

Astronomy News

KW RASC FRIDAY MAY 14TH
2021

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How planets form controls elements essential for life

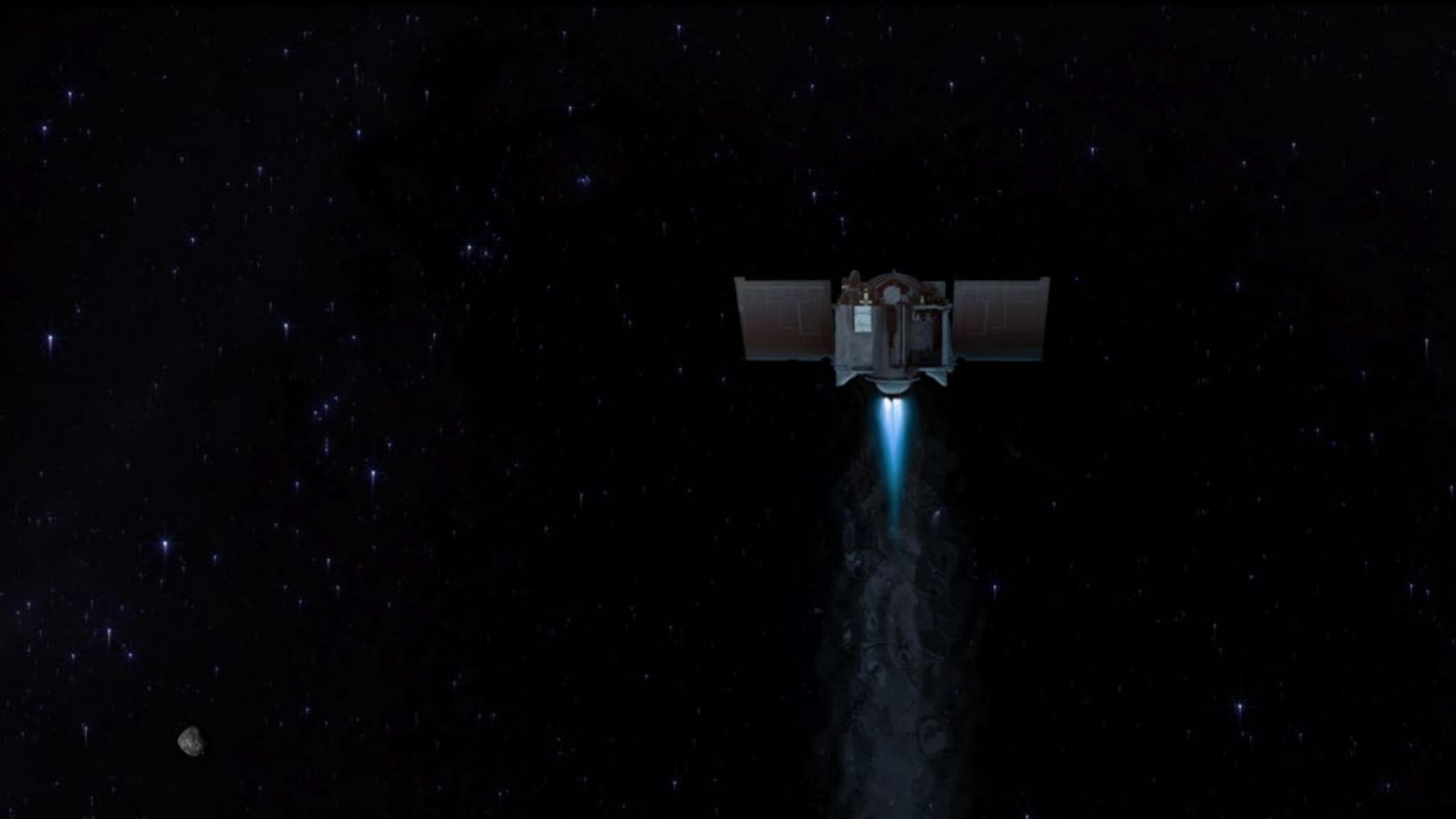
- ▶ <https://www.sciencedaily.com/releases/2021/05/210510113607.htm>
- ▶ The prospects for life on a given planet depend not only on where it forms but also how, according to Rice University scientists.
- ▶ Planets like Earth that orbit within a solar system's Goldilocks zone, with conditions supporting liquid water and a rich atmosphere, are more likely to harbor life. As it turns out, how that planet came together also determines whether it captured and retained certain volatile elements and compounds, including nitrogen, carbon and water, that give rise to life.
- ▶ In a study published in Nature Geoscience, Rice graduate student and lead author Damanveer Grewal and Professor Rajdeep Dasgupta show the competition between the time it takes for material to accrete into a protoplanet and the time the protoplanet takes to separate into its distinct layers -- a metallic core, a shell of silicate mantle and an atmospheric envelope in a process called planetary differentiation -- is critical in determining what volatile elements the rocky planet retains.

