The Prairie Astronomer

June 2022 Volume 63, Issue #6

IN THIS ISSUE:

The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer

NEXT MEETING AND PROGRAM

June 28, 6pm: Solar Observing Party at Hyde Observatory

Annual Solar Viewing Party at Hyde Observatory. If the sun is out: we will set up and observing from 6-7:30 PM. Dave will provide feedback and give a brief discussion around 7:15 pm. We will have a brief meeting at the solar scopes to review upcoming dates and activities.

If Cloudy: We'll meet at 7:30pm for a brief PAC meeting inside Hyde. We will pull up the solar observing site and Dave will use it to describe the features.

FUTURE PROGRAMS

August: JWST Image release
September: NSP Review
October: Club Viewing Night
November: How To Buy a Telescope
December: Holiday gathering

CONTENTS

Cover: The Large Magellanic Cloud (LMC) is a satellite of the Milky Way, containing about 30 billion stars. Seen here in a far-infrared and radio view, the LMC's cool and warm dust are shown in green and blue, respectively, with hydrogen gas in red. Credit: ESA/NASA/JPL-Caltech/CSIRO/C. Clark (STScI)

CALENDAR

PAC Meeting
June 28, 6:00pm at Hyde Observatory
Solar Observing Party

Nebraska Star Party
July 24-29, Merritt Reservoir, Valentine, NE

NO PAC Meeting in July

ALCON, New Mexico, July 28-30

JWST Image release
Hyde Observatory, August 14, 2:30pm

PAC Meeting
August 30, 7:30pm at Hyde Observatory
JWST Image Release with NASA Ambassador

2022 STAR PARTY DATES

	Date	Date
January	**28**	2/5
February	25	**3/4**
March	25	**4/1**
April	22	**29**
May	20	**27**
June	17	**24**
July	22	**29**
NSP	**7/24**	**7/29**
August	19	**26**
September	**23**	30
October	21	**28**
November	18	**25**
December	16	**23**

Dates in BOLD are closest to the New Moon.

CLUB OFFICERS

President	**Bob Kacvinsky** **kacvinskyb@yahoo.com**
Vice President	**Jason O'Flaherty** **jflaher@gmail.com**
2nd VP (Program Chair)	**Bill Lohrberg** **wmlohrberg89@gmail.com**
Secretary	**Jim White** **jrwhite2188@gmail.com**
Treasurer	**John Reinert** **jr6@aol.com**
Club Observing Chair	**Jim Kvasnicka** **jim.kvasnicka@yahoo.com**
Outreach Coordinator	**Mike Kearns** **mkearns@neb.rr.com**
Website and Newsletter Editor	**Mark Dahmke** **mark@dahmke.com**

amazonsmile

Shop through Amazon Smile to automatically donate to PAC:
smile.amazon.com/ch/47-6044523

Night Sky Network

www.prairieastronomyclub.org

Meeting Minutes

Jim White

PAC Meeting Minutes
5-31-2022

Bob Kacvinsky started the meeting at 7:35 P.M. We had one visitor in attendance. Our speaker tonight will be Kevin Gallagher, who is a NASA Ambassador and is joining us live via Zoom, his topic tonight will be the James Webb Space Telescope.

At 7:38 Bob turned the meeting over to Jim Kvasnicka for his monthly observing report. June's club star parties will be on the 17th and 24th at the club observing site south of Cortland. Planets for the month of June in the morning, Mercury, Venus, Mars, Jupiter, Saturn. On June 4th before dawn the naked eye planets will be visible from East to South in a line in the same order as there orbits around the sun, they will span a distance of 91 degrees in the sky. This configuration hasn't happened in over one hundred years and won't happen again until 2041. On June 24th Neptune and Uranus will join the other morning planets in a line that spans 107 degrees in the sky. Neptune and Uranus are not visible with the naked eye so you will need a telescope to see them. Jim's complete observing report can be found in this newsletter. Jim turned the meeting back over to Bob at 7:42.

The exploratory committee for the James Webb Space Telescope met on May 17th to discuss ideas for possible activities for the club to do in regard to the release of first images from the James Webb Space Telescope. PAC is one of approximately 650 groups that will be able to get the panel discussion group from NASA later in the same day that the first images are released. This is expected to happen sometime around the middle of July. Branched Oak Observatory is planning on doing something which PAC is going to try and coordinate with them. Hyde is talking about possibly doing something in the evening 2-3 weeks after the first images are released before Hyde opens for observing on a Saturday evening between 7:00 and 9:00 P.M. These plans are tentative at this times and may change as more information is released.

