

The Prairie Astronomer

April 2021 Volume 62, Issue #4

**April Program: Jim Kvasnicka
Constellations and Mythology**



**Ingenuity Helicopter Succeeds in
Historic First Powered Flight on
Another Planet**



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer



NEXT MEETING AND PROGRAM

April 27, 7:30pm: Constellations and Mythology (via Zoom)

Presenter: Jim Kvasnicka

Jim's program this month will focus on the many mythological ways earlier civilizations viewed the skies and explained the patterns in the stars. It is interesting how groups that were totally disconnected from each other often created similar descriptions of constellation groups.

Bob Kacvinsky will email the Zoom link to club members on the 27th. If you're not a member and would like to hear this presentation, please contact Bob.

FUTURE PROGRAMS

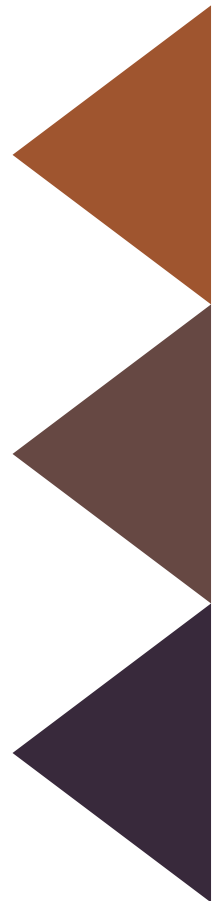
May: Jenna Bartja: Preserving Our Dark Skies

June: Solar Observing Party

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Cover: NASA's Ingenuity helicopter unlocked its rotor blades, allowing them to spin freely, on April 7, 2021, the 47th Martian day, or sol, of the mission. See <https://www.jpl.nasa.gov/images/ingenuitys-blades-are-released> Photo credit: NASA/JPL-Caltech.



CALENDAR

PAC Meeting
Tuesday, April 27, 2021, 7:30pm, via Zoom

PAC Meeting
Tuesday, May 25, 2021, 7:30pm
Jenna Bartja: Preserving our Dark Skies

PAC Meeting
Tuesday, June 29, 2021, 6:00pm
Solar Viewing Party, location to be announced

Nebraska Star Party
August 1-6, 2021

2021 STAR PARTY DATES

| | Date | Date |
|-----------|--------|-----------|
| January | 8 | 15 |
| February | 5 | 12 |
| March | 5 | 12 |
| April | 2 | 9 |
| May | 7 | 14 |
| June | 4 | 11 |
| July | 2 | 9 |
| August | Jul 30 | 6 |
| September | Aug 27 | 3 |
| October | 1 | 8 |
| November | Oct 29 | 5 |
| December | Nov 26 | 3 |

Dates in **BOLD** are closest to the New Moon.

CLUB OFFICERS

| | |
|-------------------------------|--|
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Night Sky Network



www.prairieastronomyclub.org

The President's Message

Bob Kacvinsky



Happy Anniversary. Mark Dahmke just reminded me that in April of 1961 the PAC Charter and By-Laws were established. PAC is officially 60 years old and thriving because of the great membership participation over all these years. Congratulations.

Spring has finally sprung although the cool temps seem to be a bit more stubborn this year. If you are into looking at distant galaxies, this is a great time of year with Ursa Major, Virgo, and Leo prominent in the night skies. During our recent Valentine Star Party there were several views where you could see 3-4 galaxies in the eyepiece. It is a great time to get out and enjoy our heavens.

As the general population continues to get vaccinated, we are beginning to see more social gathering opportunities open up. Yet, large scale gatherings and star parties are still a few months out. Our Nebraska Star Party, for

instance, in early August is the first national event the AL has on it's calendar.

I would expect that we will continue with our club member star parties. We can safely use the Farm site and keep proper distances between observers. Jim Kvasnicka is planning to begin hosting Lunar Star Parties focused on newer members who want a little more help with their new telescopes. Since late 2019 we have a dozen new members, many of which have recently purchased new telescopes. Our plans will be to have 3-4 experienced members available to help as needed during these special events.

We plan to evaluate any public gathering invites when they begin to come forward. We will remain cautious, but I would expect to see some smaller local star parties to begin sometime this summer. We will use the Night Sky Network to

communicate with the membership and let each member decide if they wish to participate. We would expect to require social distancing and face coverings at the minimum for any event. Stay tuned for future updates.

We are honored to have Jim Kvasnicka present at our April PAC meeting. As our observing chair, Jim provides our monthly observing reports and beginning in March has begun highlighting a constellation each month in our newsletter. Jim's program this month will focus on the many mythological ways earlier civilizations viewed the skies and explained the patterns in the stars. It is interesting how groups that were totally disconnected from each other often created similar descriptions of constellation groups. We look forward to Jim's program.

Our May PAC meeting program will be Jenna Bartja, presently working with the University of

Nebraska. Jenna worked on the successful submission for a national park in Arizona to receive the designation as an International Dark Sky site. She is presently working with UNL, Nebraska State, Valentine, Merritt, and NSP to have the entire Merritt Reservoir designated as a Dark Sky Classification. The designation would enhance the value of the site for night viewing, improve the NSP claims, and help preserve the night sky for generations in the future. Jenna will provide an update on her work, the NSP submission, and progress.

Our June program will be our annual Lunar program hosted by Dave Churilla and other members of

PAC. Last year we had over 25 members and families attend the August Lunar party. We are still evaluating the site to use depending on location access and if we can safely have public participation. We should have everything worked out by our May PAC meeting.

The PAC Board established a committee made up of past PAC presidents and asked them to gather inputs from each of you on ways to improve our club. They are presently planning to send out a survey asking for your inputs, ideas, suggestions, etc. Your comments will be kept private within the small committee, so we are asking for candid and frank feedback. The success of PAC is

determined by how the club meets your expectations and needs. Please take a few minutes and provide your comments and ideas. The committee will consolidate the information and provide a summary to the Board for action. The survey will focus on both short- and long-term areas, club activities, outreach, meeting formats, speakers, and officer makeup as potential subjects.

Please participate and THANK YOU in advance for your participation and feedback to the committee.

Dark and Clear Skies to you,
Bob Kacvinsky
PAC-President
kacvinskyb@yahoo.com
402-840-0084

A Message from Founding Member Pete Schultz

"I can't believe that it's been 60 years, not to mention 10 since the 50th. The cover of the

latest issue shows the quadcopter on Mars waiting to take off. When PAC first started, Mars

was just an object in the sky, and I just dreamed about being an astronomer, never could imagine that I would eventually look down at the surface from orbit, not to mention from the surface. Clubs like PAC are important not just for nerds but for kids who are curious about the sky and are looking for someone else with a similar passion. Congrats on 60....glad I could be part of its beginning."
—Pete Schultz



PAC Founding members Rick Johnson, Harlan Franey and Pete Schultz with Earl Moser, October, 2007.



Rick Johnson

ARP 29

Arp 29 is far better known as NGC 6946, the Fireworks Galaxy. This is because it is undergoing massive star formation and close enough that we can easily resolve many of the HII regions as well as a massive star cluster. The cluster is well resolved in the upper left corner of the Gemini North image. <http://antwrp.gsfc.nasa.gov/apod/ap050125.html> My image scale and seeing weren't sufficient to fully resolve it so only a few of the stars show with the rest forming what appears to be a blue reflection nebula. Note the Gemini image has south up while mine is north up. Another reason for its common name is all the supernova that have been seen blowing in it. The last was in 2008. NED list 9 known supernovae in this galaxy; SN 1917A, N 1939C, SN 1948B, SN 1968D, SN 1969P, SN 1980K, SN 2002hh, SN 2004et and

SN 2008S. 27 supernova remnants are also known in this galaxy according to NED.

