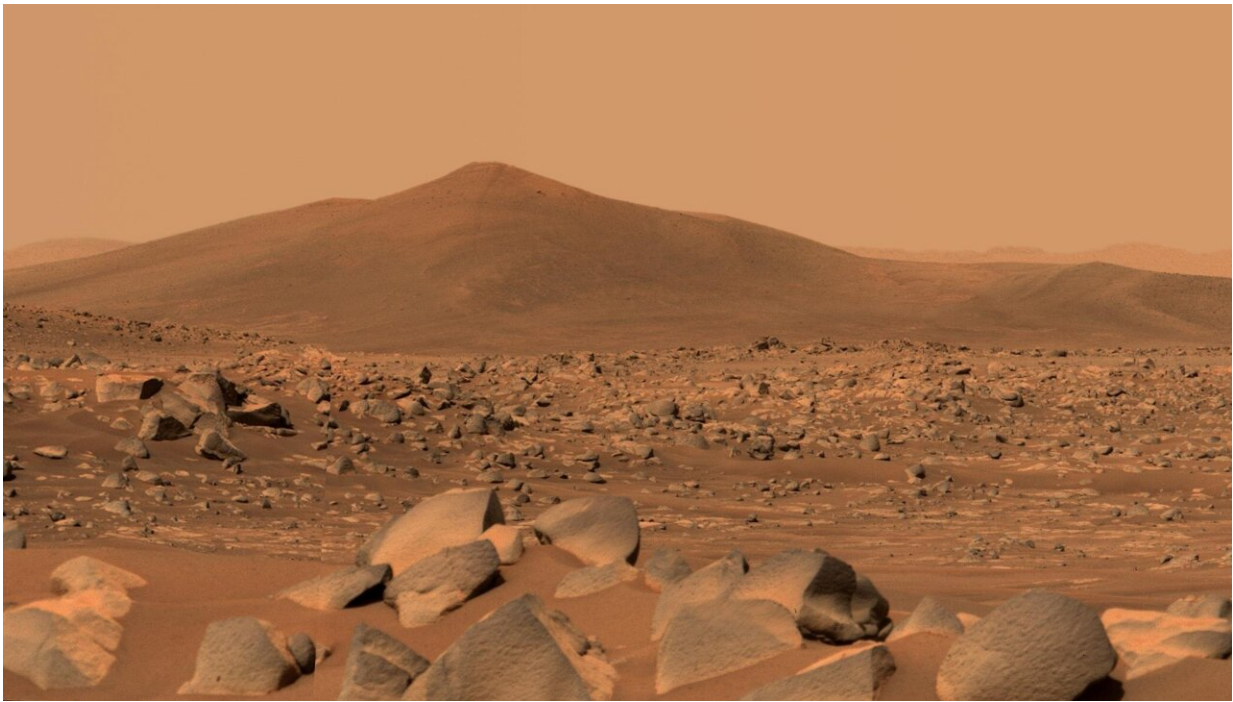


# Perseverance's robotic arm starts conducting science

May 12 2021

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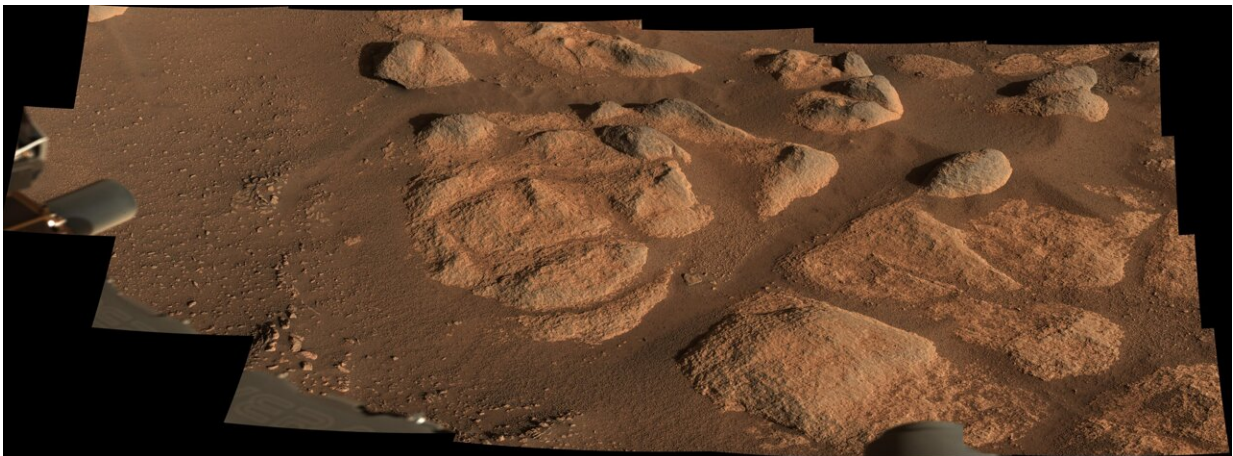
NASA's Perseverance Mars rover used its dual-camera Mastcam-Z imager to capture this image of "Santa Cruz," a hill about 1.5 miles (2.5 kilometers) away from the rover, on April 29, 2021, the 68th Martian day, or sol, of the mission. The entire scene is inside of Mars' Jezero Crater; the crater's rim can be seen on the horizon line beyond the hill. Credit: Jet Propulsion Laboratory

NASA's newest Mars rover is beginning to study the floor of an ancient crater that once held a lake.

NASA's Perseverance rover has been busy serving as a communications base station for the Ingenuity Mars Helicopter and documenting the rotorcraft's historic flights. But the rover has also been busy focusing its [science instruments](#) on rocks that lay on the floor of Jezero Crater.

What insights they turn up will help scientists create a timeline of when an ancient lake formed there, when it dried, and when sediment began piling up in the delta that formed in the crater long ago. Understanding this timeline should help date rock samples—to be collected later in the mission—that might preserve a record of ancient microbes.

A camera called WATSON on the end of the rover's [robotic arm](#) has taken detailed shots of the rocks. A pair of zoomable cameras that make up the [Mastcam-Z](#) imager on the rover's "head" has also surveyed the terrain. And a laser instrument called SuperCam has zapped some of the rocks to detect their chemistry. These instruments and others allow scientists to learn more about Jezero Crater and to home in on areas they might like to study in greater depth.



NASA's Perseverance Mars rover viewed these rocks using its Mastcam-Z imager on April 27, 2021, the 66th Martian day, or sol, of the mission. Stitched