For the August PAC meeting we are thinking of having our public event for the James Webb Space Telescope and putting off the display of NSP pictures meeting until the September PAC meeting. Our hope would be to have a speaker join us via Zoom for the August meeting. Hyde will also feature the first image releases during their Astro Shorts Programs that run during Hyde's normal Saturday night viewing routine. Ron and Lee will be working on the Astro Shorts Program integration. PAC has offered to help collaborate with Lincoln Public Schools and the Lincoln Public Libraries, some initial contacts have been made but nothing has been setup at this time. OAS (Omaha Astronomical Society) is thinking about doing something but has not set anything up yet and we may also collaborate with them on something. Stay tuned as things are still very fluid at this time.

Before anything else, Jim Kvasnicka found a Mentorship Award on the Astronomical League web site. PAC submitted the names for each of the clubs six mentors that started in the last sixth months and what they

have been doing has qualified them for the award. Bob called the mentors up to the front of the room to receive their awards. The mentors are Dan Delzell, Jason O'Flaherty, Jim Kvasnicka, Brett Boller, Jim White and Bob Kacvinsky. The mentorship program has been discussed for several years and finally this January it was started and these six people were gracious enough to offer to help new people with new telescopes.

The PAC June meeting will be our solar viewing meeting with Dave Churilla heading up the activities. The plan is to set up between 6:00 and 6:30 P.M. if the skies are clear. If it happens to be cloudy we are hoping to be able to move inside at Hyde and pull up a web site that does solar viewing 24/7 and project that on the big screen where Dave will be able to discuss what we are seeing from that web feed. We will have a brief meeting after the solar viewing but it will be mainly a social viewing event. There will be no July meeting as many members of the club will be at NSP (Nebraska Star Party). September's meeting will be sharing of club photos from NSP and the October meeting will be our club viewing night at BOO (Branched Oak Observatory).

Astrophotography class was held May 5th and went well, the class is on the internet if someone would like to view it. Brett shared a picture he took from the recent lunar eclipse, there were almost 300 at Hyde Observatory, approximately 150 at BOO, Bob had about a dozen neighbors at his house and several other members had guests at their houses for viewing also. The weather for the Lunar Eclipse was outstanding.

Bob asked John Reinert if he had anything for his treasury report and he said that he knows what he wants to do with the paperless system for membership dues but he is still wrapping up on some of it. If you want to join or bring your dues up to date see John. Dues are $30.00 dollars for an individual or $35.00 for a family.

Upcoming events, Cars and Stars at BOO on June 18th, ALCON will be July 28th to 30th in Albuquerque, New Mexico which overlaps NSP (Nebraska Star Party). MSRAL (Mid States Region of the Astronomical League) is June 1st to 3rd just outside of Columbia, Missouri. Bob is going to MSRAL to represent PAC and if anyone else would like to attend please contact Bob. Rocky Mountain Star Stare (https://rmss.org) is June 22nd to 26th and is outside of Colorado Springs at around 7600 ft. Bob Kacvinsky, Jim Kvasnicka, Mike and Linda Kearns and James Quach are planning to attend so if anyone else is interested feel free to get in touch with one of the attending members. Okie-Tex Star Party is September 23rd to October 1st.

There was no new business brought up so the meeting ended at 7:55 P.M. and the meeting was turned over to our guest speaker.

The President's Message

Bob Kacvinsky

Summer has begun with a big bang – at least from a heat standpoint. Short nights as the Milky Way becomes prominent in the night skies and the summer constellations take over. Time to get out and enjoy our great Nebraska skies.

PAC's next meeting will be Tuesday, June 28th. In June we take advantage of the long days for our Solar Observing party at Hyde. If the skies are clear, PAC members will set up their solar observing telescopes starting around 6:00 PM. Dave Churilla will be available to provide commentary and answer questions about solar activities. If it is cloudy, we are planning to gather at 7:30 pm at Hyde for a brief club meeting and with Dave Churilla providing a Solar Observing discussion using a live feed from the Solar Observing Array. The sun has finally broken out of its solar activity minimum and is sporting a number of surface features. Plan to stop in and check it out.

PACs JWST Team will be hosting several activities this summer as the First Image release has been set by NASA for July 12th and 16th. These events will be open to anyone with internet access. I will send out links on the Nightsky Network list once the details are released. We are also planning several local events along with NASA's release dates (see next page).

Several of the events will need a few volunteers to help out so as further information becomes available we will send out updates.

