THE PLANETARY SOCIETY

THE PLANETARY REPORT

DECEMBER SOLSTICE 2023

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THE YEAR IN PICTURES

THE IMAGES THAT DEFINED A YEAR OF SCIENCE AND EXPLORATION

SEEN AND UNSEEN

Gazing with wonder, sometimes at things even our human eye can't see

by Bill Nye

AS HAS BECOME our tradition, this issue of The Planetary Report looks back on the year in pictures. As I hope you expect, 2023's images are fantastic and serve to recap this year's events and achievements in space exploration. They're also a wonderful way to invite people to share the joy of discovery. Whether a person is a space professional, a night sky enthusiast, or new to planetary science, everyone can appreciate these pictures. They're beautiful.

Along with images captured with cameras that mimic our human vision, there are astonishing things out there that we can't see without a little tinkering. Many of the images in this issue were sent down from the James Webb Space Telescope, which "sees" wavelengths in the infrared. These images are exciting and vital for our understanding of the Cosmos. Then there are those exoplanets that we know are there only because of how they momentarily obscure the light of their host stars beyond. And how about those cosmic phenomena that we can't see at all because we aren't sure that they're even there, though we hope and expect that they are? What about our search for evidence of extraterrestrial life? Will we even know it if we see it? I think about this every (Earth) day.

BILL NYE *is chief executive officer of The Planetary Society.*

As you'll read later in this issue, The Planetary Society has been working year-round to advance the search for new insights about space, advocating to make further discoveries in our Solar System and beyond so that humanity might see more than ever before — more spectacular images, leading to more astonishing discoveries and more insights about what it means to exist in this Universe.

Your membership makes this work possible, and I thank you again for your support. I hope that this year-end roundup of stunning space images reminds you just how far exploration has advanced in the last 12 (Earth) months. This progress in our ability to see further into the Cosmos wouldn't happen without people like you believing that it's all worth seeing.

Onward,

Bill Nye

ON THE COVER: The United Arab Emirates Space Agency's Hope Mars mission captured this view of Deimos over Mars during a flyby on March 10, 2023. These new observations suggest that Mars' moons may have a planetary origin rather than being captured asteroids. *Image: Emirates Mars Mission* ❋ *The Planetary Report (ISSN 0736-3680) is published quarterly at the editorial offices of The Planetary Society, 60 South Los Robles Avenue, Pasadena, CA 91101-2016, 626-793-5100. It is available to members of The Planetary Society. Annual dues are $50 (U.S. dollars) for members in the United States as well as in Canada and other countries. Printed in the USA. Third-class postage at Pasadena, California, and at an additional mailing office. Canada Post Agreement Number 87424.* ❋ *Viewpoints expressed in articles and editorials are those of the authors and do not necessarily represent positions of The Planetary Society, its officers, or its advisers.*

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A SpaceX Falcon Heavy rocket with the Psyche spacecraft on board was launched from Launch Complex 39A on Oct. 13, 2023, at NASA's Kennedy Space Center in Florida. NASA's Psyche spacecraft will travel to a metal-rich asteroid with the same name, which is orbiting the Sun between Mars and Jupiter, to study its composition. The spacecraft also carries the agency's Deep Space Optical Communications technology demonstration, which will test laser communications beyond the Moon.

NASA/AUBREY GEMIGNANI

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ABOVE *JWST captured this spectral view of star-forming region NGC 346 in midinfrared light. The blue tendrils represent silicates and sooty chemical molecules, while the red glow represents warm dust heated by the brightest and most massive stars at the heart of the region. This area is also abundant with baby stars still embedded in their dusty cocoons.*

NASA/ESA/CSA/STScI/NOLAN HABEL (NASA-JPL)/IMAGE PROCESSING: PATRICK KAVANAGH (MAYNOOTH UNIVERSITY)

LOOKING FOR LONG WAVES

Why JWST observes in the infrared

by Kate Howells

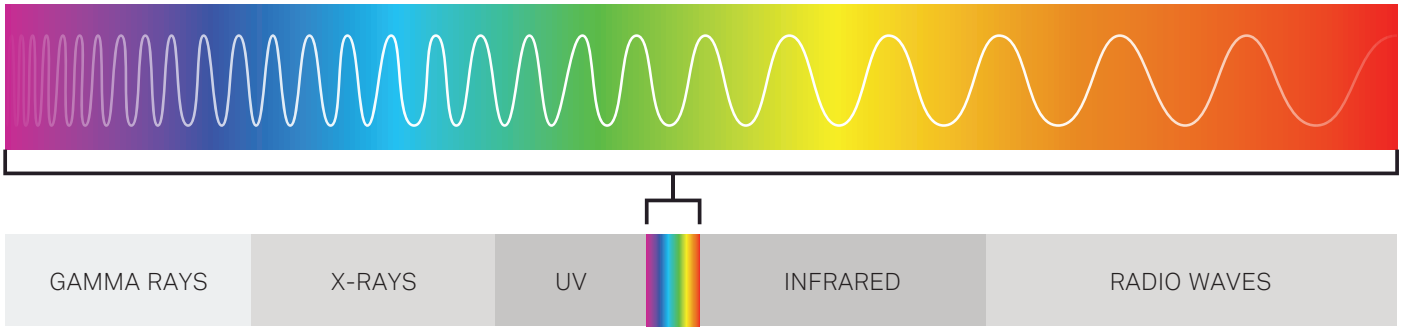
OVER THE PAST YEAR, the James Webb Space Telescope (JWST) has graced humanity with some truly stunning images. That each of these photos also teaches us something new about the Cosmos isn't just the icing on the cake — it's the whole reason for baking the cake.