together from 21 images, this mosaic is not white balanced; instead, it is displayed in a preliminary calibrated version of a natural-color composite, approximately simulating the colors of the scene as it would appear on Mars.

Credit: Jet Propulsion Laboratory

One important question scientists want to answer: whether these rocks are sedimentary (like sandstone) or igneous (formed by volcanic activity). Each type of rock tells a different kind of story. Some [sedimentary rocks](#)—formed in the presence of water from rock and mineral fragments like sand, silt, and clay—are better suited to preserving biosignatures, or signs of past life. Igneous rocks, on the other hand, are more precise geological clocks that allow scientists to create an accurate timeline of how an area formed.

One complicating factor is that the rocks around Perseverance have been eroded by wind over time and covered with younger sand and dust. On Earth, a geologist might trudge into the field and break a rock sample open to get a better idea of its origins. "When you look inside a rock, that's where you see the story," said Ken Farley of Caltech, Perseverance's project scientist.

While Perseverance doesn't have a rock hammer, it does have other ways to peer past millennia's worth of dust. When scientists find a particularly enticing spot, they can reach out with the rover's arm and use an abrader to grind and flatten a [rock](#)'s surface, revealing its internal structure and composition. Once they've done that, the team gathers more detailed chemical and mineralogical information using arm instruments called PIXL (Planetary Instrument for X-ray Lithochemistry) and SHERLOC (Scanning for Habitable Environments with Raman & Luminescence for Organics & Chemicals).

"The more rocks you look at, the more you know," Farley said.

And the more the team knows, the better samples they can ultimately collect with the drill on the rover's arm. The best ones will be stored in special tubes and deposited in collections on the planet's surface for eventual return to Earth.

Provided by Jet Propulsion Laboratory

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