But none of this is the reason it is in Arp's catalog. He included it under Spiral galaxies with one heavy arm. Some in this category have a rather obvious heavy arm but here I'm not even sure which arm he is speaking of. Maybe it's the one to the northeast (upper left) of the core in my image. Though his comment addressed the supernovas saying "Supernova once observed in tip of thick arm." This may refer to the 1948 supernova though it was well back of what I'd call the "tip" of the eastern arm. Though closer to the end than those appearing in other arms.

Every paper I found shows a different distance to this obviously nearby galaxy. In fact, two

different papers analyzed the 1980 supernova and came up with wildly different distance estimates! One decided it was 18.5 million light-years away, the other over 41 million light-years. One or both are very wrong. The APOD link above says 10 million light-years, closer than any paper I found. So I'll give the wide range of about 10 to 20 million light-years as its distance. This galaxy is in the Milky Way and thus heavily obscured. This likely complicates distance estimates. It certainly is close enough for Cepheid variables to be seen but unless the dust between us and the galaxy is accurately known the distance becomes uncertain. I suspect it is differences in dust estimates that account for much of the uncertainty of the distance to this galaxy.

The Mantrap Skies Image Catalog

Rick Johnson, a founding member of the Prairie Astronomy Club, passed away in January, 2019. His legacy lives on through his comprehensive catalog of over 1600 images at www.mantrapskies.com.

I should have taken far more data on this one. I see a hint of a long blue arm going north. The field is full of clouds. Some so close to the galaxy I can't tell if they are pieces of the galaxy or pieces of junk in our galaxy. Most likely in ours. Note the area just along the western edge of Arp 29 that has no

stars, just a faint fuzzy patch. A brighter but smaller one below it doesn't seem to obscure stars. I see no reason to question my flats so suspect these clouds are real. But they are right at the noise level. Something a lot more time would certainly help decide.

The galaxy was discovered by William Herschel on September 9, 1798 and is in the original Herschel 400 program. My notes from May 21, 1985 on a very good night with my 10" f/5 at up to 180x reads "Large, obviously face on spiral. Structure in arms very easy to see tonight. In fact, it is a



ARP 29, continued.

rival to M-51 for ease in seeing the spiral structure. It nearly fills the field at 120x and is a fantastic sight tonight."

I had a gaggle of satellites go through the images. I tried to clone them out -- with only 4 images any noise rejection I tried also added noise -- and hope I didn't add any artifacts doing so. I'm sure a few stars in our galaxy got erased, however. But there are so many in this field we can spare a few. So many they really blew

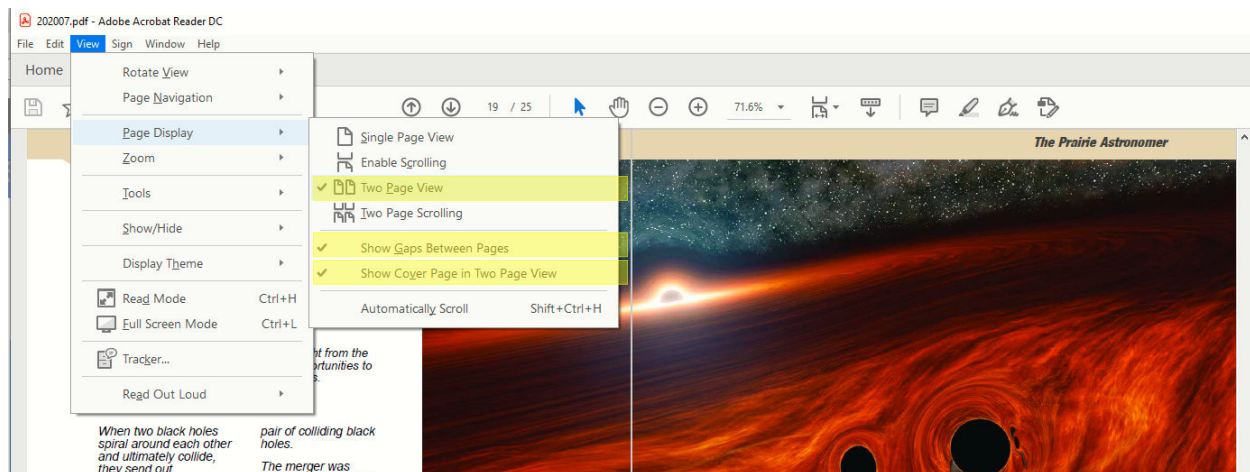
up the JPEG size of this image.

There are a few other galaxies in the image and one missing one. NED lists a 15.6 magnitude galaxy, [OBC97] N05-1 at the top of my image that should be easily visible but there's nothing there. Those easiest to find are all south-west of Arp 29. The one hiding behind a star is 2MASX J20332396+6005088. Below and east (left) of it is the slightly bigger and brighter 2MASX

J20333573+6002118. Neither have any other data, unfortunately. The same lack applies to 2MASX J20324060+6000181 in the very southwest corner of my image. I didn't quite catch all of it. You'd think one this big and bright would at least have a magnitude estimate but nothing. Guess the 2MASS survey didn't want to detract from the fireworks of Arp 29.

New Newsletter Format

How to Adjust Adobe Acrobat Settings for Two Page View



To view this newsletter in magazine spread format in Acrobat, select View -> Page Display-> Two Page View. Acrobat will then show two pages side by side. Also make sure the checkboxes "Show Cover Page in Two Page View" and "Show Gaps Between Pages" are checked.

If you have it setup correctly, the cover page will be displayed by itself and subsequent pages will be side by side with the odd numbered pages on the left.

Meeting Minutes

Bill Lohrberg

PAC meeting minutes
March 30, 2021 as
recorded by Bill Lohrberg

Club President Bob Kacvinsky hosted the Zoom meeting which began at 7:32pm with 17 attendees.

Bob welcomed Stephen Ramsden director of the Charlie Bates Solar Astronomy project, presenting the night's program on solar observing.

Jim Kvasnicka presented the observing report for April – details of which are found in the club newsletter. Jim announced club star party dates for April 2 & 9, most likely at the Cortland farm site.

In the news topic was a discussion of the Mars ingenuity slated to take flight around April 8. This will be the first such flight on another world. There is eager anticipation – however, as Jack Dunn mentioned prior to the meeting it's likely the flight will be delayed to middle of April.

Other events and activities: Anticipating a summer opening of Hyde. Earlier or later summer is

the question. Hyde board is meeting on the subject first Monday of April, updates will be forthcoming.

There were approximately six who attended the last club star party – had very good clear skies until about 1am, Bob encouraged everyone especially new members to attend the club star parties as frequently as possible. They're a lot of fun and the newer members really appreciate and benefit from the more experienced club members, as well as the clear dark skies at the site.

Next scheduled PAC meeting is April 27, Jim Kvasnicka will be doing the program on some key constellations, history and mythology.

May program is still open as of this time. Anticipating the June solar observing party with Dave Churilla – stay tuned for details and further announcements.

Club Treasurer John Reinert reported checking account is up, some dues are owed but not worried about delinquencies.

Fees have been updated, membership in International Dark sky Association was renewed, club audits to be completed prior to next club election cycle in September. Bob urged everyone to keep those dues updated and current.

Other Business - Dan Delzell made a motion to renew the annual farm observing site maintenance/upkeep fee (same as in past years). Brett Boller seconded, vote was taken, none opposed. Motion passed.

At approximately 7:50pm the meeting was adjourned to Stephen Ramsden's delightful program presentation on the Charlie Bates solar observing project.

May Observing

Jim Kvasnicka



This is a partial list of objects visible for the upcoming month.