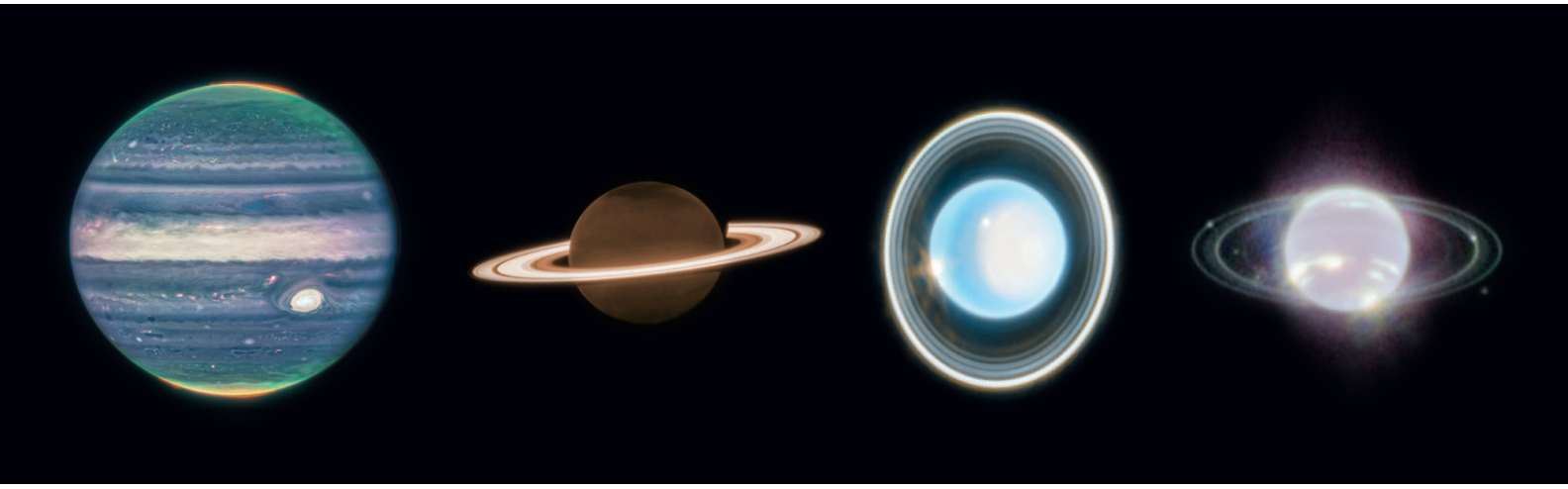
JWST's output often comes in the form of images because it is a space telescope, which means that it's designed to collect light coming from objects in space. Other kinds of spacecraft might study space in other ways, such as by measuring magnetic fields or tracking the velocity of charged particles. It's not unlike how animals use various senses to figure out what's happening in their environment. In this analogy, JWST is like the sense of sight.

Unlike humans, though, JWST doesn't see things in what we call the visible spectrum. Our eyes evolved to see the wavelengths of light that are most useful for our perception of the world around us. This represents just a portion of the entire spectrum; we see electromagnetic radiation with wavelengths ranging from about 400 to 700 nanometers, but the entire electromagnetic spectrum includes wavelengths much shorter and much longer than that. JWST looks at light in the infrared part of the spectrum. These wavelengths are shorter than radio waves but longer than those we can see with our eyes, with the near-infrared wavelengths just beyond our perception.

This particular space telescope focuses on the infrared for a few scientific reasons. One has to do with JWST's goals of studying extremely distant objects. As the Universe expands, the light from distant objects gets stretched, causing their visible and ultraviolet light to shift into the infrared part of the spectrum. By observing in these wavelengths (both with imaging and spectroscopic instruments), JWST can study the distant and early Cosmos, seeing things like the formation of the first galaxies, stars, and planetary systems.

THE VISIBLE SPECTRUM





Another reason has to do with how different wavelengths of light get blocked or absorbed by matter. Infrared light can penetrate dust and gas better than visible or ultraviolet light, meaning that JWST can peer through clouds to witness phenomena like the birth of stars and to see what's happening under thick planetary atmospheres.

When it comes to studying planetary bodies, infrared imaging provides some other advantages as well. Using JWST's unparalleled sensitivity and resolution, these images capture reflected sunlight in select infrared bands, emphasizing contrasts often hidden in the visible spectrum. For instance, while Uranus might appear predominantly blue in visible light, infrared reveals intricate details due to differences between ice clouds and the methane-rich atmosphere. These insights allow for a deeper understanding of atmospheric compositions and evolving planetary weather patterns.

JWST also distinguishes itself from other space telescopes through sheer sensitivity. Its instruments are more sophisticated than anything else we've sent into space and can pick up astonishingly faint light. That's why JWST images of Uranus and Neptune show the ice giants' rings in such glory; the rocks and dust that make up those rings don't reflect much sunlight, making them very difficult to see no matter the spectrum in which you're observing.

In so many ways, this magnificent product of human ingenuity is expanding our perception beyond what we can see with our own eyes. With new images and discoveries being announced all the time, JWST is still very much just beginning its mission to uncover the secrets that the Cosmos has been hiding from view.

KATE HOWELLS *is the public education specialist for The Planetary Society.*

TOP *The electromagnetic spectrum.*
GETTY IMAGES/LOREN A. ROBERTS

ABOVE *From left: Jupiter, Saturn, Uranus, and Neptune imaged in the near-infrared by JWST.*
NASA/ESA/CSA/STScI

THE YEAR'S BEST ASTROPHOTOGRAPHY FROM OUR MEMBERS

PLANETARY SOCIETY MEMBERS are a varied bunch, with all kinds of skills, interests, and backgrounds. What they all share is a love of space. For some of our members, this love is expressed through astrophotography. Whether using advanced equipment or simply their smartphones, these photos from our members capture the majesty of the Cosmos and the beauty of the night sky for all of us to enjoy.

If you want to learn more about these photos and see the other submissions our talented members made to the year-end astrophotography contest, visit the "Look Up!" space in our online member community at **community.planetary.org**.

ABOVE *Planetary Society member David Pinsky snapped this beautiful photo of the waxing gibbous Moon in August using a telescope and a Canon 6D Mark II camera.*

ABOVE RIGHT *Sometimes, all you need is an iPhone on the right kind of starry night. Sandra Koerte, who is both a member and employee of The Planetary Society, captured this view of the sky above the palm trees of Kauai, Hawaii.*

BELOW RIGHT *Planetary Society member Tom Clemo witnessed a rare celestial treat when the northern lights reached down into south-central Montana this summer. This picture was taken directly over the roof of his cottage using a single exposure of about 25 seconds.*

Planetary Society member Christopher Becke captured a sequence of images of the International Space Station passing in front of the Moon and combined them into this breathtaking image.

This painterly image is a photo of galaxy M81 taken by Planetary Society member John Kincinas.

This astonishing photo comes from Planetary Society member John Richards. It shows the Elephant's Trunk nebula in the Hubble palette, captured over several evenings in September 2023 from his backyard in Warner Robins, Georgia. This final image represents about 11 hours of integration using narrowband filters.

Looking back at 2023 through the eyes of spacecraft

by Jason Davis

SPACE IS VAST. It often takes planetary exploration missions a long time to get where they're going. As our robotic ambassadors cruise through the Solar System and beyond, sometimes the only thing to do is sit back and enjoy the journey.

BepiColombo, which launched in 2018, is still journeying to Mercury. It performed its third flyby of our innermost planet this year and will pass it three more times before entering orbit in 2025.