If you are completing the AL Special Spring Galaxy Challenge, please be sure to turn in your observing logs to Jim Kvasnicka for submission by the end of June. Most observers have been able to finish the program in a single evening session (2-3 hours). The program requires observing just 12 bright spring objects from a list of 22 provided by the AL. If you need a copy of the observing list or an observing log sheet, please contact Jim Kvasnicka for a copy. Starting in July and running through September the Astronomical League will have a special observing challenge featuring Globular Clusters. Details pending.

Hyde Observatory is open for viewing! If you would like to help out please let us know. There are high school volunteers that operate the telescopes with only a little basic training, so you don't need to be a rocket scientist to help. Most volunteers only participate once every 6 weeks, so the time commitment is minimal. Come give it a try, you will find it is a lot of fun seeing the

expressions of a 5-year-old seeing Saturn's rings for the first time.

Checkout this newsletter for upcoming observing events including Cars and Stars event at BOO on June 18th, late June Rocky Mountain Star Stare west of Colorado Springs (4 members attending to date), NSP at the end of July, to mention a few. If you want to get out and observe there are a lot of great options available including our monthly star parties. Look forward to seeing you at an upcoming event.

Wish you all Clear Dark Skies.

Bob Kacvinsky
kacvinskyb@yahoo.com
402-840-0084

JWST Image Release Events

June 27:
Walt Library Astronomy – Preview JWST included (Monday)

July 12 at 5 pm:
NASA First Image Release – Public Webinar (Tuesday)

July 16 at 2:30pm:
NASA First Images Public Panel Repeat (Saturday)

Starting July 16:
Hyde Observatory Inclusion in Astro Shorts

July 27-28:
NSP Girl Scout Attendees (W-R)

Aug 14 at 2:30pm:
NASA First Images Panel NE Lead Up Hyde (Sunday)

Aug 20th 7-9pm:
Branched Oak Observatory Public Event (Saturday)

Aug 29 at 6:30pm:
Lincoln Public Library Presentation – Bennett Martin (Monday)

Aug 30 at 7:30pm: PAC Public Meeting with NASA Ambassador

Sept 9 at 6pm:
First Images Panel Home School Group Lincoln and Girl Scouts (Friday)

29th Annual Nebraska Star Party


Photo Credit: Fred Hultstrand History in Pictures Collection, NDSU, Fargo, N.D.

Join us this summer as families from all over the US and around the world gather in the sparsely populated sand hills of North Central Nebraska to spend a good week under a galaxy of stars.

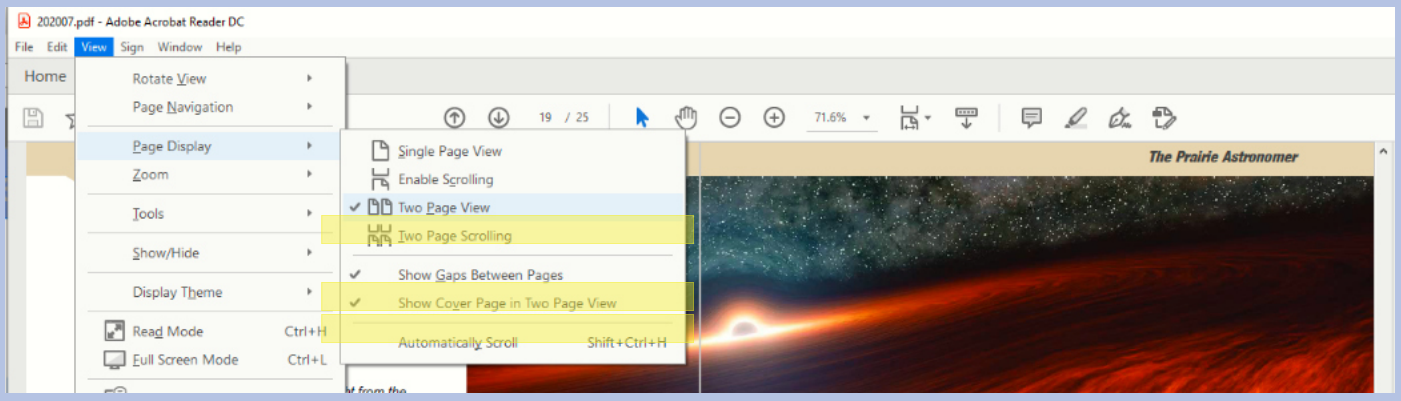
July 24-29 at Merritt Reservoir, Valentine, Nebraska

Online Registration is now open

Notices

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.

