NASA taps Penn State geoscientist to join ancient Mars habitability project

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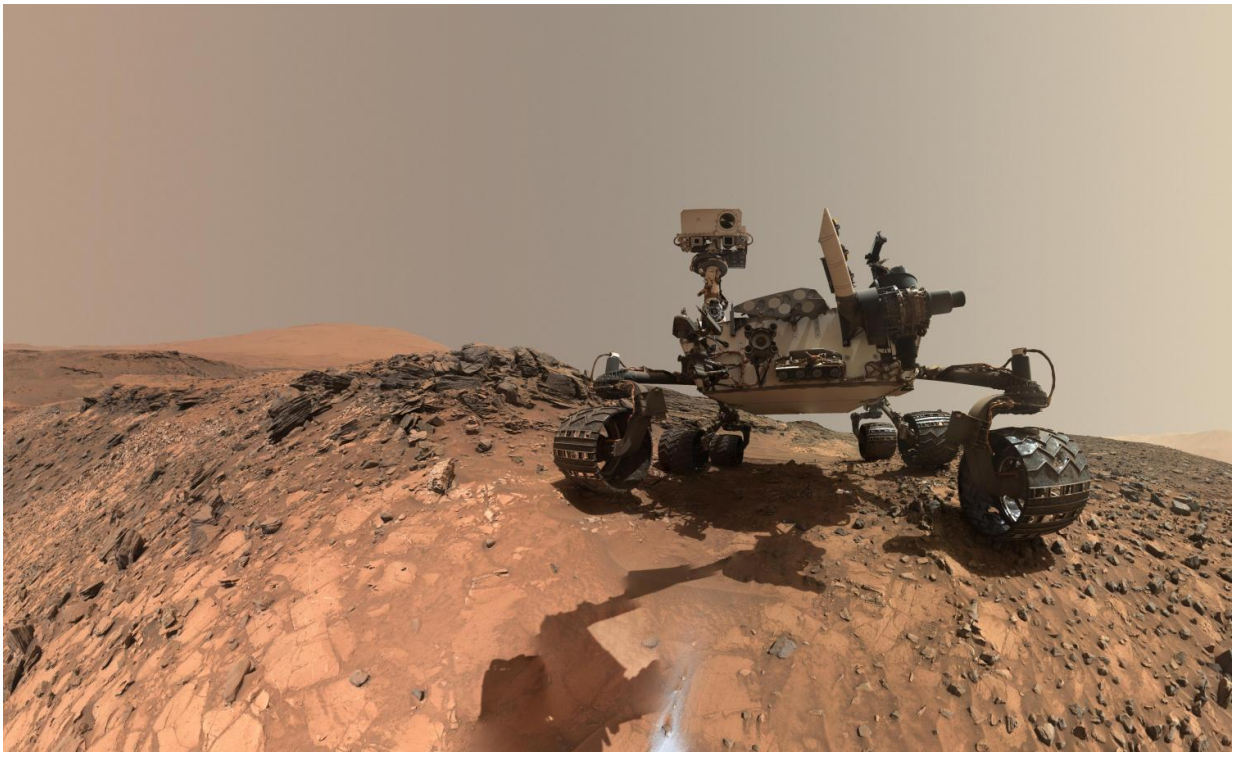

NASA's Curiosity Rover on Mars. Credit: NASA

When NASA began seeking new scientists to join its Curiosity Mars rover team, Penn State geoscientist Christopher House knew his experience could be a valuable asset to the project.

"My research has focused on the early Earth and what happened here

billions of years ago," said House, professor of geosciences, director of Penn State's Astrobiology Research Center and director of the Pennsylvania Space Grant Consortium. "I've studied methane seeps and marine sediments and have investigated ancient Earth rocks for signatures of life. I would like to take those lessons learned and apply them to other parts of the solar system, and joining the NASA Mars rover project seemed like a great way to do this."

House applied and was one of six new scientists selected from around the world who are completely new to the rover's science team. The goal of the Curiosity rover mission is to investigate whether environmental conditions on Mars were ever favorable for microbial life.

The mission has determined that there were habitable lake and groundwater environments life could have existed on Mars roughly 3.5 billion years ago with all the key chemical ingredients and energy needed for life. The team is also looking for evidence of water in Mars' past. House will be joined by geosciences graduate student Gregory Wong, and their contributions are being funded by NASA for a threefour-year, $379,000 grant contract through the Mars Science Laboratory Project at NASA's Jet Propulsion Laboratory.

As it negotiates Mars' hazardous terrain, Curiosity collects samples of rocks that it processes and analyzes with on-board instrumentation, such as a mass spectrometer that lets the team understand the composition of rock samples. The team is looking for microscopic evidence suggesting that the red planet was habitable, such as forms of sulfur naturally produced by microbes. House has conducted similar types of research on early Earth sediments. He has investigated whether microbial residue contained within rocks could be a sign of life, and he has investigated how life thrives in extreme environments on Earth such as hydrothermal vents at the ocean floor.

In addition to collaborating on ongoing Curiosity research, House is planning to compare analyses of Mars rocks with the same type of analyses performed on Earth rocks.

"We want to compare samples we have here on Earth, both from marine sediments and the rock record, to the signals that Curiosity is getting through mass spectrometry," he said. "What we're really trying to understand is whether the signatures we find are from sulfide and possibly organic matter, which could be signs that Mars was once habitable, but we need to consider all possibilities in our research."

For this expedition, the Curiosity rover is headed up a mountain on Mars called Mount Sharp, which has exposed layers of sediment deposited over a period of thousands or millions of years early in Mars' history. By sampling these rocks, the Curiosity team hopes to understand how their composition changed over time and whether early rocks contain information indicating that Mars was once suitable for life.

"I think my timing for joining the mission is fortuitous," said House. "The rover is in excellent health, and we're just about to get to some exciting rocks. My own experience from working on early Earth and looking at marine sediments puts me in a good position to help evaluate the origin of some of the sediments they're seeing—and potentially to start to think about answering the complex question of whether or not there's evidence for life recorded in those sediments."

Provided by Pennsylvania State University