NASA Invites Public to Submit Names to Fly Aboard Next Mars Rover

Although it will be years before the first humans set foot on Mars, NASA is giving the public an opportunity to send their names — stenciled on chips — to the Red Planet with NASA’s Mars 2020 rover, which represents the initial leg of humanity’s first round trip to another planet. The rover is scheduled to launch as early as July 2020, with the spacecraft expected to touch down on Mars in February 2021.

The opportunity to send your name to Mars comes with a souvenir boarding pass and “frequent flyer” points. More than 2 million names flew on NASA’s InSight mission to Mars, giving each “flyer” about 300 million frequent flyer miles (nearly 500 million frequent flyer kilometers).

From now until Sept. 30, you can add your name to the list and obtain a souvenir boarding pass to Mars here: https://go.nasa.gov/Mars2020Pass

SpaceX Launched Its Starlink Satellites

After several delays, SpaceX has finally launched the first 60 satellites of its Starlink program. The California company hopes that the satellites, launched on a Falcon 9 rocket whose booster was making its third mission, will eventually be joined by 12,000 or so others as the company attempts to expand low-cost broadband internet across the globe.

The Falcon 9 rocket’s booster successfully landed on the company’s “Of Course I Still Love You” droneship, stationed in the Atlantic Ocean. The landing marked SpaceX’s 40th successful booster recovery.
The ‘Forbidden’ Planet Has Been Found in the ‘Neptunian Desert’

An exoplanet smaller than Neptune with its own atmosphere has been discovered in the Neptunian Desert, by an international collaboration of astronomers, with the University of Warwick taking a leading role. New research, led by Dr. Richard West including Professor Peter Wheatley, Dr. Daniel Bayliss and Dr. James McCormac from the Astronomy and Astrophysics Group at the University of Warwick, has identified a rogue planet. NGTS is situated at the European Southern Observatory’s Paranal Observatory in the heart of the Atacama Desert, Chile. It is a collaboration between UK Universities Warwick, Leicester, Cambridge, and Queen’s University Belfast, together with Observatoire de Genève, DLR Berlin and Universidad de Chile.

Dr. Richard West, from the Department of Physics at the University of Warwick comments:

“This planet must be tough—it is right in the zone where we expected Neptune-sized planets could not survive. It is truly remarkable that we found a transiting planet via a star dimming by less than 0.2% - this has never been done before by telescopes on the ground, and it was great to find after working on this project for a year.

“We are now scouring out data to see if we can see any more planets in the Neptune Desert—perhaps the desert is greener than was once thought.”

Rare Meteorites Found in Costa Rica Could Shed Light on Earth’s Water

Meteorites are an astronomer’s dream. In a field that by definition studies objects and phenomena above and beyond Earth’s atmosphere, many researchers never get a chance to touch or see up close the things they study. But then, sometimes, these items simply rain down from the sky, in the form of ancient space rocks called meteorites. Meteorites come in many different types. But some of the most precious are called carbonaceous chondrites, valued because they contain large amounts of water and organic compounds. These meteorites contain a history of that water from the solar system’s early days, and trace how the materials of life were distributed across the planets and space.

On April 23 of this year, one of these space rocks – roughly the size of a washing machine – streaked through the skies over the Costa Rican town of Aguas Zarcas. As it fell, it broke into many smaller pieces, and astronomers scrambled to collect and study them. They are the first large fall of carbonaceous chondrites in half a century, and should provide ample data on the history of water in the solar system, according to a press release from Arizona State University, which is studying the meteorites.

Mud balls
Even though meteoroids have survived in space for billions of years, all the water contained in carbonaceous chondrites can make them surprisingly fragile once they hit the ground. They’re basically balls of clay, and dissolve rapidly when exposed to more water – and May marks the beginning of the rainy season in Costa Rica. So meteorite hunters knew there was a clock ticking as soon as the fireball streaked across the skies above Aguas Zarcas.

