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Questions or comments on this article? E-mail us at feedback@sciencenews.org | Reprints FAQ This story was updated March 18 to describe the astronauts' emergence from the SpaceX Dragon capsule. The story was updated again on March 27 to clarify the description of the capsule's landing site. Witness live views of Earth from the International Space Station as it orbits the planet. Space streaming company Sen is broadcasting 24/7 from the ISS in beautiful 4K HD. Witness live views of Earth from the International Space Station as it orbits the planet. Space streaming company Sen is broadcasting 24/7 from the ISS in beautiful 4K HD. Witness live views of Earth from the International Space Station as it orbits the planet. Space streaming company Sen is broadcasting 24/7 from the ISS in beautiful 4K HD. Witness live views of Earth from the International Space Station as it orbits the planet. Space streaming company Sen is broadcasting 24/7 from the ISS in beautiful 4K HD. Witness live views of Earth from the International Space Station as it orbits the planet. Space streaming company Sen is broadcasting 24/7 from the ISS in beautiful 4K HD. Witness live views of Earth from the International Space Station as it orbits the planet. Space streaming company Sen is broadcasting 24/7 from the ISS in beautiful 4K HD. Witness live views of Earth from the International Space Station as it orbits the planet. Space streaming company Sen is broadcasting 24/7 from the ISS in beautiful 4K HD. Skip to content Sign up for our newsletter We summarize the week's scientific breakthroughs every Thursday. From monitoring Mercury to launching a new adventure to an icy moon of Jupiter, spacecraft and astronauts made great strides in 2024. Here are some of the highlights of this year in space. The moon has been a hot destination for space agencies and private companies in recent years, and 2024 was no exception. In January, the Japanese SLIM spacecraft made a successful but lopsided precision landing on a crater‘s rim, marking the country’s first soft landing on the moon. The solar-powered Smart Lander for Investigating the Moon was designed to collect data for one lunar day, or about two weeks on Earth, before night fell and it got too dark and cold to survive. But SLIM surprised everyone by sending signals to Earth for three months. China’s Chang’e 6 mission collected the first dirt samples from the moon’s far side and returned them to Earth in June for analysis.CLEP/CNSA SLIM was joined by another unintentionally sideways lander in February. Odysseus, a spacecraft built by Houston-based company Intuitive Machines, touched down and toppled over near the lunar south pole. During its six-day mission, the probe sent back data that may be instructive for NASA’s Artemis mission, which aims to land humans on the moon in 2026 (SN: 3/23/24, p. 16). Finally, China’s Chang’e 6 spacecraft grabbed the first samples from the farside of the moon in June (SN: 6/29/24, p. 12). The first look at the samples revealed soil that’s fluffier than soil from the nearside. A chemical analysis of the samples, reported in Nature, suggests the farside was volcanically active some 2.8 billion years ago (SN: 11/15/24). Sign up for our newsletter We summarize the week's scientific breakthroughs every Thursday. Meanwhile, the Chang’e 6 orbiter turned up at a spot orbiting the sun called L2, the same region of space that is occupied by the James Webb Space Telescope. It’s not clear yet what the Chinese space agency plans to do with it there. NASA’s Perseverance rover took this selfie in 2021, with the Ingenuity helicopter behind it.NASA/JPL-Caltech/MSSS 2024 opened with a farewell to a beloved Mars explorer. NASA’s Ingenuity, nicknamed Ginny, was the first helicopter to operate on the Red Planet. The craft was supposed to fly a few times over the course of 30 days; instead, it took 72 flights over almost three years. The airborne explorer was finally grounded in January after its rotor blades were damaged (SN: 1/25/24). Ingenuity’s companion, the Perseverance rover, made perhaps its most important discovery yet in July: a rock containing hints of ancient microbes (SN: 8/24/24, p. 6). But the discovery came against a backdrop of uncertainty: The budget for NASA’s planned Mars Sample Return mission is in jeopardy (SN: 6/15/24, p. 12), which means the intriguing bit of rock might not make it back to Earth for further study. NASA astronauts Butch Wilmore (left) and Sunita Williams (right) were scheduled to return from the International Space Station in mid-June. But a malfunction on the Starliner spacecraft has prevented the duo from making the return trip to Earth until February.NASA Four years after SpaceX became the first private company to launch astronauts to the International Space Station, the company supported another commercial milestone: the first all-civilian spacewalk (SN: 5/27/20). The Polaris Dawn mission launched four astronauts to the space station in September. The crew tested new SpaceX spacesuits and collected data on radiation and the astronauts’ physiology. One member of the crew, Sarah Gillis, also became the first person to play the violin in space. Another private company had a rougher time of it. Boeing’s Starliner spacecraft launched astronauts Sunita Williams and Butch Wilmore to the space station in early June for an eight-day mission, but problems with the spacecraft’s thrusters delayed the astronauts’ return. Starliner returned to Earth in September without its crew. Williams and Wilmore will remain on the space station until February, when a SpaceX Dragon spacecraft will bring them home. Sponsor Message Earth lost a planetary protector this year. In August, NASA said goodnight to the NEOWISE telescope after it spent more than a decade scanning the sky for threatening asteroids. NEOWISE launched in 2009 on a mission to study infrared light from distant cosmic objects (SN: 12/10/09). When the telescope ran out of coolant, scientists repurposed it to observe asteroids that come close to Earth, which also emit infrared light thanks to heat from the sun. Over its lifetime, NEOWISE observed thousands of asteroids and hundreds of comets, giving scientists a more precise sense of the dangers these space rocks pose to Earth. The telescope’s loss leaves us somewhat in the dark, but fortunately not for too long. Another asteroid hunter, NEO Surveyor, is slated to launch no earlier than 2027. The recently retired NEOWISE infrared telescope (illustrated) observed thousands of space rocks that flew close to Earth.NASA/JPL-Caltech The BepiColombo spacecraft made a close flyby of Mercury on September 4, getting its first view of the planet’s south pole. The joint European and Japanese probe took off for Mercury in October 2018, and it still has about two years to go until it arrives. Because Mercury is so close to the sun and its gravitational might, it’s not easy to maneuver a spacecraft into orbit around the tiny planet. BepiColombo is making close passes of Mercury and using the planet’s gravity to nudge it on course to enter orbit in November 2026. In September, BepiColombo got its closest glimpse of Mercury yet as the spacecraft inches its way into the planet’s orbit. BepiColombo/MTM/ESA (CC BY-SA 3.0 IGO) One flyby this year gave the spacecraft views of Mercury it won’t have even when it is in orbit. BepiColombo approached from Mercury’s night side, so the planet’s crater rims cast deep shadows that could reveal new details about their topography. The next flyby will be on January 8. NASA’s Europa Clipper spacecraft launched on October 14, bound for an icy moon of Jupiter that may have the conditions for life to exist (SN: 10/8/24). Because Europa hosts a liquid water ocean under a thick shell of ice, it is among the top contenders for extraterrestrial life in the solar system. Europa is surrounded by intense radiation, which means that when Clipper arrives at Jupiter’s icy moon, the spacecraft will have to study it closeup in short stints to avoid getting damaged. JPL-Caltech/NASA Once Clipper arrives at Jupiter in 2030, the spacecraft will make nearly 50 flybys of the moon to study its subsurface ocean. Clipper won’t orbit Europa directly because of Jupiter’s intense magnetic field, which traps high amounts of technology-disrupting radiation in the moon’s vicinity. Instead, Clipper will dip in and out of this radiation field to avoid prolonged exposure, taking data and then backing off to recover before diving back in.

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