

PHYSICS COLLOQUIUM

Steven W. Squyres

*James A. Weeks Professor of Physical Sciences
at Cornell University*

“Roving Mars: Spirit, Opportunity and
the Exploration of the Red Planet”

In January of 2004, twin robotic explorers named *Spirit* and *Opportunity* landed on Mars. Expected to last for 90 days, their mission has now gone on for more than fourteen years. Its objective is to search for evidence of past water on Mars, and to determine if Mars ever had conditions that would have been suitable for life.

Spirit landed in Gusev Crater, a large impact crater in the southern highlands of Mars. Finding only ancient lava on the crater floor, *Spirit* drove 2.5 km to the base of the Columbia Hills, a mountain range near the landing site. There *Spirit* ascended Husband Hill, the highest summit in the range, finding evidence that the rocks were modified long ago by water. Later, *Spirit* found strong evidence for ancient hot springs on Mars. *Spirit*'s mission ended after six years on the martian surface.

Opportunity landed on Meridiani Planum, a smooth plateau near the martian equator. In the first few weeks after landing, *Opportunity* found compelling evidence for long-ago water on Mars. This evidence included thick deposits of sulfate salts, concretions that precipitated from liquid water, and rocks that preserve ancient ripples formed when water flowed over sand. *Opportunity* has driven more than 40 kilometers across the martian surface, and has been exploring Endeavour Crater, a spectacular impact crater 25 kilometers in diameter.

To develop *Spirit* and *Opportunity*, a team of more than 4,000 highly motivated engineers and scientists overcame a host of technical challenges. The challenges were multiplied by an extraordinarily tight schedule that was driven by the motions of the planets. The talk will provide an up-to-date summary of the missions of *Spirit* and *Opportunity*, from their initial conception through their development, launch, landing, and operations on the surface of Mars.

**Thursday, March 29, 2018
at 4:10PM in Lewis Lab. 270**

Refreshments at 3:45PM

Steven W. Squyres is the James A. Weeks Professor of Physical Sciences at Cornell University, and is the Principal Investigator for the science payload on the Mars Exploration Rover Project. He received his Ph.D. from Cornell in 1981, and after five years at NASA's Ames Research Center became a faculty member at Cornell in 1986. He has participated in many planetary exploration missions, including Voyager, Magellan, NEAR, Cassini, Mars Express, MRO, Mars Odyssey, and the Mars Science Laboratory. Dr. Squyres led the most recent National Research Council Planetary Decadal Survey, and until recently served as Chairman of the NASA Advisory Council. He is a fellow of the American Academy of Arts and Sciences.