Back at Earth, OSIRIS-REx completed a seven-year, 7.1-billion-kilometer (4.4-billion-mile) trek to asteroid Bennu and back in September, delivering a sample that may teach us about our very origins. The spacecraft is now on its way to visit Apophis, a near-Earth asteroid that will pass unnervingly close to Earth in 2029.

Psyche blasted off on a mission to visit a metal asteroid of the same name located between Mars and Jupiter. The spacecraft won't arrive until 2029 after a journey of 4 billion kilometers (2.5 billion miles).

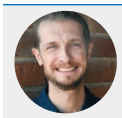
Juice, the Jupiter Icy Moons Explorer, launched on a mission to visit Europa, Ganymede, and Callisto. The spacecraft will perform three Earth flybys, one Venus flyby, and one Mars flyby before reaching Jupiter in 2031.

Humans are journeying too. This year, there were briefly 17 people aboard the International Space Station and Tiangong space station combined, setting a new record for the number of people in low-Earth orbit at the same time.

The Moon continues to be a popular destination. The Chandrayaan-3 mission successfully placed a lander and rover in the Moon's south polar region, and as The Planetary Report went to press, two NASA-sponsored commercial landers were scheduled to launch by the end of the year.

At Mars, the Perseverance rover and its companion helicopter Ingenuity continue their journey through Jezero Crater. Perseverance is collecting samples that will one day be brought back to Earth. Farther out, Juno is using Jupiter's gravity to bring the spacecraft's orbit closer and closer to the volcanic moon Io. On Dec. 30, 2023, and Feb. 3, 2024, Juno will fly past Io at a distance of just 1,500 kilometers (930 miles).

Sometimes, a destination is too distant for us to visit at the moment. Fortunately, we can still journey to far-off worlds with space telescopes like JWST, which delivered some stunning new views of the outer planets. Meanwhile, in interstellar space, Voyager 1 and 2 continued their journeys into infinity, collecting data on interstellar space.



JASON DAVIS *is the senior editor for The Planetary Society.*

NASA's Perseverance Mars rover took a selfie with one of 10 tubes the rover deposited at the sample depot it created in an area within Jezero Crater nicknamed Three Forks. The images used to create this mosaic were captured using the rover's robotic arm on Jan. 20, 2023.

NASA/JPL-CALTECH/MSSS

The Year in Pictures

ABOVE LEFT *The ESA/JAXA BepiColombo mission captured a series of images from its June 2023 Mercury flyby. In this one, the spacecraft appears to give a goodbye "hug" to Mercury. Due to its proximity to Mercury, the team fired up some of the instruments on board to sense magnetic, plasma, and particle environments around the planet.*
ESA/BEPICOLOMBO/MTM

ABOVE RIGHT *The Indian Space Research Organization's Pragyan rover captured this image of the Chandrayaan-3 Vikram lander on the Moon's surface on Aug. 30, 2023.*
ISRO

BELOW *NASA's Juno spacecraft captured this image of Jupiter and Io on May 16, 2023. The spacecraft flew by Io at a distance of 35,500 kilometers (22,060 miles), marking the mission's closest Io flyby to date.*
NASA/JPL-CALTECH/SWRI/MSSS/KEVIN M. GILL

TOP *JWST's NIRCam instrument captured this wide view of the Uranian system that features the planet Uranus as well as six of its 27 known moons.*

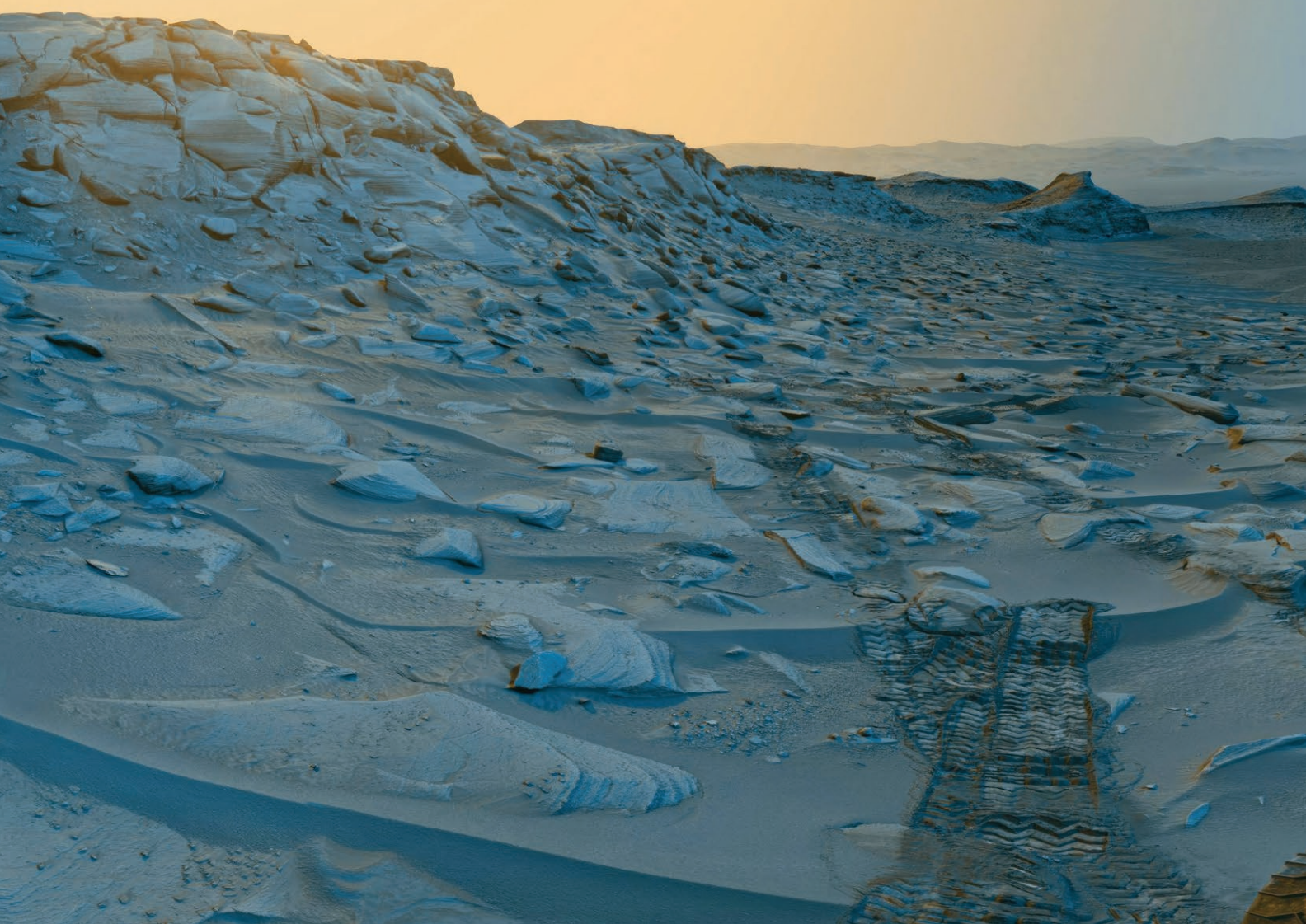
NASA/ESA/CSA/STScI/J. DEPASQUALE (STScI)