Planets

Venus and Mercury: Both are visible in the evening. On May 28 Venus and Mercury are separated by less than a $\frac{1}{2}^\circ$.

Jupiter and Saturn: In the morning in Capricornus.

Mars: In Taurus, sets around 1:00 am.

Uranus and Neptune: Both are not visible.

Total Lunar Eclipse

May 26, total eclipse starts at 6:11 am but the moon sets at 6:06 am in Lincoln.

Messier List

M49/M61: Galaxies in Virgo.

M51: The Whirlpool Galaxy in Canes Venatici.

M63: The Sunflower Galaxy in Canes Venatici.

M64: The Black Eye Galaxy in Coma Berenices.

M85/M94: Galaxies in Coma Berenices and Canes Venatici.

M101: The Pinwheel Galaxy in Ursa Major.

M102: Galaxy in Draco.

M104: The Sombrero Galaxy in Virgo.

Last Month: M40, M65, M66, M95, M96, M105, M106, M108, M109

Next Month: M58, M59, M60, M84, M86, M87, M88, M89, M90, M91, M98, M99, M100

NGC and other Deep Sky Objects

NGC 4244: The Silver Needle Galaxy in Canes Venatici.

NGC 4651/4656:

The Whale Galaxy and Hockey Stick galaxies in Canes Venatici.

NGC 4666: Elongated galaxy in Virgo.

NGC 4754/4762: Galaxy pair in Virgo.

NGC 4866: Elongated galaxy in Virgo.

Double Star Program List

Kappa Bootis: Yellow and blue stars.

Iota Bootis: Yellow and dim blue pair.

Pi Bootis: Pair of white stars.

Epsilon Bootis: Yellow and greenish yellow stars.

Xi Bootis: Yellow pair.

Delta Bootis: Yellow primary with a blue-white secondary.

Mu Bootis: Two yellow stars.

Zeta Corona Borealis: Light blue and greenish yellow stars.

Challenge Object

Markarian's Chain: Galaxy group along the Virgo and Coma Berenices border. How many can you fit in your FOV?

Mars as seen by Mariner 4, July, 1965. This image shows an area of about 330km x 1200km with a resolution of 5km.



Focus on Constellations

Virgo

Jim Kvasnicka

Virgo, The Virgin, is well away from the dust of the Milky Way and contains a super abundance of galaxies. Eleven of them are Messier objects. Virgo is in the heart of the Coma-Virgo supercluster. In the central $12^\circ \times 10^\circ$ area some 3,000 galaxies can be counted, and those are just the brightest members. Virgo covers 1,294 square degrees and is best seen in May.

Showpiece Objects

Galaxies: M49, M58, M59, M60, M61, M84, M86, M87, M89, M90, M104

Mythology

Virgo is named for the Greek goddess Demeter, the Earth goddess, and is associated with the arrival of spring and the growing season. Hades, the god of the Underworld, fell in love with Demeter's daughter, Persephone and carried her back to the Underworld. Demeter became worried and went to look for her. Zeus pleaded with Demeter to return. Demeter refused and continued to search

for her daughter. People everywhere were starving and could not understand how the Earth goddess could be so cruel. Zeus sent Hermes to Hades telling him that Persephone must return home to Olympus. Demeter was happy but her Persephone told her mother she was in love with Hades. Zeus solved the problem saying that Persephone would spend half of her time with Hades in the Underworld and half of her time with her mother in Olympus. Winter comes when

Persephone goes to the Underworld and spring begins when she returns to Olympus.

Number of Objects Magnitude 12.0 and Brighter

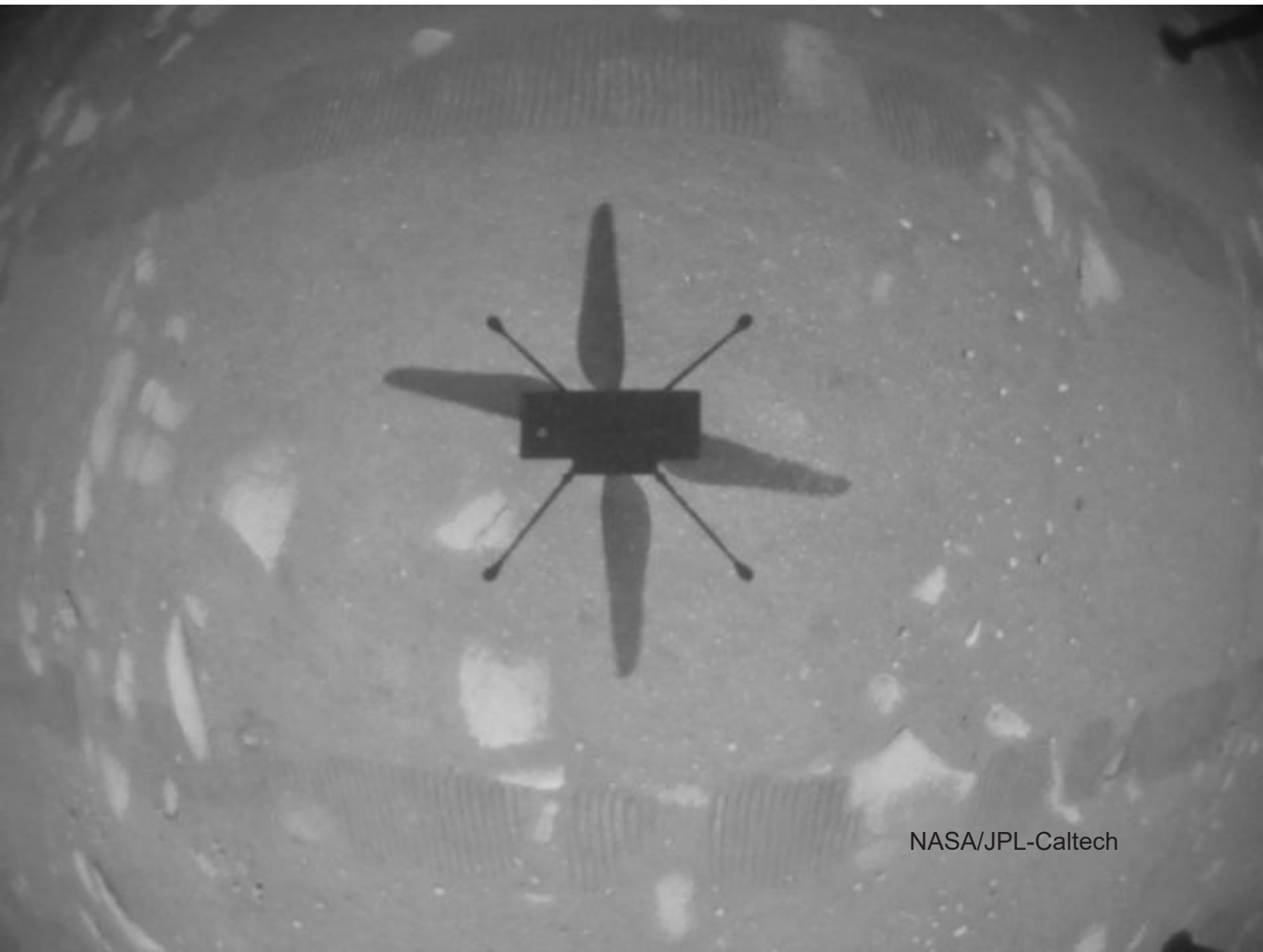
Galaxies: 69
Globular Clusters: 1
Open Clusters: 0
Planetary Nebulae: 0
Dark Nebulae: 0
Bright Nebulae: 0
SNREM: 0



By Till Credner - Own work: [AlltheSky.com](https://commons.wikimedia.org/w/index.php?curid=20042019), CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=20042019>

NASA's Ingenuity Mars Helicopter Succeeds in Historic First Flight

The small rotorcraft made history, hovering above Jezero Crater, demonstrating that powered, controlled flight on another planet is possible.