They ended up having five days to search for and collect the meteorites from the surrounding area before the rain fell. About 55 pounds have been collected so far. Some of them have made their way to ASU thanks to a meteorite hunter named Michael Farmer. He collected some of the space rocks or bought them from locals and donated them to ASU, which has a dedicated Center for Meteorite Studies. Researchers there are comparing the Aguas Zarcas fall to other, previously known meteorites so they can be more accurately classified. All meteorites began as part of larger asteroids. These building blocks of the solar system are the same as the long-ago space rocks that collided to form Earth and the other planets, and could be the source of Earth’s water and other materials vital for the formation of life. By analyzing the detailed chemistry of the water contained in meteorites, researchers can learn when and how Earth obtained its water, which had a big impact on Earth’s early history.
Scientists have found a new way that future Mars explorers could potentially generate their own oxygen. Mars is a long way from Earth, so being able to create breathable air on-site would save money and effort in having to haul oxygen all the way from our own planet. A research team discovered this new oxygen-generating reaction by studying comets. Most of these small icy worlds originate in a distant area of the solar system known as the Oort Cloud, far beyond the orbit of Neptune. If a comet’s orbit brings it close to the sun, heat begins pushing cometary ice off into space. This reaction produces long tails that can stretch for thousands of miles.

A team of researchers from the California Institute of Technology (Caltech) in Pasadena found a new way to explain how comets generate molecular oxygen, the two atoms of oxygen that come together to form breathable air. One already-known method is through kinetic energy. A sublimating comet is a busy environment, where the solar wind (the constant stream of particles emanating from the sun) can push floating water molecules into the comet's surface at high speed. If there are oxygen-containing compounds on the surface, careening water molecules can rip oxygen atoms off and produce molecular oxygen.

Molecular oxygen can also be produced through carbon dioxide reactions, the team found. (Carbon dioxide contains a single carbon atom and two oxygen atoms.) Former Caltech postdoctoral fellow Yunxi Yao and current Caltech chemical engineering professor Konstantinos Giapis simulated this reaction by crashing carbon dioxide into gold foil. Since gold foil cannot be oxidized, by itself it should not produce any molecular oxygen. But when carbon dioxide caretens into the foil at high speed, the gold surface emits molecular oxygen. “This meant that both atoms of oxygen come from the same CO2 [carbon dioxide] molecule, effectively splitting it in an extraordinary manner,” Caltech representatives said in a statement.

To better understand how carbon dioxide can break down into molecular oxygen, Caltech chemistry professor Tom Miller and postdoctoral fellow Philip Shushkov created a computer simulation. One challenge in modeling the reaction is that the reacting molecules are very “excited,” meaning they vibrate and rotate in a complex way, the researchers said. “In general, excited molecules can lead to unusual chemistry, so we started with that,” Miller said in the statement. “But, to our surprise, the excited state did not create molecular oxygen. Instead, the molecule decomposed into other products.”

Strange Martian Mineral Deposit Likely Sourced From Volcanic Explosions

Ashfall from ancient volcanic explosions is the likely source of a strange mineral deposit near the landing site for NASA’s next Mars rover, a new study finds. The research, published in the journal Geology, could help scientists assemble a timeline of volcanic activity and environmental conditions on early Mars.

“This is one of the most piecemeal pieces of evidence yet for the idea that explosive volcanism was more common on early Mars,” said Christopher Kremer, a graduate student at Brown University who led the work.

“Understanding how important explosive volcanism was on early Mars is ultimately important for understanding the water budget in Martian magma, groundwater abundance and the thickness of the atmosphere.”

Volcanic explosions happen when gases like water vapor are dissolved in underground magma. When the pressure of that dissolved gas is more than the rock above can hold, it explodes, sending a fiery cloud of ash and lava into the air. Scientists think that these kinds of eruptions should have happened very early in Martian history, when there was more water available to get mixed with magma. As the planet dried out, the volcanic explosions would have died down and given way to more effusive volcanism - a gentler oozing of lava onto the surface. There’s plenty of evidence of an effusive phase to be found on the Martian surface, but evidence of the early explosive phase hasn’t been easy to spot with orbital instruments, Kremer says.
On May 20, a nearly Full Moon and Jupiter shared this telephoto field of view. Captured when a passing cloud bank dimmed the moonlight, the single exposure reveals the familiar face of our fair planet’s own large natural satellite, along with bright Jupiter (lower right) and some of its Galilean moons. Lined up left to right the tiny pinpricks of light near Jupiter are Ganymede, Europa, (Jupiter) and Callisto. (That’s not just dust on your screen ...) Closer and brighter, our own natural satellite appears to loom large. But Ganymede, and Callisto are physically larger than Earth’s Moon, while water world Europa is only slightly smaller. In fact, of the Solar System's six largest planetary satellites, Saturn's moon Titan is missing from the scene and a fourth Galilean moon, Io, is hidden by our ruling gas giant.