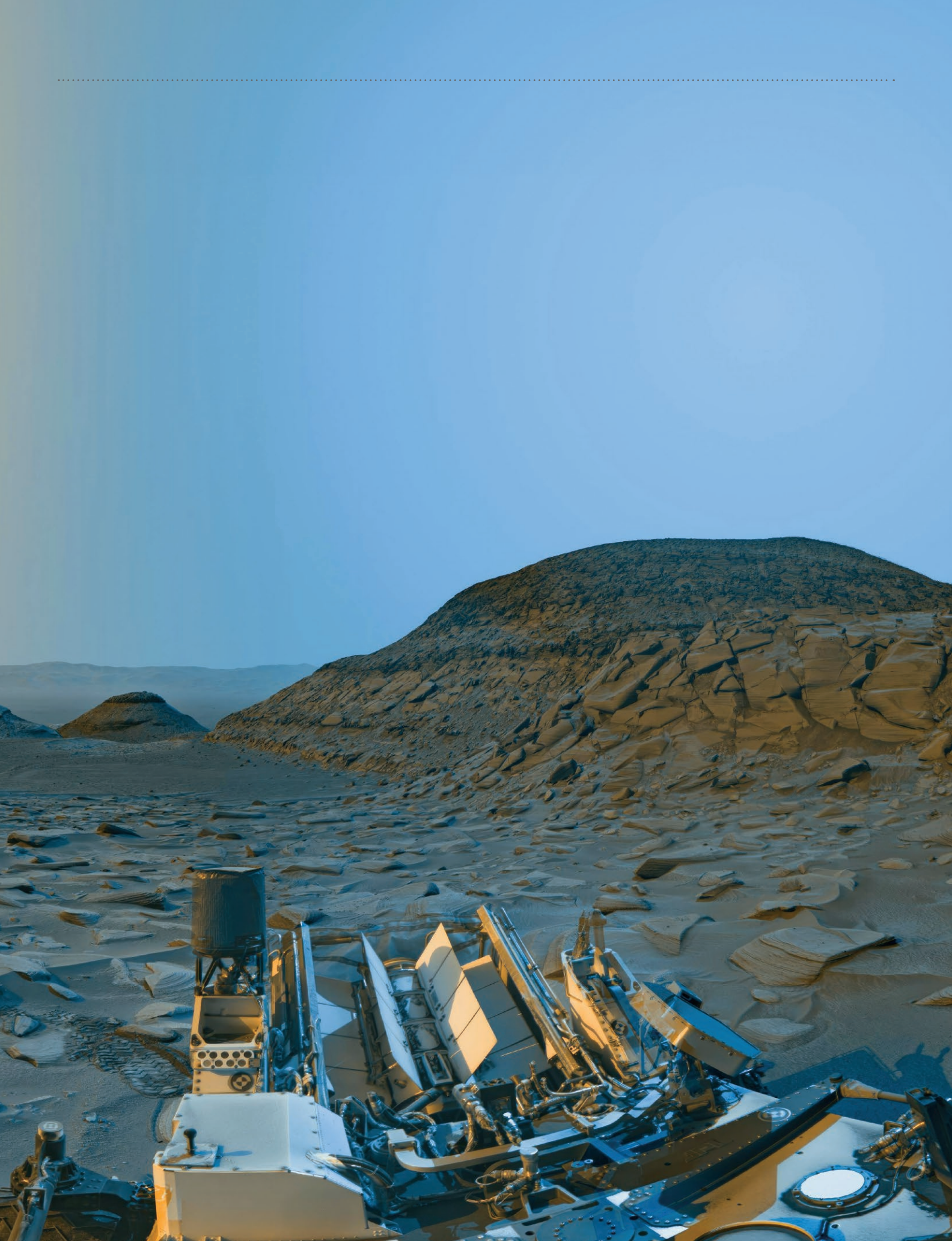
BOTTOM *JWST captured this view of Saturn using its Near Infrared Camera (NIRCam) instrument. The view includes Saturn's moons Dione, Enceladus, and Tethys. The monochrome source image was mapped with an orange hue.*

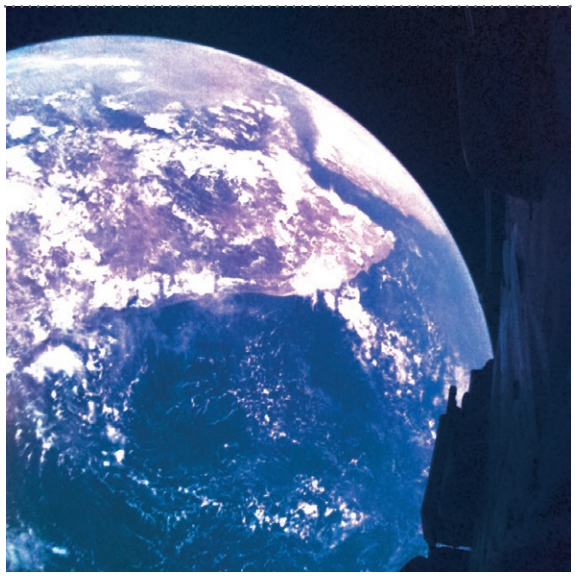
NASA/ESA/CSA/STScI/M. TISCARENO (SETI INSTITUTE)/M. HEDMAN (UNIVERSITY OF IDAHO)/M. EL MOUTAMID (CORNELL UNIVERSITY)/ M. SHOWALTER (SETI INSTITUTE)/L. FLETCHER (UNIVERSITY OF LEICESTER)/ H. HAMMEL (AURA)/IMAGE PROCESSING BY J. DEPASQUALE (STScI)

NASA's Curiosity Mars rover used its black-and-white navigation cameras to capture panoramas at two times of day on April 8, 2023. The panoramas were captured at 9:20 a.m. and 3:40 p.m. local Mars time and were then merged together. Color was added for an artistic interpretation of the scene, with blue representing the morning panorama and yellow representing the afternoon one. NASA released the resulting image on June 13, 2023.