NASA's Ingenuity Mars Helicopter took this shot while hovering over the Martian surface on April 19, 2021, during the first instance of powered, controlled flight on another planet. It used its navigation camera, which autonomously tracks the ground during flight.

The Ingenuity Mars Helicopter was built by JPL, which also manages this technology demonstration project for NASA Headquarters. It is supported by NASA's Science Mission Directorate, Aeronautics Research Mission Directorate, and Space Technology Mission Directorate. NASA's Ames Research Center and Langley Research Center

provided significant flight performance analysis and technical assistance during Ingenuity's development.

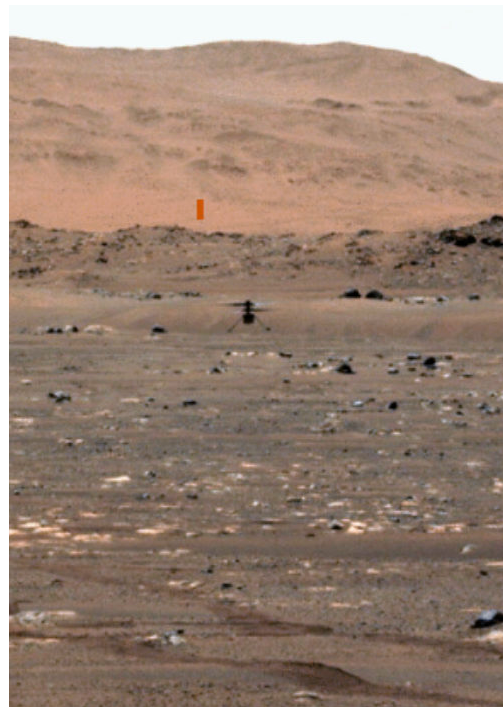
A key objective for Perseverance's mission on Mars is astrobiology, including the search for signs of ancient microbial life. The rover will characterize the planet's geology and past climate, pave the way for human exploration of the Red Planet, and be the first mission to collect and cache Martian rock and regolith (broken rock and dust).

Subsequent NASA missions, in cooperation with ESA (European Space Agency), would send spacecraft to Mars

to collect these sealed samples from the surface and return them to Earth for in-depth analysis.

The Mars 2020 Perseverance mission is part of NASA's Moon to Mars exploration approach, which includes Artemis missions to the Moon that will help prepare for human exploration of the Red Planet.

JPL, which is managed for NASA by Caltech in Pasadena, California, built and manages operations of the Perseverance rover.



These images were taken by the Navigation Camera, or Navcam, aboard the agency's Perseverance Mars rover from a distance of 210 feet (64 meters).

Credit: NASA/JPL-Caltech

NASA's Curiosity Team Names Martian Hill That Serves as Mission 'Gateway'

The name honors recently deceased mission scientist Rafael Navarro-González, who helped lead the team that identified ancient organic compounds on Mars.

The team of scientists and engineers behind NASA's Curiosity rover named a hill along the rover's path on Mars in honor of a recently deceased mission scientist. A craggy hump that stretches 450 feet (120 meters) tall, "Rafael Navarro Mountain" is located on Mount Sharp in northwest Gale Crater.

The inspiration for the name is award-winning scientist Rafael Navarro-

González; he died on Jan. 28, 2021, from complications related to COVID-19. A leading astrobiologist in Mexico, Navarro-González was a co-investigator on the Sample Analysis at Mars (SAM), a portable chemistry lab aboard Curiosity that has been sniffing out the chemical makeup of Martian soil, rocks, and air. As such, he helped lead the team that identified ancient organic

compounds on Mars; his many accomplishments also included identifying the role of volcanic lightning in the origin of life on Earth. Navarro-González was a researcher at Nuclear Sciences Institute at the National Autonomous University of Mexico in Mexico City.

"We are truly honored to have a prominent hill named after our dad; it's



'Rafael Navarro Mountain': NASA's Curiosity Mars rover used its Mastcam to take an image of this mountain, nicknamed "Rafael Navarro Mountain" after the astrobiologist Rafael Navarro-González, who worked on the mission until he passed away Jan. 26, 2021. Credit: NASA/JPL-Caltech/MSSS.

his and our dream come true to see this happen," wrote Navarro-González's children, Rafael and Karina Navarro Aceves, in a statement to NASA. "Ever since our parents met, their dreams merged together and they became a beautiful team, working very hard for 36 years. Our dad was an accomplished scientist, but above all, a great human being who managed to balance work and family. Our mom, Faby, would always tell him that his name one day would be on Mars, and now that is coming true. We all believe that there must be a party in heaven."

Rafael Navarro Mountain sits at a major geological

transition in Gale Crater from a clay-rich region to one that's rich in sulfate minerals. Analyzing sulfate minerals may help scientists better understand the major shift in the Martian climate from wetter to drier conditions, according to Ashwin Vasavada, Curiosity's project scientist based at NASA's Jet Propulsion Laboratory in Southern California.

"We think of this hill as a gateway," Vasavada said. "Rafael Navarro Mountain will be constantly in our sights for the next year as Curiosity winds around it."

The new hill name is informal and meant for the use of Curiosity's global team members. The team

unofficially has named thousands of features in Gale Crater, from drill holes to rocks to dunes. "Team members agree on a name for a particular feature of interest, so that people don't get confused if we observe it with multiple instruments," Vasavada said.

Before Rafael Navarro Mountain, the Curiosity team has named four other features after deceased mission scientists: "Jake Matijevic" is the first boulder Curiosity studied and is named after a rover engineer who died in 2012. Curiosity's first drill hole, "John Klein," honors the mission's deputy project manager who died in 2011. "Nathan Bridges



