



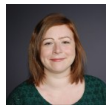
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Brid-Aine Parnell (<http://www.forbes.com/sites/bridaineparnell/>) Contributor

I write about science, technology and the wonders of the universe

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TECH (TECHNOLOGY) 12/16/2014 @ 3:12PM | 3,119 views

Mysterious Methane Spike Offers Tantalising Hint Of Life On Mars

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The Curiosity rover has measured a large spike in methane on [Mars \(/companies/mars/\)](#), which could indicate the presence of life on the planet.

NASA's Martian explorer has used its Sample Analysis at Mars (SAM) science instrument a dozen times in 20 months to sniff the atmosphere and analyse rock samples drilled from the surface of the planet. During two of those months, once in late 2013 and again early this year, four measurements averaged seven parts per billion. But before and after that, methane readings were at one-tenth that level.

“This temporary increase in methane – sharply up and then back down – tells us there must be some relatively localised source,” said Sushil Atreya of the University of Michigan and Curiosity's rover science team. “There are many possible sources, biological or non-biological, such as interaction of water and rock.”

That's not all the rover found either. Curiosity has also detected different organic chemicals in powder drilled from a rock dubbed Cumberland, the first definitive detection of organics in the surface material.

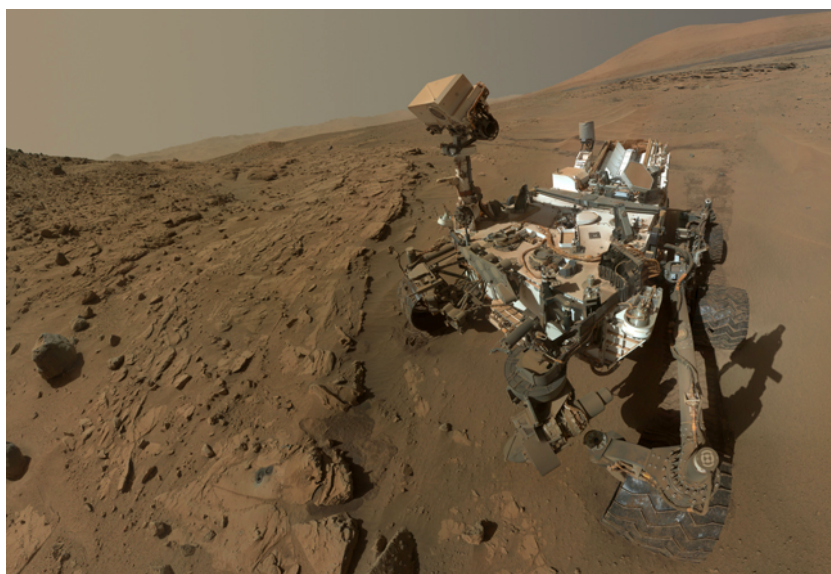


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Curiosity Self-Portrait at 'Windjana' Drilling Site (Credit: NASA/JPL-Caltech/MSSS)

We can't get too excited about life on Mars just yet though. These organics could have been formed on the Red Planet or delivered there by meteorites, but although they represent the chemical building blocks of life, they don't prove that the planet once harboured living microbes. They can exist on a planet without any presence of life.

However, both these discoveries show that Mars is still chemically active today and are a good sign for favourable conditions for life on ancient Mars.

"We will keep working on the puzzles these findings present," said John Grotzinger, Curiosity project scientist at Caltech. "Can we learn more about the active chemistry causing such fluctuations in the amount of methane in the atmosphere? Can we choose rock targets where identifiable organics have been preserved?"

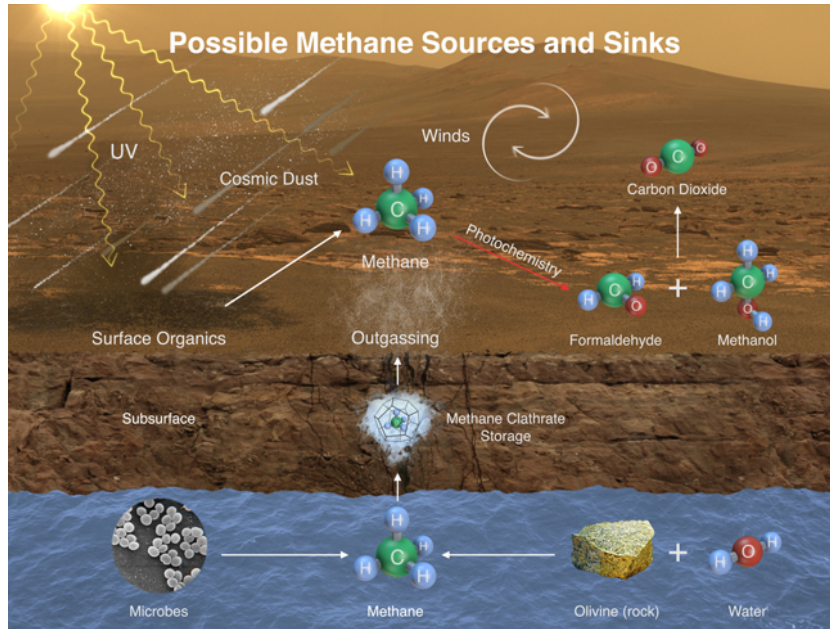
Researchers had to be sure that the organics SAM detected were really Martian. In other samples, organics showed up that were later found to have been transported from Earth in the rover. But extensive testing and analysis has made the scientists confident that these chemicals are from Mars.