NASA/JPL-CALTECH



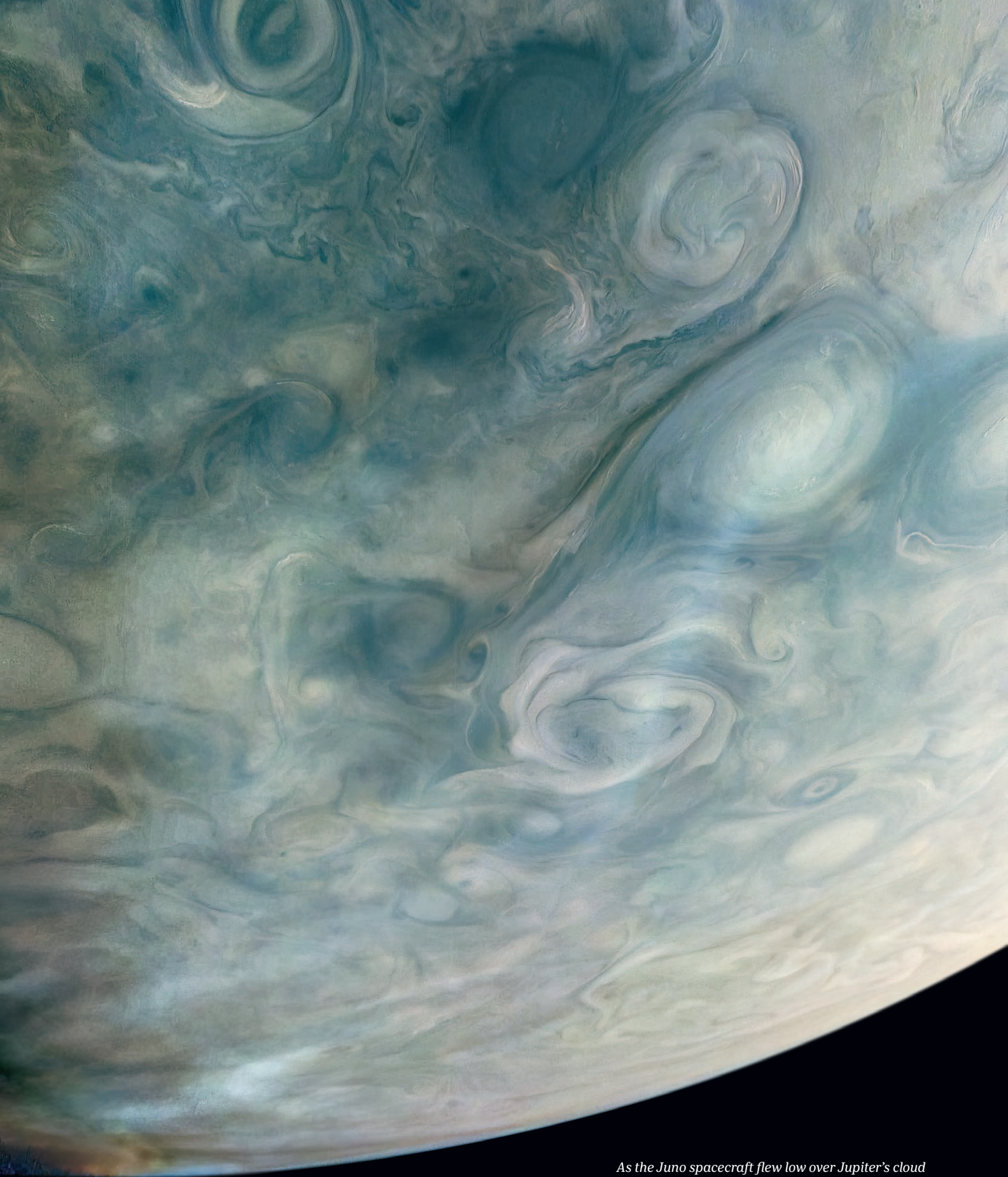




BELOW *NASA astronaut Stephen Bowen is pictured during a spacewalk to install and deploy a roll-out solar array on the International Space Station. Bowen is attached to the Canadarm2 robotic arm during the removal of the new array from a pallet before installation.*
NASA

RIGHT *Juice, ESA's Jupiter Icy Moons Explorer, captured this selfie roughly a half hour after liftoff on April 14, 2023. The image was taken by a monitoring camera and shows the coastline around the Gulf of Aden. This field of view will eventually be filled with deployed antennas and part of one of the solar arrays.*
ESA/JUICE/JMC

OPPOSITE PAGE *The sample return capsule from NASA's OSIRIS-REx mission is seen shortly after touching down at the Department of Defense's Utah Test and Training Range on Sept. 22, 2023. The sample was collected from asteroid Bennu in October 2020.*
NASA/KEEGAN BARBER



As the Juno spacecraft flew low over Jupiter's cloud tops in March 2023, its JunoCam instrument captured this look at bands of high-altitude haze forming above cyclones in an area known as Jet N7.

NASA/JPL-CALTECH/SwRI/MSSS/IMAGE PROCESSING BY BJÖRN JÓNSSON

SpaceX's Starship vehicle sits on the launch pad in January 2023 prior to its first integrated test flight.
SPACEX

TOP RIGHT *Mike (left) and Larry (right) Puzio attending the U.S. Astronaut Hall of Fame Induction in May 2023.*
MIKE PUZIO

TOP LEFT *Planetary Society members at the 2023 Day of Action.*
THE PLANETARY SOCIETY

LOWER LEFT *Planetary Society members on Capitol Hill during the 2023 Day of Action.*
THE PLANETARY SOCIETY

SPACE ADVOCACY BACK IN ACTION

In September, The Planetary Society's Day of Action returned to its usual in-person format after having gone virtual throughout the pandemic. More than 100 Planetary Society members took part, traveling to Washington, D.C. to meet with their representatives in Congress and speak about the importance of investing in NASA's space exploration programs. This year, we focused on the VERITAS mission to Venus, Mars Sample Return, and NEO Surveyor.

BENNU IS HERE!

OSIRIS-REx completed its mission in September, bringing samples from the asteroid Bennu back to Earth for labs to study. The Planetary Society has been deeply involved in this mission since its very beginnings, including running the public contest to name Bennu.

Mike Puzio, who was 9 years old at the time he won the contest in 2013, explained why he chose that name: "Bennu was a large heron and the living symbol of Osiris. The winged OSIRIS-REx and its heronlike TAGSAM also evoke attributes of Bennu, as does the egg shape of the asteroid itself. Bennu means 'the ascending one' and 'to shine' and suits the near-Earth object that will shine in our skies in 2023 at the return of OSIRIS-REx." Mike, now 19 and pursuing an engineering degree at North Carolina State University, helped the U.S. Postal Service unveil a new OSIRIS-REx stamp as part of the sample drop celebrations this September. Mike's connection to Bennu and OSIRIS-REx is a great representation of the way The Planetary Society works to help people find their place in space. Read his story at **planetary.org/mikepuzio**.