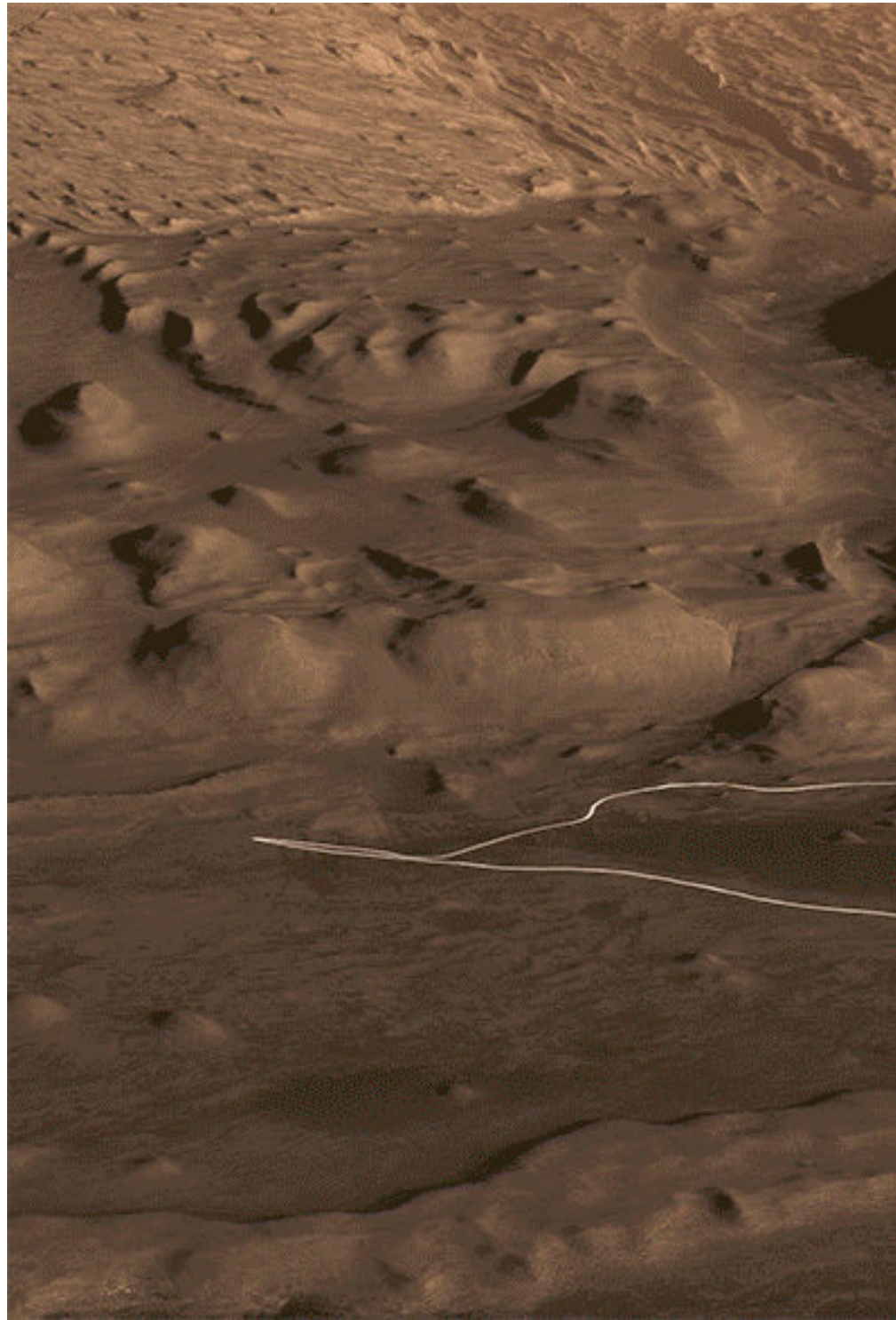
Martian Hill, continued.

Dune” gets its name from a co-investigator on Curiosity’s ChemCam instrument who died in 2017. And “Heinrich Wänke” is a rock target that commemorates Wänke’s contributions to the development of a rover instrument, APXS, which analyzes the chemical makeup of Martian rocks.

While a few other names of notable scientists not involved with Curiosity, such as astronomer Vera Rubin, and even writers, such as Ray Bradbury, grace the features of Gale Crater (which was named after Australian astronomer Walter F. Gale), the rover team’s general strategy is to name regions, and features within them, after areas of geological significance on Earth. For example, the region where Curiosity landed, the site of an ancient lake, was named “Yellowknife” after a city in northwest Canada where scientists gather to kick off geologic expeditions. The features in Martian Yellowknife were named after towns (“Bathurst Inlet”), mountains (“Sayunei”), or lakes (“Knob Lake”) in northern Canada.

In late March, Curiosity left “Nontron,” a region that takes the name of a village in southwestern France where the mineral nontronite was first described by scientists.

Nontronite is part of a group of the most common types of clays on Mars. Now, Curiosity will navigate around Rafael Navarro Mountain, stopping in different

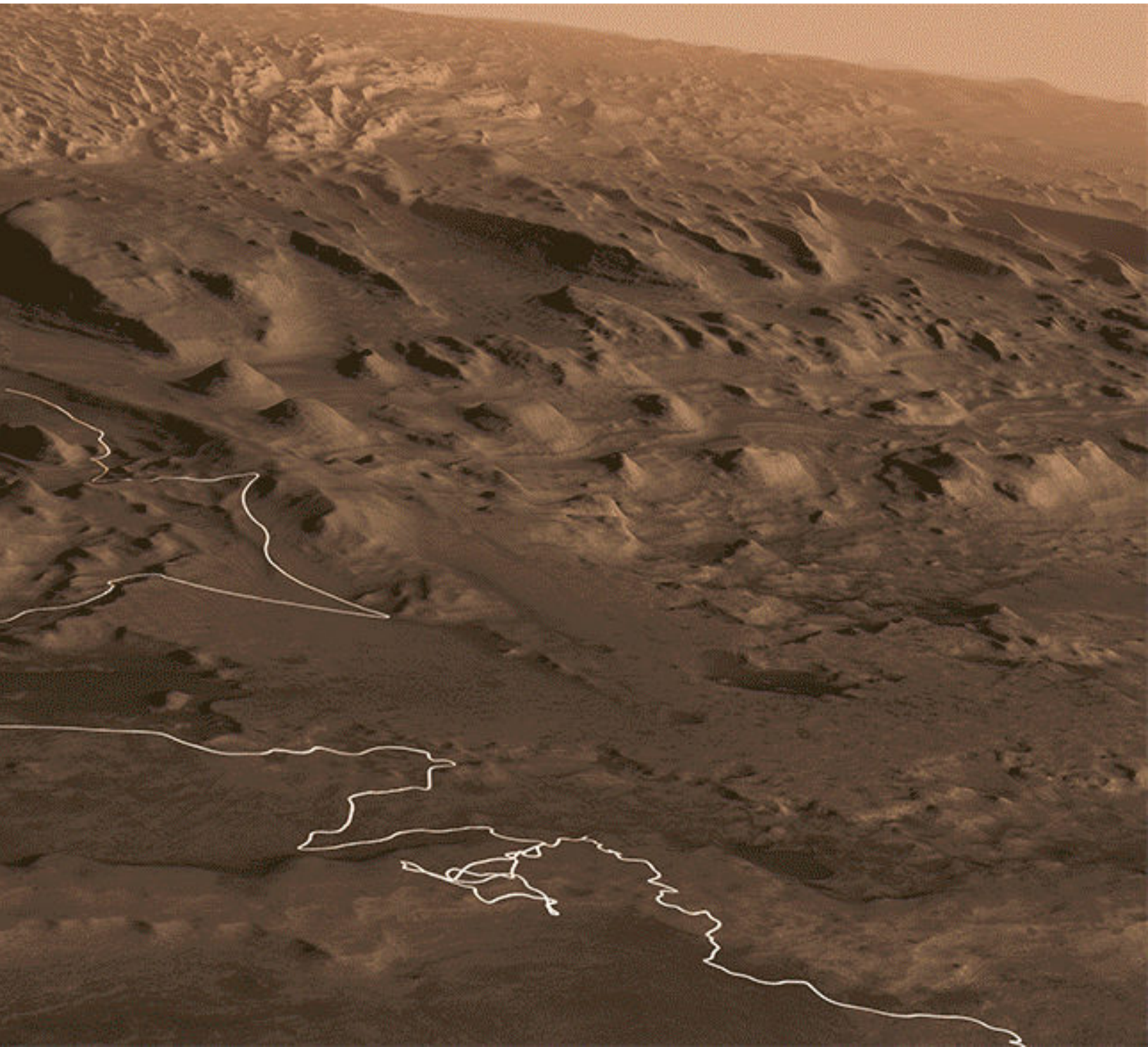


regions of scientific interest to drill samples.

“We won’t have Rafael with us for this next stretch, but we will bring his considerable expertise, creativity, and great enthusiasm for astrobiology studies to

bear on our investigation of the ancient habitable environments in Gale Crater,” said Paul Mahaffy, principal investigator of Curiosity’s SAM experiment, who’s based at NASA’s Goddard Space Flight Center in Greenbelt, Maryland.

“Rafael was a good friend and dedicated scientist, and it has been a privilege and honor for our Mars exploration team to work with him over the years.”