Icy clouds could have kept early Mars warm enough for rivers and lakes

- ▶ <https://www.sciencedaily.com/releases/2021/04/210426154813.htm>
- ▶ A new study led by a planetary scientist uses a computer model of Mars to put forth a promising explanation onto how Mars once contained rivers and lakes: Mars could have had a thin layer of icy, high-altitude clouds that caused a greenhouse effect.
- ▶ One of the great mysteries of modern space science is neatly summed up by the view from NASA's Perseverance, which just landed on Mars: Today it's a desert planet, and yet the rover is sitting right next to an ancient river delta.
- ▶ The apparent contradiction has puzzled scientists for decades, especially because at the same time that Mars had flowing rivers, it was getting less than a third as much sunshine as we enjoy today on Earth.
- ▶ But a new study led by University of Chicago planetary scientist Edwin Kite, an assistant professor of geophysical sciences and an expert on climates of other worlds, uses a computer model to put forth a promising explanation: Mars could have had a thin layer of icy, high-altitude clouds that caused a greenhouse effect.

Infinity & Beyond — Episode 19: The Science of Star Wars

- ▶ <https://astronomy.com/news/videos/2021/05/infinity--beyond--episode-19-the-science-of-star-wars>
- ▶ <https://www.youtube.com/watch?v=xqIT8TRCknY&t=4s>
- ▶ The Star Wars franchise permeates modern pop culture. But does this amazing fictional universe hold water in the real one? Join host Abigail Bollenbach as she walks you through the science of Star Wars
- ▶ The Star Wars franchise permeates modern pop culture. But do the amazing scientific and technological aspects of this broad fictional universe hold water in the real one?
- ▶ From lightsabers to droids to holographic messages, Star Wars contains numerous devices and even characters that are vital to move the plot forward. But diving deep into these topics shows there's still much left for our modern-day scientists to do if we want to enjoy these gadgets in real life. What exactly are lightsaber blades composed of, and could we build such weapons today? How close do our best artificial intelligence programs and existing robots come to the droids R2-D2 and C-3PO? And could we really send each other holographic messages? Help us, Obi-Wan Kenobi!
- ▶ In this week's episode of Infinity & Beyond, host Abigail Bollenbach will walk you through the science of Star Wars. May the force be with you.



NASA'S OSIRIS-REX LEAVES ASTEROID BENNU, HEADS FOR HOME

- ▶ <https://skyandtelescope.org/astronomy-news/nasas-osiris-rex-leaves-asteroid-bennu-heads-home/>
- ▶ NASA's asteroid explorer has begun its long journey home with precious cargo onboard: samples of the asteroid Bennu.
- ▶ It has been worth the wait. After five years on mission, including more than two years spent exploring the 500-meter asteroid 101955 Bennu, NASA's Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer (OSIRIS-REX) burned its thrusters for seven minutes on Monday, May 10th. This burn set the spacecraft moving 1,000 kilometers per hour (600 mph) relative to the asteroid to start its 2.5-year journey home to Earth.
- ▶ Now, the spacecraft will orbit the Sun twice interior to the orbit of Venus, before making a flyby of the Earth on September 24, 2023. Then, the sample return capsule will separate from the spacecraft, for a parachute reentry over the Utah Test and Training Range in the Utah desert. This isn't without risk: in 2004, the Genesis sample return capsule slammed into the Utah desert floor when its drogue chute failed to open.

○ Nova

Caph

Cassiopeia







NOVA IN CASSIOPEIA BRIGHTENS SUDDENLY

- ▶ <https://skyandtelescope.org/astronomy-news/nova-in-cassiopeia-brightens-suddenly/>
- ▶ A star in the constellation Cassiopeia that flared into view during mid-March has erupted to naked-eye visibility. Catch it while you can!
- ▶ Novae are full of surprises. When discovered at the onset of the explosion, a nova can brighten from obscurity and become visible in binoculars in a matter of hours. Some plateau and then fade. Others fade and then temporarily re-brighten one or more times before returning to their former slumbers.
- ▶ Enter Nova Cassiopeiae 2021, formally named V1405 Cassiopeiae. Discovered at magnitude 9.6 by Japanese amateur Yuji Nakamura on March 18th, it rapidly brightened to around magnitude 7.5-8.0 magnitude, then remained fairly constant in brightness for the next four weeks at magnitude 8.0. In mid-April the nova began to slowly brighten again, ending the month at magnitude 7.5.
- ▶ The big surprise came on May 6-7, when V1405 Cas did a pole vault, shooting up almost two magnitudes to 5.7






LONG MARCH

TIANHE BOOSTER TO REENTER THIS WEEKEND

- ▶ <https://skyandtelescope.org/astronomy-blogs/astronomy-space-david-dickinson/tianhe-booster-to-reenter-this-weekend/>
- ▶ UPDATE:
- ▶ May 9, 2021: The U.S. Combined Space Operations Center's Space-Track, the U.S. Air Force's 18th Space Control Squadron, and China all report that the Long March 5B rocket core stage reentered the atmosphere on May 9th from 2:14 to 2:24 UT (May 8th, EDT) over the Arabian Peninsula, terminating in the Indian Ocean shortly after sunrise. Sightings came in over Twitter from Jordan, Saudi Arabia and Oman as the booster streaked through the pre- and post-dawn sky. Marco Langbroek has an excellent, in-depth report on the demise of the 23-ton booster, one of the largest reentries in decades