FAREWELL TO A FRIEND

A special send-off from Planetary Society co-founder Louis Friedman

The Planetary Society's very good friend and invaluable colleague, Jim Burke, died this year at the age of 97. Jim was more than a polymath. He not only knew a lot about a lot but he did a lot with a lot: physics, math, biology, engineering and then sailing, piloting, inventing, mentoring, and so much more.

Jim began volunteering for The Planetary Society while he was still working at the Jet Propulsion Laboratory, where he was the first manager of America's first planetary mission: the Ranger spacecraft that went to the Moon. He helped us start The Planetary Report as our technical editor, working with our founding editor Charlene Anderson to create not just a beautiful magazine but a scientifically accurate one. For our pioneering work on a Mars Balloon, he invented the "snake," a guiderope that served as ballast and was designed to carry instruments to study the Martian surface. With Society co-founder Bruce Murray, students at Caltech, and other colleagues, he developed the idea. He then helped the Society organize a number of international tests for the system — our first major project. Eventually, the snake made it to a spaceflight program — not at NASA but with the French and Russian space agencies. Jim's project work continued as he became a principal in our Mars rover test program, and that success led to rovers being used by NASA to explore the red planet. Longtime members may remember pictures of Jim in Death Valley during our Mars rover tests.

Jim Burke, 1925-2023
THE INTERNATIONAL SPACE UNIVERSITY

After retiring from JPL, he went on to a third career mentoring and teaching at the International Space University. Scores of students now working in industry and the commercial sector are pursuing Jim's dream of returning to the Moon to explore. He was always a lunar advocate, pursuing the possibilities of what we could learn there and how to utilize what we learned.

There was much more to Jim's remarkable life than merely the three careers mentioned here — JPL, TPS, ISU — but they are the ones I shared with him. He was a good friend to me and to countless others. And he was the most positive man I ever met — he never said it couldn't be done.

Louis Friedman,
Co-Founder and Executive Director Emeritus
The Planetary Society

International OBSERVE the MOON Night

CELEBRATING SPACE WITH THE WORLD

As we do every year, The Planetary Society partnered with World Space Week and International Observe the Moon Night in October to support activities that engage people around the planet in the celebration of all things space. From virtual and in-person events to videos and educational content, these two international events help share the wonders of the Cosmos with new people and give existing space fans a great way to fuel their passion.

WANT TO HEAR MORE ABOUT YOUR IMPACT AS A MEMBER?

Check out our annual impact report on the web, available now at **planetary.org/2023impact**.

GIVE THE GIFT OF SPACE

Looking for some last-minute gift ideas for the space enthusiast in your life? We've got you covered with our annual guide to space-themed gifts. See this year's picks at **planetary.org/2023giftguide**.

A total solar eclipse is seen in this image captured on Aug. 21, 2017, from Madras, Oregon. The wispy white strands seen behind the Moon are the corona, the Sun's outer atmosphere.
NASA/AUBREY GEMIGNANI

Eclipse 2024

The total solar eclipse on April 8, 2024, begins in the Pacific Ocean and crosses through Mexico, the United States, and Canada before ending in the Atlantic Ocean.
THE ECLIPSE COMPANY

GET READY FOR THE GREAT NORTH AMERICAN ECLIPSE!

Total solar eclipses are fairly rare, and it's even more uncommon for one to pass over huge, populated areas. That's why we're extraordinarily excited about the total solar eclipse that will pass over large portions of North America on April 8, 2024. An estimated 635 million people will be able to watch the Moon obstruct at least part of the Sun, including a rarer few who will see the Moon entirely block the Sun for a few minutes.

ECLIPSE-O-RAMA 2024: AN ECLIPSE FESTIVAL FOR SPACE ENTHUSIASTS

The Planetary Society is developing a once-in-a-lifetime opportunity to view the great North American total solar eclipse of 2024 with your fellow Planetary Society members. Join CEO Bill Nye and others in the Planetary Society family in Fredericksburg, Texas — one of the best viewing locations in the heart of the Texas Hill Country.

It will be two days of science, art, music, and space! Our family-friendly festival will feature special talks on astronomy and planetary science, exhibitor and vendor booths, star parties, music, food, and an unparalleled view of the eclipse.

The last total eclipse in North America was in 2017, and the next one after this one won't happen for another two decades — in 2045! That's why The Planetary Society is excited to offer a very special opportunity to watch this eclipse in person with your fellow members.

A solar eclipse is a remarkable celestial event, blending scientific wonder with cultural significance and an undeniable sense of magic. There's no better place to watch the eclipse than with all your favorite space friends. Come join us! Go to **planetary.org/eclipse** to learn more.

THE ECLIPSE EXPLORER JUNIOR RANGER BOOKLET

The Planetary Society is excited to once again collaborate with the U.S. National Park Service to provide an engaging and educational eclipse experience for children and families. The Eclipse Explorer Junior Ranger booklet features interactive activities, guidance from Planetary Society CEO Bill Nye, and more! Kids who complete the booklet will receive a badge and become a certified junior ranger. Booklets are available in participating parks.

INTERACTIVE ECLIPSE MAP

We've teamed up with The Eclipse Company to bring you an interactive map to help you find the best viewing spot for the total solar eclipse on April 8, 2024. Use the map to check cloud cover, see how long the eclipse will last in your location, and assess light pollution levels. Being prepared enhances the experience.

We've prepared lots of eclipse resources for you! Check them out at **planetary.org/eclipse**.

- WHAT IS A SOLAR ECLIPSE? YOUR QUESTIONS ANSWERED
- A GUIDE TO ECLIPSE VOCABULARY
- ARE YOUR SOLAR ECLIPSE GLASSES SAFE?
- WHY IT'S WORTH GETTING INTO THE PATH OF TOTALITY
- A CHECKLIST FOR WHAT TO EXPECT DURING THE 2024 TOTAL SOLAR ECLIPSE
- A PRACTICAL GUIDE TO THE 2024 TOTAL SOLAR ECLIPSE
- WHY IT'S WORTH EXPERIENCING A PARTIAL SOLAR ECLIPSE

CELEBRATE SPACE IN YOUR MEMBER COMMUNITY

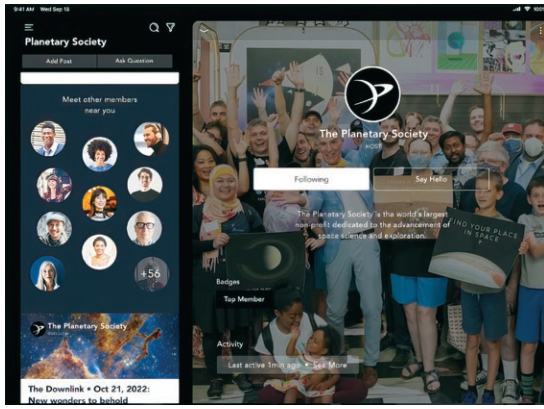
More than 8,000 Planetary Society members have already joined our online member community, which launched earlier this year. Join them to learn more about the Cosmos and humanity's efforts to understand it, hear from space experts at the forefront of exploration, watch launches and other major events, share your artwork and astrophotography, and just have fun! Go to **community.planetary.org** to log in.