Valentine Star Party, April 2-12



Bob Kacvinsky

In April several members attended a star party at Lord Ranch, south of Valentine NE.

Participating were Jim Kvasnicka (Teeter 16"), Dan Delzell (Teeter 16"), Mike Kearns (10" Dob), Brett Boller, James Quach (8" SCT), Chad Tolly, John Speck (Chicago 9.25" SCT), Eric Balcom (OAS 24" Dob) and Bob Kacvinsky (16" Dob).

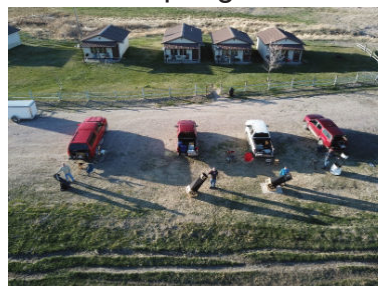


Lord Ranch as straight East of the NSP location and isolated from any traffic and lights. A single farm light is visible on the western horizon. The cabins are down a very rustic cattle drive a mile back from the access road. Recent rains had made the road muddy and lined with puddles that

decorated our vehicles. Once we arrived the parking area is located adjacent to the cabins allowing a short walk to our set up point. Note photos.

Wednesday was windy and mostly cloudy till around 11:00 pm when we got out for 2-3 hours before the cold winds picked back up again. It was a Bolo Brewery and pizza evening and dice games before the clearing. Thursday was a much better evening with clear skies and good viewing till about 2 when the wind came back up again.

Dan was working on his Hershel I spring list and



after this weekend is very close to finishing. Jim was working on ARP list of peculiar galaxies while Mike was continuing his M list. Bob was starting his Hershel II list. Others were working on different selections and objects. Saturday night Eric and John spent a couple hours with the Lord Ranch hosts taking a tour of the skies.

The photo to the right gives a birds eye view of observing area and the marshes and pastures facing to the east. This location easily compares to the NSP site on Merritt and has less lights inhibiting the horizon.

Saturday turned out to be the best night with excellent seeing and transparency and low humidity allowing for beautiful views and sharp contrasts. Dan and I finally had freezing finger issues and packed up

around 4:30 Sunday morning.

Sunday morning the winds came up again and were predicted to be above 25 mph all day and night. We decided to pack up and head back to Lincoln instead of spending another night out.



In October we tried a similar fall star party at the Ranch, but weather limited us to just a few hours of marginal viewing. Our April experience left us with plans to make this an annual event. The skies are pristine, and the accommodations were particularly good. We had constant waterfowl surrounding and talking to us during our visit. The coyotes were serenading our nightly views and even thought we had excellent cell service, you could easily disconnect from the world.



I'd encourage anyone interested to watch for a notice on the newsletter for future Lord Ranch Star Party invites. If the weather cooperates, it provides a breath-taking experience in viewing and relaxation.

From the Archives

April, 1971

Observatory Project

The observatory project is going great guns. We are now negotiating for a site on Earl's Father's land west of Hickman, which is looking very good, as it goes with your wishes as expressed by the poll of a while back. We should have a site in the next month or two.

At the last meeting, a vote was taken and passed with a two thirds majority to authorize the Board of Directors to handle all design, financial, detail,

legal and location matters which are necessary to the construction of the observatory. So we going to go ahead, as a club, and stop the haggling and get some work done.

We now have temporary observatory, which is a 10 metal garden shed from Wards. This will be used for the protection of the telescope until the permanent observatory is completed, which should be sometime next year at the latest.

We still need money. This

is a fact of life which we cannot avoid.

One very good way of obtaining some is to pass the hat at our next meeting. I urge every member to bring his loose change, or what he can afford, to the club meeting and put it in the hat.

This is a great help to the observatory project, to the club as whole. We're doing very well so far, but we have to keep it up. Come to the meeting.

Astrophotography, Valentine Star Party

Photos by Brett Boller. Samsung Galaxy Note 9. Handheld shots of Orion and the group at Lord Ranch South of Valentine.





Hubble Spots Double Quasars In Merging Galaxies

NASA's Hubble Space Telescope is "seeing double." Peering back 10 billion years into the universe's past, Hubble astronomers found a pair of quasars that are so close to each other they look like a single object in

ground-based telescopic photos, but not in Hubble's crisp view.

The researchers believe the quasars are very close to each other because they reside in the cores of two merging galaxies. The team went

on to win the "daily double" by finding yet another quasar pair in another colliding galaxy duo.

A quasar is a brilliant beacon of intense light from the center of a distant galaxy that can



outshine the entire galaxy. It is powered by a supermassive black hole voraciously feeding on inflating matter, unleashing a torrent of radiation.

"We estimate that in the distant universe, for every 1,000 quasars, there is one double quasar. So finding these double quasars is like finding a needle in a haystack," said lead researcher Yue Shen of the University of Illinois at Urbana-Champaign.

The discovery of these four

quasars offers a new way to probe collisions among galaxies and the merging of supermassive black holes in the early universe, researchers say.

Quasars are scattered all across the sky and were most abundant 10 billion years ago. There were a lot of galaxy mergers back then feeding the black holes. Therefore, astronomers theorize there should have been many dual quasars during that time.

"This truly is the first sample of dual quasars at the peak epoch of galaxy formation with which we can use to probe ideas about how supermassive black holes come together to eventually form a binary," said research team member Nadia Zakamska of Johns Hopkins University in Baltimore, Maryland.

The team's results appeared in the April 1 online issue of the journal *Nature Astronomy*.

Shen and Zakamska are members of a team that is using Hubble, the European Space Agency's Gaia space observatory, and the Sloan Digital Sky Survey, as well as several ground-based telescopes, to compile a robust census of quasar pairs in the early universe.

The observations are important because a

quasar's role in galactic encounters plays a critical part in galaxy formation, the researchers say. As two close galaxies begin to distort each other gravitationally, their interaction funnels material into their respective black holes, igniting their quasars.

Over time, radiation from these high-intensity "light bulbs" launch powerful galactic winds, which sweep out most of the gas from the merging galaxies. Deprived of gas, star formation ceases, and the galaxies evolve into elliptical galaxies.

"Quasars make a profound impact on galaxy formation in the universe," Zakamska said. "Finding dual quasars at this early epoch is important because we can now test our long-standing ideas of how black holes and their host galaxies evolve together."

Astronomers have discovered more than 100 double quasars in merging galaxies so far. However, none of them is as old as the two double quasars in this study.

The Hubble images show that quasars within each pair are only about 10,000 light-years apart. By comparison, our Sun is 26,000 light-years from the supermassive black hole in the center of our galaxy.

The pairs of host galaxies



Double Quasars, continued.

will eventually merge, and then the quasars also will coalesce, resulting in an even more massive, single solitary black hole.

Finding them wasn't easy. Hubble is the only telescope with vision sharp enough to peer back to the early universe and distinguish two close quasars that are so far away from Earth. However, Hubble's sharp resolution alone isn't good enough to find these dual light beacons.

Astronomers first needed to figure out where to point Hubble to study them. The challenge is that the sky is blanketed with a tapestry of ancient quasars that flared to life 10 billion years ago, only a tiny fraction of which are dual. It took an imaginative and innovative technique that required the help of the European Space Agency's Gaia satellite and the ground-based Sloan Digital Sky Survey to compile a group of potential candidates for Hubble to observe.

Located at Apache Point Observatory in New Mexico, the Sloan telescope produces three-dimensional maps of

objects throughout the sky. The team poured through the Sloan survey to identify the quasars to study more closely.

