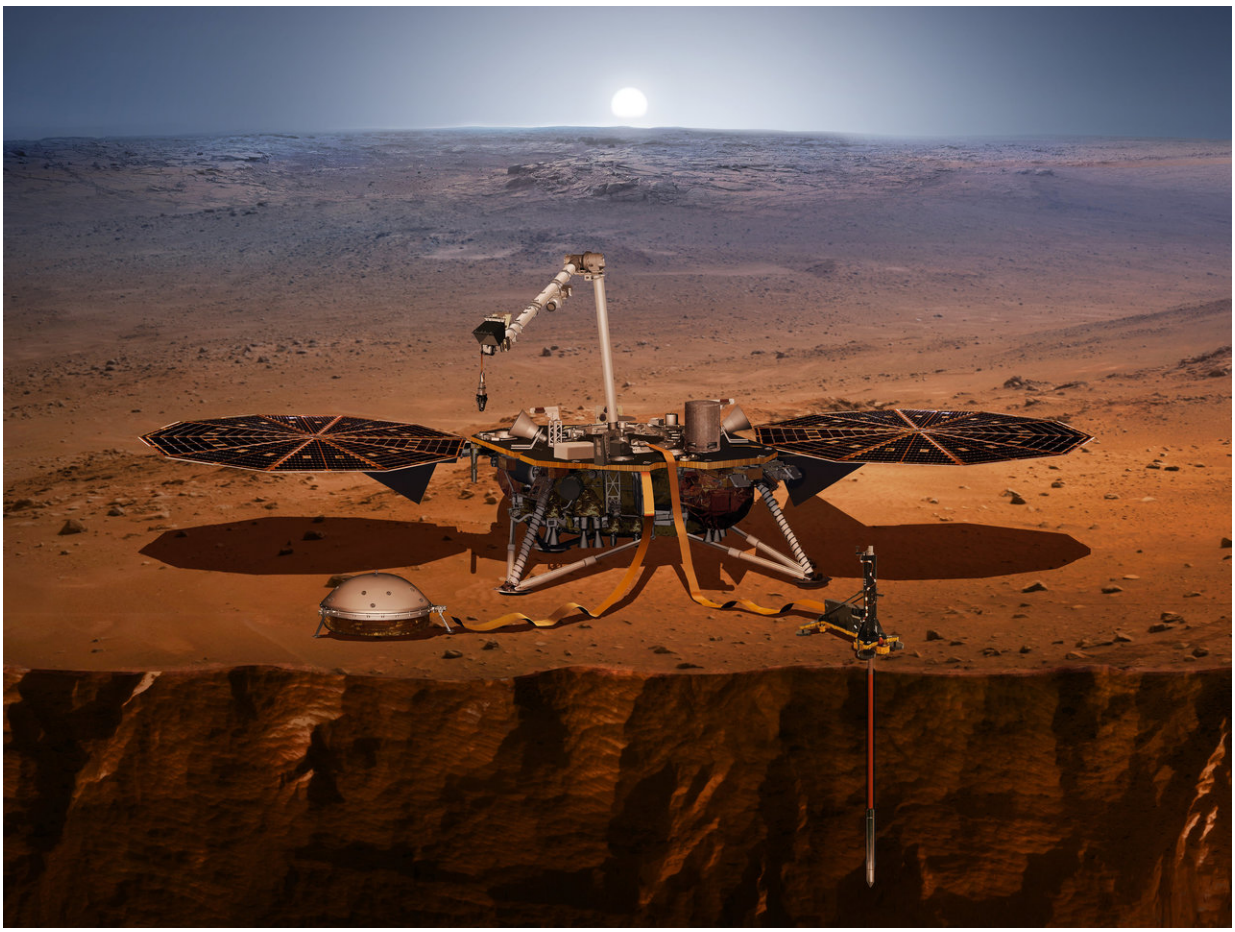
Geosciences researchers will use data from new NASA lander to learn about Mars interior, core

November 21 2018, by Steven Mackay



This artist's concept shows the InSight lander, its sensors, cameras and instruments. Credit: NASA.

When NASA's new InSight lander touches down on Mars on Nov. 26 to begin new explorations of the Red Planet's interior structure, Virginia Tech's Scott King will be anxiously awaiting the first feedback of data.

King, a professor with the Department of Geosciences in the Virginia Tech College of Science, is heading one of 24 new research teams selected this past summer by NASA to receive data science collected by the lander as it explores the planet during the next four years. When InSight – that's short for Interior Exploration using Seismic Investigations, Geodesy, and Heat Transport – arrives on Mars after its 301 million-mile journey, the robotic explorer will take on the mission of studying Mars' crust, mantle, and core.

In NASA's words, this first-of-its-kind mission will "give the Red Planet its first thorough checkup since it formed 4.5 billion years ago." In King's words, "I'll be thinking a lot about what's inside Mars for the next few years." King will focus on the size of Mars' core and how it moves and wobbles, or rotates.

"At the end of the project, I hope that we have a model for the composition of the interior of Mars, including the composition of the core, the size of the core, and the composition of the rocky mantle above it," King said. "I hope this model will be consistent with all the available observations we have—from InSight, from Martian meteorites, from the compositions of the surface rocks from the rovers, and from the global models of gravity and topography. Knowing the composition will help us understand Mars' evolution through time: When did the magnetic field start and stop? And why did it stop? What is the origin of the large volcanoes and why are they on one hemisphere of Mars?"

InSight's exploration of Mars is not King's first project with NASA. He was part of the Dawn at Ceres mission and is continuing to study Ceres, the largest body in the asteroid belt. He has published papers on

Mercury, Venus, Earth, and Mars. The Red Planet, though, has remained a top focus.

"I've always been fascinated with the large volcanoes on Mars, including Olympus Mons, the largest volcano in the solar system," King said. "It seemed counter-intuitive to me that a planet smaller than Earth would have volcanoes two to three times larger than Earth."

Working with King will be Josh Murphy, a geosciences doctoral student from Stafford, Virginia. "I have long been curious about the internal structure of Mars, particularly the state of the core—solid vs. liquid—and how geologically active present-day Mars is. The data from InSight will help answer these questions as well as provide key constraints for my research modeling the volcanic history of the Red Planet."

InSight launched on May 5 from Vandenberg Air Force Base in California and is managed by JPL, a division of Caltech, and is part of NASA's Discovery Program.

Before the craft launched, NASA received 100 or so proposals from scientists seeking to join InSight's science team and work with the data that would be returned from InSight. King ended up being among the 24 finalists. Unlike NASA's Hubble Space Telescope, where scientists "borrow" time on the observatory to take on specific missions, Scott and his fellow scientists will be part of an early core group to get a first look at data as its collected by InSight.

"We are developing numerical models using laboratory measurements to interpret the seismic data," King said. "What we really want to know is what is the composition of the interior and does it change with depth? We take the seismic data and compare that with various assumed compositions and find the composition that best fits the data."

NASA said one instrument on the lander will burrow beneath the surface as it seeks out how the planet was formed.

"Studying Mars' interior structure answers key questions about the early formation of rocky planets in our inner solar system—Mercury, Venus, Earth, and Mars—more than 4 billion years ago, as well as rocky exoplanets," the agency said. It's not the first time NASA has tried to study the interior of the planet. In the 1976 Viking lander, the robot's seismometer failed because it was too exposed to the windy environment.

Provided by Virginia Tech

Citation: Geosciences researchers will use data from new NASA lander to learn about Mars interior, core (2018, November 21) retrieved 20 March 2024 from https://phys.org/news/2018-11-geosciences-nasa-lander-mars-interior.html