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NASA'S INGENUITY MARS HELICOPTER ENTERS NEW PHASE OF FLIGHT

- ▶ <https://skyandtelescope.org/astronomy-news/nasas-ingenuity-mars-helicopter-enters-new-phase-of-flight/>
- ▶ UPDATE:
- ▶ The fifth flight, too, was successful: a one-way trip 129 meters (423 feet) to the south of the Wright Brothers Field. Read details in NASA's press release.
- ▶ The Red Planet rotorcraft headed south in support of furthering research into the potential use of aerial scouts on Mars in the future.
- ▶ <https://www.jpl.nasa.gov/news/nasas-ingenuity-mars-helicopter-completes-first-one-way-trip>
- ▶ NASA's Ingenuity Mars Helicopter completed its fifth flight on the Red Planet today with its first one-way journey from Wright Brothers Field to an airfield 423 feet (129 meters) to the south. After arrival above its new airfield, Ingenuity climbed to an altitude record of 33 feet (10 meters) and captured high-resolution color images of its new neighborhood before touching down.
- ▶ The flight represents the rotorcraft's transition to its new operations demonstration phase. This phase will focus on investigating what kind of capabilities a rotorcraft operating from Mars can provide. Examples include scouting, aerial observations of areas not accessible by a rover, and detailed stereo imaging from atmospheric altitudes. These operations and the lessons learned from them could significantly benefit future aerial exploration of Mars and other worlds.





Perseverance rover is ready to unlock the history of Mars

- ▶ <https://www.cnn.com/2021/05/12/world/perseverance-rover-mars-rocks-scn/index.html>
- ▶ For the past month, the Perseverance rover has spent much of its time documenting the flights of the Ingenuity helicopter on Mars. In between those events, the rover has also been taking in the local view and spied a multitude of intriguing rocks.
- ▶ Now, Perseverance is gearing up to conduct its primary mission: studying Jezero Crater and searching for signs of ancient life on Mars.
- ▶ About 3.9 billion years ago, the crater was filled with a lake that was fed by a river delta. Now, rocks strewn across the dry lake bed could help scientists reconstruct the history of this area on Mars and determine whether life ever existed there.
- ▶ Information locked inside the rocks could reveal more about when the lake formed and dried up, as well as at what point sediment from the delta began piling up. Creating a timeline that corresponds with the rocks will help researchers date rock samples that the rover collects over the next two years. These samples, which will be returned to Earth by future missions, could contain microfossils preserving the presence of ancient life.



String of satellites baffles residents, bugs astronomers

- ▶ <https://www.ctvnews.ca/sci-tech/string-of-satellites-baffles-residents-bugs-astronomers-1.5419957>
- ▶ A string of lights that lobbed across the night sky in parts of the U.S. on Wednesday, Thursday and Friday had some people wondering if a fleet of UFOs was coming, but it had others-- mostly amateur stargazers and professional astronomers-- lamenting the industrialization of space.
- ▶ The train of lights was actually a series of relatively low-flying satellites launched by Elon Musk's SpaceX as part of its Starlink internet service earlier this week. Callers swamped TV stations from Texas to Wisconsin reporting the lights and musing about UFOs.
- ▶ An email to a spokesman for SpaceX was not returned Saturday, but astronomy experts said the number of lights in quick succession and their distance from Earth made them easily identifiable as Starlink satellites for those who are used to seeing them.



James Webb Space Telescope launch delay “likely,” says government report

- ▶ <https://astronomy.com/news/2021/05/james-webb-space-telescope-launch-delay-likely-says-government-report>
- ▶ For once, the delay isn't due to a problem with the telescope — but with the Ariane 5 rocket it's scheduled to fly on.
- ▶ NASA officials have acknowledged that the scheduled October launch of the James Webb Space Telescope (JWST) could be pushed back yet again, according to a report from the Government Accountability Office (GAO) released May 13. But this time, the issue isn't with the telescope.
- ▶ Instead, it's with the usually reliable, European-produced Ariane 5 rocket, which is slated to carry JWST aloft on October 31 from Kourou, French Guiana. “According to NASA project officials, the JWST launch date will likely be delayed beyond October 2021 due to anomalies discovered in the JWST launch vehicle,” says the report.
- ▶ The issue lies with the Ariane 5's fairing, the nose cone that protects its payload as it accelerates up through the atmosphere. Once the vehicle reaches space, the fairing separates from the rocket in two pieces and falls away.
- ▶ But in two recent launches, the rocket experienced “unexpected vehicle accelerations” during fairing separation, according to the GAO report. As a result, Ariane 5 launches have been postponed while the European Space Agency and Arianespace, the rocket's manufacturer, investigate the issue.