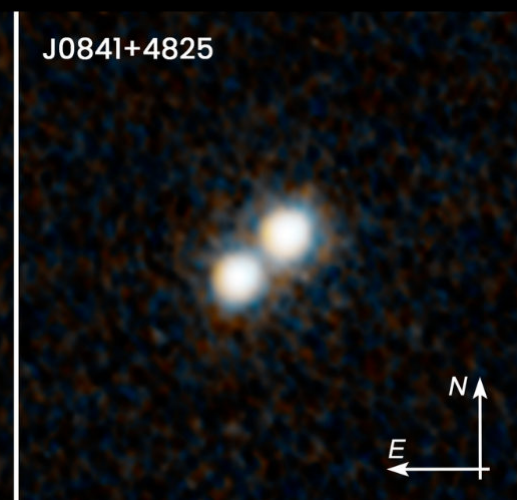
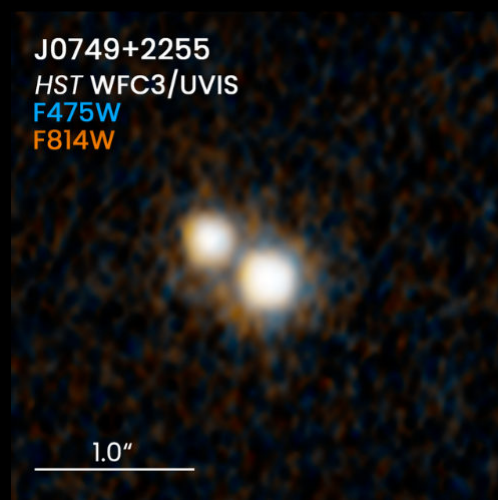
The researchers then enlisted the Gaia observatory to help pinpoint potential double-quasar candidates. Gaia measures the positions, distances, and motions of nearby celestial objects very precisely. But the team devised a new, innovative application for Gaia that could be used for exploring the distant universe. They used the observatory's database to search for quasars that mimic the apparent motion of nearby stars. The quasars appear as single objects in the Gaia data. However, Gaia can pick up a subtle, unexpected "jiggle" in the apparent position of some of the quasars it observes.

The quasars aren't

moving through space in any measurable way, but instead their jiggle could be evidence of random fluctuations of light as each member of the quasar pair varies in brightness. Quasars flicker in brightness on timescales of days to months, depending on their black hole's feeding schedule.

This alternating brightness between the quasar pair is similar to seeing a railroad crossing signal from a distance. As the lights on both sides of the stationary signal alternately flash, the sign gives the illusion of "jiggling."

When the first four targets were observed with Hubble, its crisp vision revealed that two of the targets are two close pairs of quasars. The researchers said it was a "light bulb moment" that verified their plan of using



Sloan, Gaia, and Hubble to hunt for the ancient, elusive double powerhouses.

Team member Xin Liu of the University of Illinois at Urbana-Champaign called the Hubble confirmation a "happy surprise." She has long hunted for double quasars closer to Earth using different techniques with ground-based telescopes. "The new technique can not only discover dual quasars much further away, but it is much more efficient than the methods we've used before," she said.

Their Nature Astronomy article is a "proof of concept that really demonstrates that our targeted search for dual quasars is very efficient," said team member Hsiang-Chih Hwang, a graduate student at Johns Hopkins University and the principal investigator of the Hubble program. "It opens a new direction where we can accumulate a lot more interesting systems to follow up, which astronomers weren't able to do with previous techniques or datasets."

The team also obtained follow-up observations with the National Science Foundation NOIRLab's Gemini telescopes. "Gemini's spatially-resolved spectroscopy can unambiguously reject interlopers due to chance superpositions from unassociated star-quasar

systems, where the foreground star is coincidentally aligned with the background quasar," said team member Yu-Ching Chen, a graduate student at the University of Illinois at Urbana-Champaign.

Although the team is convinced of their result, they say there is a slight chance that the Hubble snapshots captured double images of the same quasar, an illusion caused by gravitational lensing. This phenomenon occurs when the gravity of a massive foreground galaxy splits and amplifies the light from the background quasar into two mirror images. However, the researchers think this scenario is highly unlikely because Hubble did not detect any foreground galaxies near the two quasar pairs.

Galactic mergers were more plentiful billions of years ago, but a few are still happening today. One example is NGC 6240, a nearby system of merging galaxies that has two and possibly even three supermassive black holes. An even closer galactic merger will occur in a few billion years when our Milky Way galaxy collides with neighboring Andromeda galaxy. The galactic tussle would likely feed the supermassive black holes in the core of each galaxy, igniting them as quasars.

Future telescopes may offer more insight into these merging systems. NASA's James Webb Space Telescope, an infrared observatory scheduled to launch later this year, will probe the quasars' host galaxies. Webb will show the signatures of galactic mergers, such as the distribution of starlight and the long streamers of gas pulled from the interacting galaxies.

The Hubble Space Telescope is a project of international cooperation between NASA and ESA (European Space Agency). NASA's Goddard Space Flight Center in Greenbelt, Maryland, manages the telescope. The Space Telescope Science Institute (STScI) in Baltimore, Maryland, conducts Hubble science operations. STScI is operated for NASA by the Association of Universities for Research in Astronomy in Washington, D.C.

CREDITS:

Artist's Illustration: NASA, ESA, and J. Olmsted (STScI)

Science: NASA, ESA, Y. Shen and X. Liu (University of Illinois, Urbana-Champaign), and H.-C. Hwang and N. Zakamska (Johns Hopkins University)

PAC Newsletter Archive is Now Online

Mark Dahmke

In 2009, with the fiftieth anniversary of the Prairie Astronomy Club coming up in 2011, I started compiling and updating the club history with the intention of publishing a small book.

Fortunately for PAC, long-time club member Earl Moser had saved almost every issue of the newsletter, going back to 1962. He allowed me to borrow his collection so I could scan them. It took a couple of years, but I was able to scan over four

hundred newsletters.

All newsletters published since 2001 were already available in digital form as Word documents or as PDFs.

I included many articles in the PAC history book and use them monthly for the "From the Archives" section in recent newsletters.

But since the book was published, I've wanted to make the archive available to all club members. Since newsletters up to 2001 were

scanned and the format varied widely over the years, it's not yet practical to make them all machine readable (although at the rate OCR technology and machine learning is progressing, it might not be long), I decided to create a title index.

Even indexing titles for that many issues was a chore. I started in mid-2020, working my way through a year of newsletters at a time.

When I got to the 2000s it occurred to me that I should

www.prairieastronomyclub/newsletters

Prairie Astronomy Club Newsletter Archive

Search

note on categories:

- Articles: content contributed by club members.
- News, Syndicated: content from other sources including NASA, news releases, other websites.
- Archives: articles from previous editions of the Prairie Astronomer.
- Astrophotography: photos contributed by club members or from other sources.
- Club Business: rosters, meeting minutes and other articles related to the club.
- President's Letters: articles, editorials and letters from PAC presidents.
- Notices: meeting notices, items for sale, etc.
- Events: special club events.
- Uncategorized: miscellaneous and items not yet categorized.