Exactly what organics are in the rocks is also difficult to determine. SAM heats its samples for analysis and this causes changes in the structures of the organic compounds because of the presence of perchlorate minerals in Martian rocks and soils.

"This first confirmation of organic carbon in a rock on Mars holds much promise (<https://twitter.com/intent/tweet?url=http%3A%2F%2Fonforb.es%2F1vWDrZk&text=This%20first%20confirmation%20of%20organic%20carbon%20in%20Mars>)," said Curiosity participating scientist Roger Summons of MIT.

"Organics are important because they can tell us about the chemical pathways by which they were formed and preserved. In turn, this is informative about Earth-Mars differences and whether or not particular environments represented by Gale Crater sedimentary rocks were more or less favourable for

accumulation of organic materials. The challenge now is to find other rocks on Mount Sharp ([/companies/sharp/](http://companies/sharp/)) that might have different and more extensive inventories of organic compounds.”



This image illustrates possible ways methane might be added to Mars' atmosphere (sources) and removed from the atmosphere (sinks). NASA's Curiosity Mars rover has detected fluctuations in methane concentration in the atmosphere, implying both types of activity occur on modern Mars. (Credit: NASA/JPL-Caltech/SAM-GSFC/Univ. of Michigan)

Meanwhile, the taste of water Curiosity found in the lakebed minerals in the Cumberland rock indicates that the planet lost much of its water before that lakebed formed three billion years ago – and continued to lose large amounts after.

By looking at the levels of the heavier hydrogen isotope deuterium and comparing the ratio to the lighter hydrogen, scientists can work out the history of a planet's water.

The rover found the Cumberland sample had around half the ratio of water vapour as today's Martian atmosphere, suggesting that the planet was losing water after it formed. But the ratio is about three times higher than in the original water supply of Mars, based on the assumption that that ratio is similar to that measured in Earth's oceans. That would mean that Mars had already lost most of its water before the rock formed.

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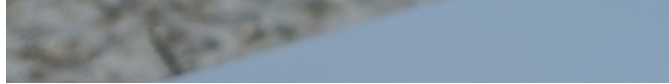
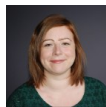
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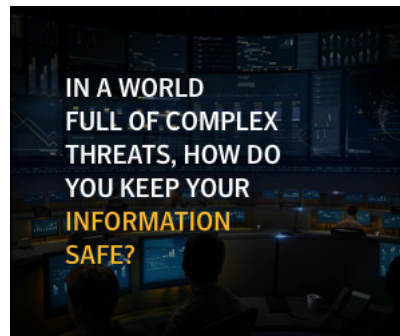
Fancy Naming A Crater On Mercury In Honour Of NASA's 10-year MESSENGER Mission?

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NASA is offering you the chance to name one of the craters of Mercury in honour of the MESSENGER mission, which is in its final days.