PAC Newsletter Archive

Back issues of the Prairie Astronomer from 1962 to present are now available online:

https://www.prairieastronomyclub.org/newsletters

PAC-LIST

Subscribe through GoogleGroups or contact Mark Dahmke to be added to the list. You’ll need a Google/gmail account, but if you want to use a different email address, just associate that address with your google account to access Google Groups. Once subscribed, you can view message history through the GoogleGroups website.

To post messages to the list, send to this address: pac-list@googlegroups.com

ARP 44

Rick Johnson

Arp 44/IC 609 is a rather distorted spiral galaxy in Sextans about 270 million light-years distant. Arp puts it in his category spiral galaxies with companions on arms: Low surface brightness companions. Apparently, the two faint galaxies to the south are the companions Arp is talking about. At least that's the conclusion of Kanipe and Webb in their book on the atlas. Arp included both in his image. Most catalogs only include the closer, brighter one, however. I don't see either as being on an arm. Arp left no comment to help decide this issue. IC 609 was discovered by Stephane Javelle on March 21, 1893.

However, there is another galaxy that might be the one Arp refers to. It is due south of the western end of the faint south arm. It appears like a star in my image. It is SDSS J102534.00-021344.5 but has no distance data. I assume it is far beyond Arp 44. The galaxy most, including NED, consider the companion is the obvious fuzzy galaxy south of Arp 44. It is UGC 05641(1). It's far beyond any arm of Arp 44 however and far beyond Arp 44 in distance. Redshift shows it to be about 660 million light-year distant. More than twice as far as Arp 44. Obviously, it had nothing to do with the distortions seen in Arp 44.

The other galaxy in Arp's image, near the top right of center and quite faint is SDSS J102538.22-021438.8. It has no redshift data but I can't see it as having anything to do with Arp 44.

So what did distort Arp 44? Arp 44 is one of 4 galaxies in the in my frame that are about 270 million light-years from us. Two are north and east of Arp 44. They are quite small. I doubt they could be involved. The 4th member is CGCG 009-022 toward the lower right corner. It is large enough but doesn't

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.

ARP 44, continued.

appear sufficiently distorted. NGC 3243, a large elliptical at 270 million light-years is just out of the image to the southeast. It certainly is large enough but again, shows no sign of being the culprit. Maybe this is the result of a merger. Seems possible as there are a bunch of small galaxies at this distance in the area.

PAC Mentors Honored

PAC mentors received their awards at the last meeting. The mentors are Dan Delzell, Jason O'Flaherty, Jim Kvasnicka, Brett Boller, Jim White and Bob Kacvinsky. The mentorship program has been discussed for several years and finally this January it was started and these six people were gracious enough to offer to help people with new telescopes.

Focus on Constellations

Scorpius

Jim Kvasnicka

Scorpius, the Scorpion covers 497 square degrees of sky. Scorpius lies in the general direction of the center of our Milky Way Galaxy. Because our Galaxy's family of approximately 200 globular clusters is concentrated toward the center of the Milky Way, Scorpius is rich in globular clusters, two of them M4 and M80 being Messier objects. Scorpius contains two additional Messier objects, M6 and M7, both are open clusters.