Newsletter Search

Narrow Search

Category: All where title contains keyword(s)

Narrow by author: All Narrow by year: All Search

| Issue | Title | Author | Category | PDF |
|--------------|--|----------------|--------------------|---------------------------------|
| 1962, April | Editor's letter | Schultz, Pete | President's Letter | 1962/196204.pdf |
| 1962, May | Editor's letter | Schultz, Pete | President's Letter | 1962/196205.pdf |
| 1962, May | Book review: The Incandescent Lamplit Hour | Erbach, Walter | Article | 1962/196205.pdf |
| 1962, May | Editor's letter | | President's Letter | 1962/196205.pdf |
| 1962, June | Missing Issue | | None | 1962/196206.pdf |
| 1962, July | Editor's letter | | President's Letter | 1962/196207.pdf |
| 1962, July | Solar Seance | | Notice | 1962/196207.pdf |
| 1962, July | Did you Know? | Schultz, Pete | Article | 1962/196207.pdf |
| 1962, August | Editor's letter | Schultz, Pete | President's Letter | 1962/196208.pdf |
| 1962, August | Solar Seance | | Notice | 1962/196208.pdf |
| 1962, August | Did you Know? | | Article | 1962/196208.pdf |
| 1962, August | President's Notes | | President's Letter | 1962/196208.pdf |
| 1962, August | Questions asked Me | | Article | 1962/196208.pdf |

A Special THANK YOU to Earl Moser, John Johnson, Ron Veys and others who saved their old newsletters. Without them we would not have been able to preserve so much of the club's history!

have been coding articles by category, so I added a column to the spreadsheet for "article, news, club business, etc."

I finished indexing in April, and then came the task of turning it into a proper database. Articles were coded by year and month, title and author (where known) and category.

It took a few days to normalize the data and add categories to the older entries.

By the time it was done, the database contained 683 newsletters and almost 4,900 entries. I'm still

missing a few issues, so if you have any of them (see next below) please let me know.

How to Search

The search dialog box allows you to search by keyword within the title, and you can narrow or filter by category, author and year.

The resulting list will be sorted by date in ascending order, and at the bottom are pagination buttons, so you can step through the results at 20 per page.

To view the issue, just click on the PDF link to the right. It'll open in another window.

Full Text Search?

At this time, full-text search is not available. I'm looking at ways to add it for issues after 2000, but we'll have to wait for better AI to index every word of the older issues. As you'll see if you click on the PDFs, some of the 1960s issues are rather difficult to read, even if you're a human.

Please email me if you have any questions or suggestions for improvement.

Narrow Search

Category: All where title contains

Narrow by: All Narrow by year: All Search

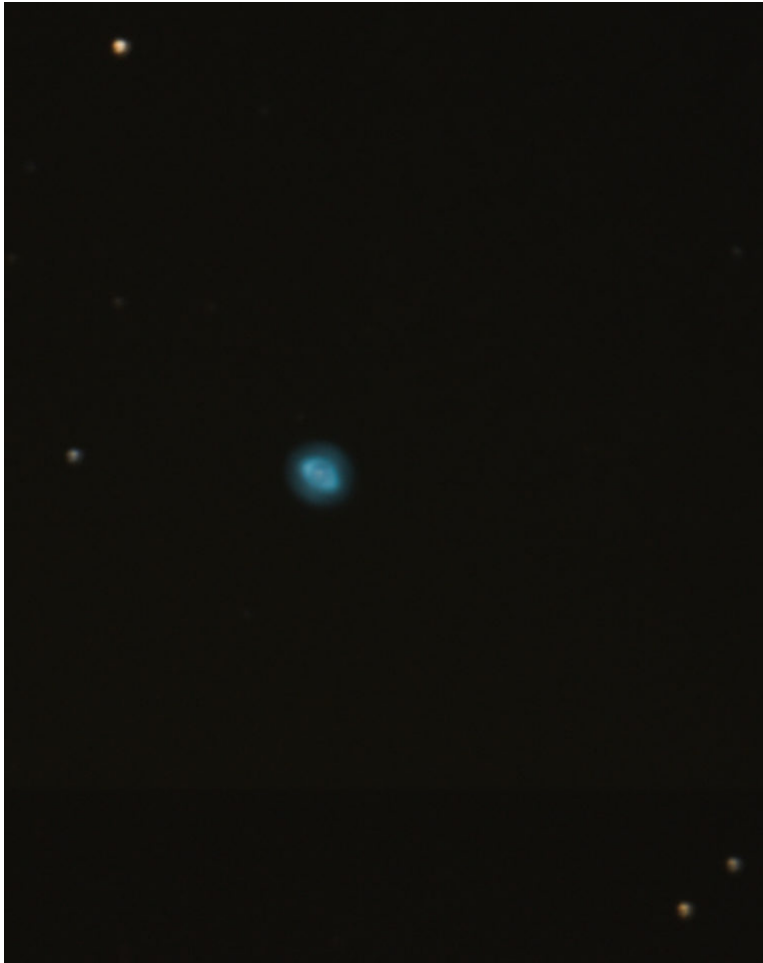
- All
- Uncategorized
- Notices
- Events
- Club Business
- President's Letters
- Astrophotography
- From the Archives
- News, Syndicated
- Articles
- Articles, News, Archives, Astrophotos...
- Notices, Events, Club Business...

| Issue | | Author | Category |
|-------------|------------|----------------|--------------------|
| 1962, April | | Schultz, Pete | President's Letter |
| 1962, May | | Schultz, Pete | President's Letter |
| 1962, May | split Hour | Erbach, Walter | Article |

Issues that are still missing:

| | | | | | | | |
|------|-----------|------|----------|------|-----------|------|-----------|
| 1962 | June | 1964 | January | 1969 | March | 1993 | August |
| | | | February | | August | | |
| 1963 | January | | March | 1979 | March | 1995 | September |
| | March | | April | | | | |
| | April | | June | 1984 | September | | |
| | May | | July | | | | |
| | June | | November | 1992 | January | | |
| | August | | | | May | | |
| | September | 1966 | February | | June | | |
| | October | | June | | | | |
| | December | | July | | | | |

Astrophotography



NGC 3242 by Jim White

The attached picture is of NGC 3242, The Ghost of Jupiter Nebula, that I took from my light polluted back yard along Pine Lake Road on 4-11-2021 around 1:00 a.m. This image was created by stacking the best 15% of 56 frames using AutStakkert 3 (free software) and then cropping and minor adjustments in Lightroom. This was shot with a Nikon D750 attached to a Tele Vue 2X Powermate and a Celestron 925 EdgeHD on a Celestron CGX GEM mount, guided with a Meade monochrome camera and a guide scope. The frames were 30 second exposures at ISO 3200.

CLUB MEMBERSHIP INFO

REGULAR MEMBER - \$30.00 per year. Includes club newsletter, and 1 vote at club meetings, plus all other standard club privileges.

FAMILY MEMBER - \$35.00 per year. Same as regular member except gets 2 votes at club meetings.

STUDENT MEMBER - \$10.00 per year with volunteer requirement.

If you renew your membership prior to your annual renewal date, you will receive a 10% discount.

Club members are also eligible for special subscription discounts on Sky & Telescope Magazine.

CLUB TELESCOPES

To check out one of the club telescopes, please contact a club officer. Scopes can be checked out at a regular club meeting and kept for one month. Checkout can be extended for another month if there are no other requests for the telescope, but you must notify a club officer in advance.

100mm Orion refractor: Available

10 inch Meade Starfinder Dobsonian: Available

13 inch Truss Dobsonian: Needs repair

10 inch Zhumell: Needs mount

Buy the book! The Prairie Astronomy Club: Fifty Years of Amateur Astronomy. Order online from Amazon or lulu.com.

ADDRESS

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The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc. Membership expiration date is listed on the mailing label. Membership dues are: **Regular \$30/yr, Family \$35/yr.** Address all new memberships and renewals to: **The Prairie Astronomy Club, Inc., PO Box 5585, Lincoln, NE 68505-0585.** For other club information, please contact one of the club officers listed to the right. Newsletter comments and articles should be submitted to: **Mark Dahmke, P. O. Box 5585, Lincoln, NE 68505** or mark@dahmke.com, no less than ten days prior to the club meeting. The Prairie Astronomy Club meets the last Tuesday of each month at Hyde Memorial Observatory in Lincoln, NE.