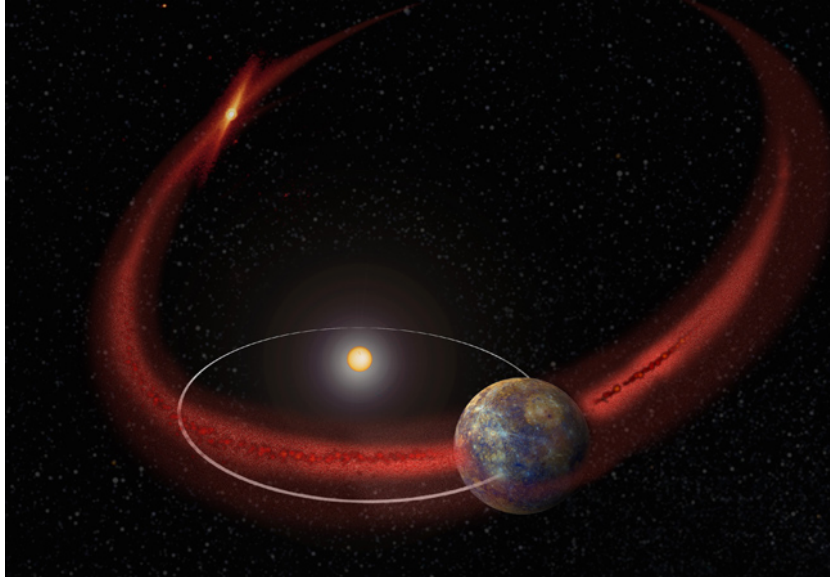
The agency, together with Johns Hopkins University and the Carnegie Institution for Science, has kicked off a month-long competition to name five impact craters on the Sun's closest neighbour – so long as the name is that of an artist.

According to the International Astronomical Union (IAU), the governing body for planetary and satellite naming, new craters on Mercury can't be called any old thing, they have to be named for an artist, composer or writer who was famous for more than 50 years and has been dead for more than three. Current craters on Mercury include Beethoven, Caravaggio and Lennon, for the Beatles star.



The famous artist can be from anywhere in the world and [submissions from the public \(http://namecraters.carnegiescience.edu/welcome\)](http://namecraters.carnegiescience.edu/welcome) will be accepted up until January 15. The IAU will then announce the winners in late March or April next year, to coincide with the end of MESSENGER's mission.

The space agency's MErcury Surface, Space ENvironment, GEOchemistry, and Ranging (MESSENGER) probe has spent ten years on its mission to the smallest planet in the Solar System and will use up the last of its manoeuvring propellant and orbit decays to crash into the surface of Mercury in early 2015.



Mercury appears to undergo a recurring meteor shower, perhaps when its orbit crosses the debris trail left by comet Encke.

(Artist's concept/Credit: NASA's Goddard Space Flight Centre)

The spacecraft has far surpassed expectations both in terms of its duration and the scientific data it has yielded, the Carnegie Institution said. Instead of the original 2,500 images of the planet that scientists were hoping for, MESSENGER has delivered more than 250,000 pictures, giving researchers a detailed, high resolution map of the entire planet.

“This brave little craft, not much bigger than a Volkswagen Beetle, has travelled more than 8 billion miles since 2004—getting to the planet and then in orbit,” Julie Edmonds, head of the mission's Education and Public Outreach, said.

“We would like to draw international attention to the achievements of the mission and the guiding engineers and scientists on Earth who have made the MESSENGER mission so outstandingly successful.

“As scientists study the incredible data returned by MESSENGER, it becomes important to give names to surface features that are of special scientific interest. Having names for landforms such as mountains, craters, and cliffs makes it easier for scientists and others to communicate,” she added.

During the three years it has spent orbiting Mercury, MESSENGER has confirmed that deposits of water ice are tucked into craters near the planet's poles, despite the planet's heat, because they are permanently

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shadowed from the Sun. The craft has also discovered that the planet has a remarkably dynamic electromagnetic environment, including unexplained burst of electrons and highly variable distributions of different elements in the thin exosphere, according to deputy principal investigator Larry Nittler.

And the science isn't over yet. Although MESSENGER is nearing the end of its life, it's still sending back data, now gathered from closer than ever as it drops its altitude.

Most recently, the craft indicated that Mercury might be getting hit by a periodic meteor shower, possibly from the same comet that produces multiple events annually on Earth.

Our planet just went through one of its annual meteor showers, December's Geminids, which are associated with an asteroid. And in the summer, Earth observers in the north can see the Perseids, which come from the comet Swift-Tuttle.

MESSENGER tipped scientists off to Mercury's meteor shower because of a regular surge of calcium in the exosphere it's measuring with its Atmospheric and Surface Composition Spectrometer. Researchers reckon that the spike in calcium is a shower of dust particles hitting the planet and knocking calcium-bearing molecules free from the surface.

"If our scenario is correct, Mercury is a giant dust collector," said Joseph Hahn, a planetary dynamist in the Austin, Texas, office of the Space Science Institute and co-author of a paper on the theory.

"The planet is under steady siege from interplanetary dust and then regularly passes through this other dust storm, which we think is from comet Encke."

Comet Encke is the source of several debris fields in the inner solar system, which give rise to the Southern and Norther Taurids meteor showers in October and November and the Beta Taurids in June and July here on Earth.

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