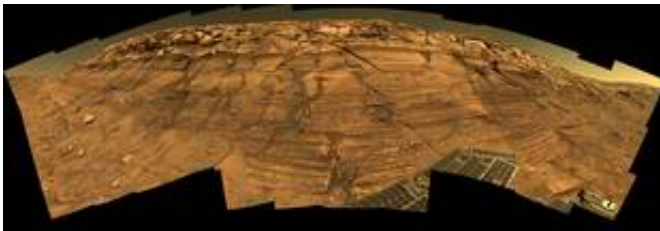


# Science Magazine Names Mars Discovery Breakthrough of the Year

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*Science* magazine has chosen the discoveries of NASA's Mars Exploration Rover (MER) mission as Breakthrough of the Year in its Dec. 17 edition, published today.

The principal scientific investigator for the mission's twin-rover science program is Steve Squyres, professor of astronomy at Cornell University, assisted by a large team of researchers, 28 of them at Cornell, including 15 students. The mission is managed by the Jet Propulsion Laboratory in Pasadena, Calif.

*Before leaving Endurance Crater, Opportunity rover's panoramic camera, or Pancam, captured this view of "Burns Cliff" at the base of the southeastern portion of the inner wall of the crater. The view, processed and calibrated in Cornell's MarsLab, is a composite of 46 different images, each acquired in seven different Pancam filters. (Cornell)*

The journal, published by the American Association for the Advancement of Science, says that its annual top honor is awarded for the mission's discovery of evidence for the prolonged presence of potentially life-supporting, salty, acidic water on the planet's surface.

"For a time, it seems, early Mars was a watery, habitable place," the magazine says.

Says Squyres: "All of us on the MER project team have been working so hard on this for so long that it's really difficult for us to judge the significance of our work -- we're too close to it, and the results are too new. But it's very gratifying to hear that others in the science community see significance in what we've found."

The Mars discoveries by the Spirit and Opportunity rovers, which bounced down on opposite sides of the planet last January, lead nine other research advances that make up Science's list of the top 10 scientific developments of 2004, chosen for "their profound implications for society and the advancement of science," according to the magazine.

The magazine's lead article on the rovers, "On Mars, A Second Chance for Life" by Richard Kerr, begins: "Inanimate, wheeled, one-armed boxes roaming another planet have done something no human has ever managed: They have discovered another place in the universe where life could once have existed." It continues: "The two Mars rovers [Spirit in Gusev Crater and Opportunity in Meridiani Planum] confirmed what many Mars scientists have long suspected: Long ago, enough water pooled on the face of Earth's neighbor long enough to allow the possibility of life."

The article notes that although Viking missions provided "tantalizing hints" almost 30 years ago, "Mars scientists could never be sure whether the water-carved valleys, channels and gullies that they saw through

orbiting cameras implied the prolonged presence of surface water.

"The Mars rovers have now put a bound on the water debate."

Although the Mars rover mission is not designed to look for life, but to look for evidence of whether conditions were once right for life, it does have the goal of seeking rocks that were formed in liquid water. From these, mission scientists can say not just that liquid water was on Mars but what the environmental conditions were like and whether they would have been suitable for life. And, as Squyres has noted, do the minerals that were formed have the capability to preserve evidence of former life for long periods of time?

The record that Opportunity's instruments found in the rocks in the rover's landing site, dubbed Eagle crater, the Science article notes, "turned out to be about salt, an end product of the water weathering of rock, rather than the expected water-altered minerals." (This discovery was made before the rover drove to and entered the large crater dubbed Endurance for a six-month sojourn, from which it has just emerged.)

As the article explains, the Eagle outcrop is up to 40 percent salts, mostly magnesium and calcium sulfates. And the presence of the mineral jarosite suggests that the water was quite acidic. Acid water leached salts from the rock and flowed across "a shallow sea, or perhaps a vast puddle." When the water evaporated, it left the salts and dirt behind. The salty sea, or puddles, "appear to have spanned more than 300,000 square kilometers of Meridiani Planum," the article says.

Source: Cornell University

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