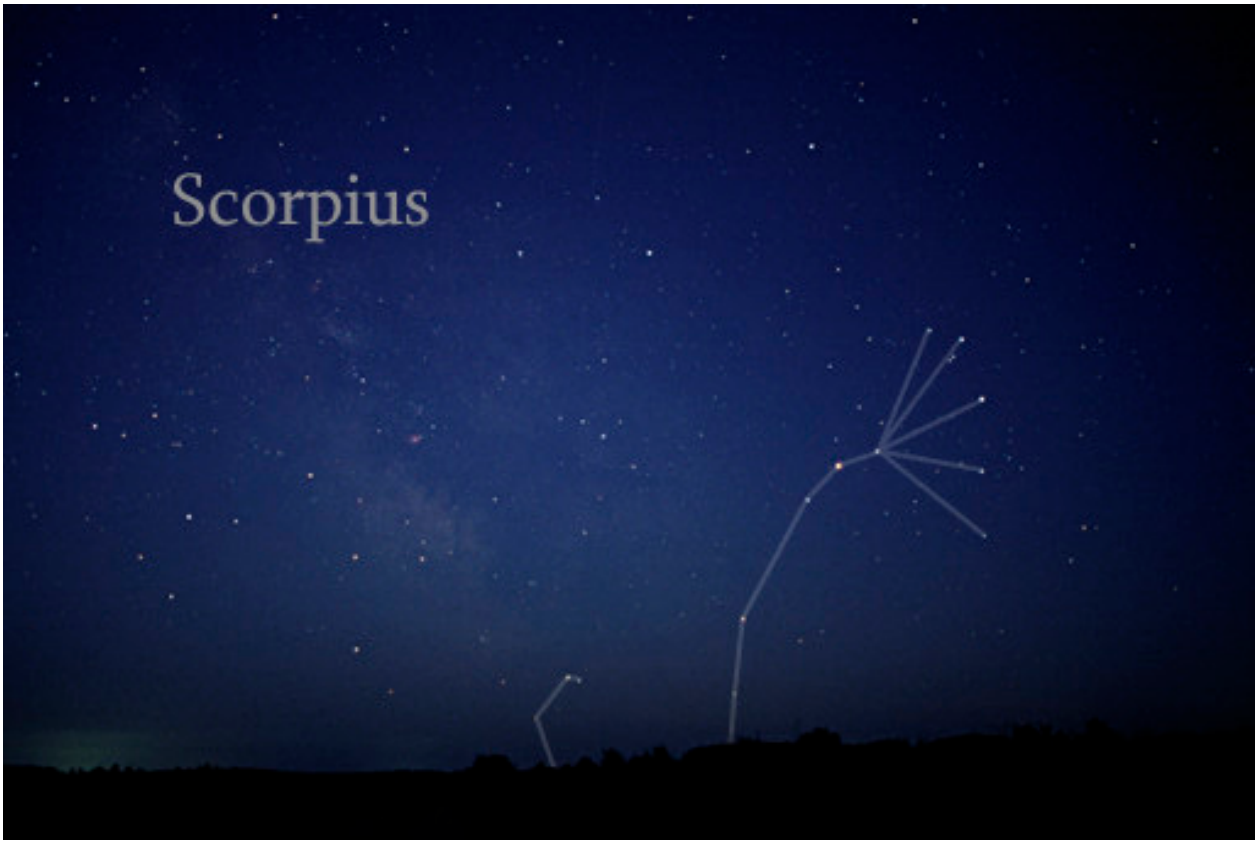
Showpiece Objects
Open Clusters: M6, M7, NGC 6231
Globular Clusters: M4, M80
Multiple Stars: Xi Scorpii, Beta Scorpii, 14 Scorpii, 12 Scorpii, Alpha Scorpii

Mythology

Scorpius represents the Scorpion sent to sting Orion in the heel. The constellation is mentioned several times in a group of Mesopotamian tablets dated to 2,500 B.C.; and in Mesopotamian art there are figures of scorpions and scorpion-men.

Number of Objects Magnitude 12.0 and Brighter

Galaxies: 0
Globular Clusters: 10
Open Clusters: 43
Planetary Nebulae: 5
Dark Nebulae: 23
Bright Nebulae: 0
SNREM: 0



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

Mid-states Regional Convention Report

Bob Kacvinsky

The Misstates Regional Astronomical League meeting (MSRAL) on June 3-5 was hosted by the St Louis Astronomical Society (SLAS). Friday night included the traditional Star-B-Que at Jefferson College, the observing site for the local observing field. We toured the SLAS recently constructed observatory and public outreach facility on the campus.

Saturday and Sunday program was hosted on the Washington University campus. I participated in a tour of the NASA Data Center where all data from space exploration projects are stored. Wash U is one of several sites across the country where project data is stored for research and public access. Wash U has a very active science and space program in their curriculums.