MAKE A YEAR-END DONATION TO THE SOCIETY

A year-end donation to The Planetary Society's Planetary Fund is a powerful way to make an impact on our shared mission to advance space science and exploration. **Make your gift today at planetary.org/planetaryfund**.

For U.S. tax purposes, gifts must be received on or before the last day of the year. Here are some common methods of making a gift and their associated deadlines.

- Online credit card gifts: transaction completed by 11:59 p.m. EST (8:59 p.m. PST), Dec. 31, 2023.
- Checks sent via U.S. mail: postmarked on or before Dec. 31, 2023.
- Checks sent via third-party shipping (such as FedEx or UPS): delivered on or before Dec. 31, 2023.
- Credit card gifts via U.S. mail: received and processed on or before Dec. 31, 2023.
- Stock transfer: broker-to-broker instructions issued in time for completed transfer on or before Dec. 31, 2023.



CALENDAR OF EVENTS

JANUARY

3–4
Quadrantids meteor shower peaks

FEBRUARY

1
20-year anniversary of Columbia Space Shuttle disaster

11
International Day of Women and Girls in Science

MARCH

19
Spring equinox

25
Lunar eclipse (Australia, East Asia, Africa, Europe)

INITIATIVES

Beyond the Horizon embodies three calls to action for the Society and its members.

Discover

Together, we will:

- Explore Worlds — increase discoveries about the worlds of our Solar System and beyond
- Find Life — elevate the search for life as a space exploration priority
- Defend Earth — decrease the risk of Earth being hit by an asteroid or comet

Connect

Together, we will:

- Build a larger and more diverse, international, effective, and empowered community
- Grow and strengthen our community
- Inspire public knowledge and appreciation
- Increase international participation

Advance

Together, we will:

- Increase our capacity
- Build our reputation
- Improve our effectiveness

BEYOND THE HORIZON: THE PLANETARY SOCIETY CAMPAIGN TO CREATE SPACE FOR EVERYONE

THE PLANETARY SOCIETY'S leadership is proud to announce that we're embarking on the final public phase of our most ambitious comprehensive fundraising campaign ever. The goal for the effort — called **Beyond the Horizon: Creating Space for Everyone** — is to raise $40 million over five years to explore worlds, search for life, defend Earth, and grow and strengthen the Society. With the help of our members and donors like you, through this campaign we seek to connect everyone with the beauty, adventure, and promise of space exploration.

In 2019, under the leadership of Bill Nye and our board of directors, the Society adopted a visionary five-year strategic framework called **Space for Everyone**. This framework embodies our commitment to you, the explorer. In it, we outlined our priorities for organizational decision-making through 2024 and beyond. As our plan has unfolded, we have added more opportunities to participate in the great adventure of space — programs you will recognize, like the quickly growing Planetary Academy for kids and our new wildly successful online member community.

Supported by a generous $9 million lead gift from fellow member Taner Halıcıoğlu, the Society has been able to achieve growth not seen since our founding decade. If you were with us for our Planetest '21 virtual fundraising gala, you will remember that's where we first shared the news of Taner's amazing commitment. And now, as of December 2023, we are excited to announce that we have raised an astounding $32 million toward our $40 million goal! With a deadline of Dec. 31, 2024, we are now poised — with your help — to complete and even exceed our campaign goal.

Day by day, we reach more and more of the world's citizens with our message that space is for everyone. We celebrate Taner's momentous gift, but it will not be any one individual who makes these things happen. It will be a society of people — members like you — who believe that space exploration is a worthy use of our intellect and treasure. By harnessing our collective passion, we can change the course of history. With a transformative goal of $40 million, the Beyond the Horizon campaign will grow and strengthen the Society and fuel our efforts to explore worlds, search for life, and defend Earth. And with your support, we will help everyone come to know the Cosmos and our place within it.

This spring, the Society will launch a special appeal to members for support of the **Beyond the Horizon** campaign. If you have any questions, please reach out to Chief Development Officer Richard Chute at richard.chute@planetary.org.

Richard Chute,
Chief Development Officer

LEFT *The Nightingale site on asteroid Bennu was chosen as the sample collection site. It is located on Bennu's Northern Hemisphere. Other sites considered were located on Bennu's equatorial region and Southern Hemisphere.*
NASA/GODDARD/UNIVERSITY OF ARIZONA

IN THE SKY

Super-bright Venus is in the pre-dawn east, dropping lower to the horizon as the weeks pass. Reddish Mars is very low in the pre-dawn east in February, getting higher in March. Venus and the much dimmer Mars are less than 1 degree apart Feb. 21-23 but may be hard to view, being very low to the eastern horizon. Very bright Jupiter is high in the evening sky, moving to the west as the weeks pass. Yellowish Saturn is in the early evening west dropping toward the horizon as days pass, becoming hard to see by February. Mercury is low in the pre-dawn east below Venus in mid-January. Mercury is low in the evening twilight west below Jupiter in late March. The hard-to-pronounce (for me at least) Quadrantids meteor shower peaks the night of Jan. 3/4. The Quadrantids can be an above-average shower near its peak, with 20 meteors per hour from a dark site. A third-quarter Moon will rise around midnight and wash out some of the dimmer meteors this year. For more night sky tips, you can always check out **planetary.org/night-sky**.

RANDOM SPACE FACT

Scale model: If the Sun was in New York City and Earth in Philadelphia, then Neptune would be in Los Angeles.

TRIVIA CONTEST

Our June solstice contest winner is Jim Secosky of Loveland, Colorado, USA. Congratulations! The question was: ***On the asteroid Bennu, what were the names the OSIRIS-REx team assigned to the final four sampling sites they considered before choosing one of them to sample?*** The answer: ***Nightingale, Osprey, Sandpiper, and Kingfisher. They chose Nightingale to sample.***

Try to win a copy of the new book "Casting Shadows: Solar and Lunar Eclipses with The Planetary Society" by Bruce Betts and a Planetary Radio T-shirt by answering this question:
What did NASA name the Mars helicopter Ingenuity's first takeoff and landing airfield on Mars?

Email your answer to planetaryreport@planetary.org or mail your answer to The Planetary Report, 60 S. Los Robles Ave., Pasadena, CA 91101. Make sure you include the answer and your name, mailing address, and email address (if you have one). By entering this contest, you are authorizing The Planetary Report to publish your name and hometown. Submissions must be received by March 1, 2024. One entry per person. The winner will be chosen in a random drawing from among all the correct entries received.

IGUAZU FALLS IN THE ARGENTINIAN NATIONAL PARK

***Please contact Terri or Taunya at Betchart Expeditions for brochures and updated information on COVID and travel. Call 1-800-252-4910 or go to* betchartexpeditions.com.**

We invite you to join other members of The Planetary Society to discover the world on Betchart Adventures!

ALASKA AURORA BOREALIS
MARCH 7-13, 2024
FEBRUARY 27 - MARCH 25, 2025
Come see the Greatest Light Show on Earth! Explore the Kenai, take the train to Fairbanks, and delight in the sled dogs, ice festival, and aurora in the night sky!

ARGENTINA ANNULAR SOLAR ECLIPSE
SEPTEMBER 28 - OCTOBER 7, 2024
Discover the magnificence of Argentina from Buenos Aires to thundering Iguazu Falls including the "Ring of Fire" Eclipse in historic coastal San Julian.

EASTER ISLAND ANNULAR SOLAR ECLIPSE
SEPTEMBER 27 - OCTOBER 5, 2024
See the "Ring of Fire" amidst the majestic statues on Easter Island! Enjoy astronomical and cultural sites in Santiago, Chile, and discover the fascinating heritage of Easter Island.

TAHITI TOTAL LUNAR ECLIPSE
MARCH 6-16, 2025
A breathtaking opportunity to see the Total Lunar Eclipse in this South Pacific paradise! Explore Tahiti and Moorea, then fly to legendary Bora Bora for the Lunar Eclipse. You have the option of staying in overwater bungalows in our lagoon side hotel!

THE PLANETARY SOCIETY
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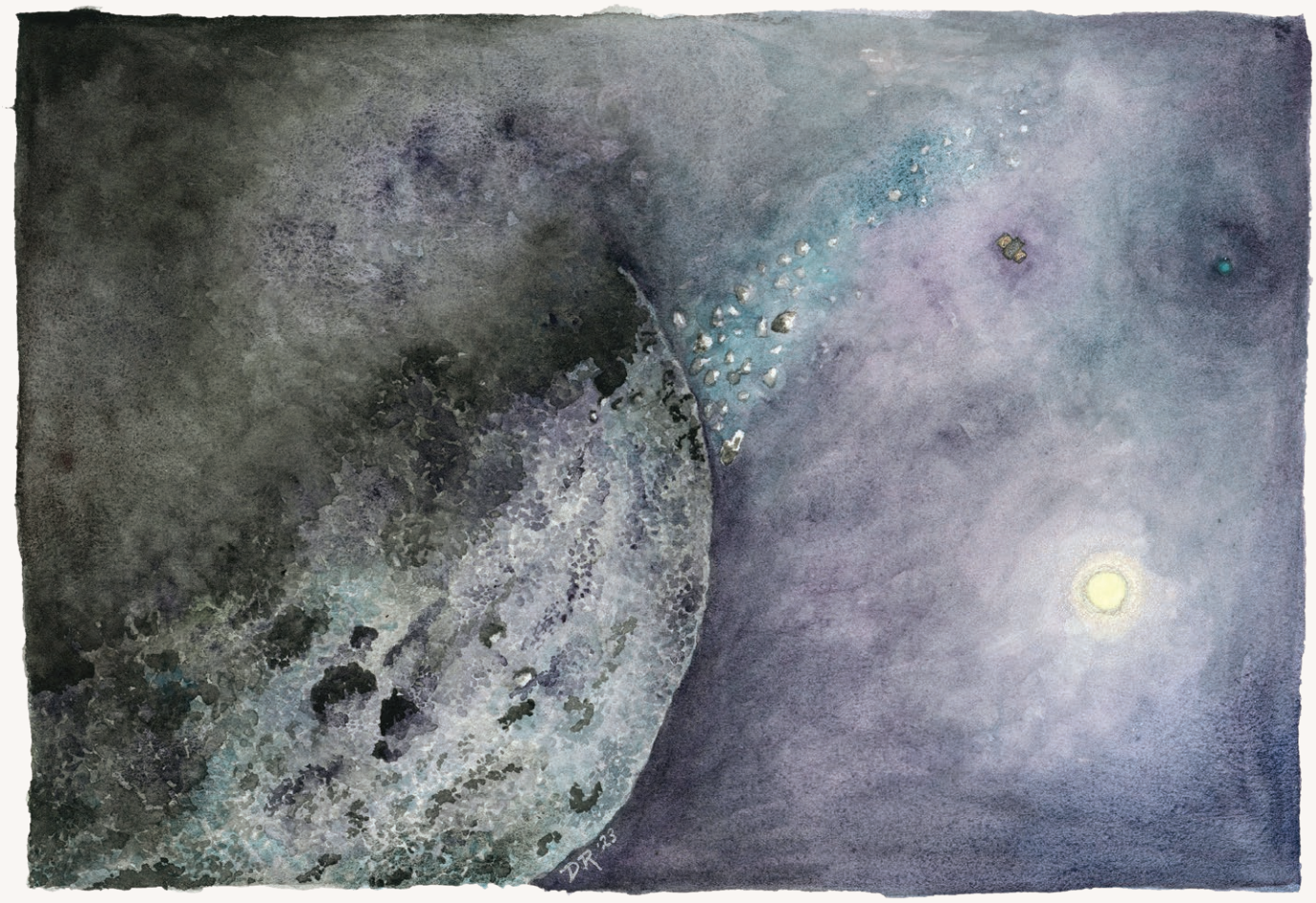

DANIELLE ROSE

Farewell Bennu

Danielle Rose

OSIRIS-REx finished its journey to bring an asteroid sample back to Earth this year in September after being in space for seven years. The whole time it was out there, it remained on the minds of space enthusiasts around the world, including Planetary Society member Danielle Rose. She made this watercolor painting to capture the moment that OSIRIS-REx departed the asteroid it had been sent to study. With OSIRIS-REx now on its way to another asteroid target, it will no doubt continue to inspire wonder and imagination in the minds of those who love space.

Do you want to see your artwork here? We love to feature our members throughout this magazine.
Send your original, space-related artwork to *connect@planetary.org*.