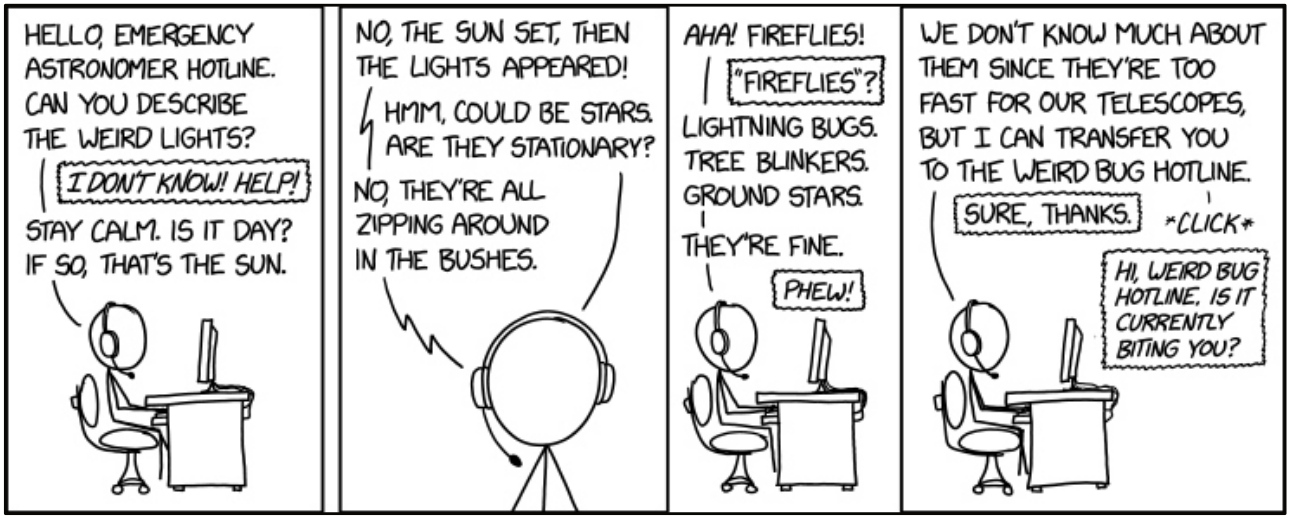
The program presentations focused on several relevant topics

MSRAL Banquet Speaker: Dr. Scott VanBromme.
"The Pale Red Dot: Mars Sample Return Project"

including outreach activities, gaining and activating youth and young adults into astronomy, 3D printing telescope accessories, utilizing EV telescopes and projections vs “eye in the eyepiece” public observing, along with a couple around Mars rover findings. One interesting absence was any program centered around the James Webb Space Telescope.

There were several programs focused on Electronic Assisted Astronomy using home made or EV telescopes that can track and stack images and then project them onto screens for crowd observing. The limitations of viewing directly at an eyepiece and social distancing requirements have sparked several observatories to switch to electronic outside projection. Using stacking software also allowed for enhancements of the image as it “grows” over a few minutes of viewing.

The MSRAL business meeting focused on basic reports and the continuation of finding hosts for future MSRALs. Omaha is scheduled to host the 2024 convention while 2023 is still open for volunteers. PAC is presently not in the running. I’d encourage members to attend a MSRAL or AL convention to network with other state members and gain awareness of national issues and opportunities for astronomy.



xkcd.com

Astrophotography

The open star cluster M21 taken from my driveway under a gibbous moon with my 9.25 inch SCT, 35 second exposure with a Canon EOS Rebel XT Model 350D, set at ISO1600. - Dave Knisely

July Observing

Jim Kvasnicka

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

Planets

Mercury, Venus, Mars, Jupiter, and Saturn: All five naked eye planets are in the morning before sunrise. The five planets cover 118° in the sky. Venus shines at magnitude -4.0 and Jupiter at -2.4.

Uranus and Neptune: These two are in the morning as well rising after midnight.

Messier List

M3: Class VI globular cluster in Canes Venatici.

M4: Class IX globular cluster in Scorpius.

M5: Class V globular cluster in Serpens Caput.

M53: Class V globular cluster in Coma Berenices.

M68: Class X globular cluster in Hydra.

M80: Class II globular cluster in Scorpius.

M83: Galaxy in Hydra.

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

Next Month: M6, M7, M8, M9, M10, M12, M19, M20, M21, M23, M62, M107

NGC and other Deep Sky Objects

NGC 6210: Blue colored planetary nebula in Hercules.

NGC 6229: Class IV globular cluster in Hercules.

NGC 6302: The Bug Nebula in Scorpius.

NGC 6309: Planetary nebula in Ophiuchus.

NGC 6369: The Little Ghost Nebula in Ophiuchus.

NGC 6543: The Cat's Eye Nebula in Draco.

IC 4703: The Eagle Nebula in Serpens, M16 is the open cluster embedded in the nebula.

Double Star Program List

Nu Draconis: Equal pair of white stars.

Psi Draconis: Pair of light yellow stars.

40/41 Draconis: Equal pair of light yellow stars.

Xi Scorpii: Yellow primary with a light blue secondary.

Struve 1999: Two yellow-orange stars.

Beta Scorpii: Bluish white primary with a light blue secondary.

Nu Scorpii: Yellow and light blue pair.

Delta Serpentis: Light yellow stars.

Theta Serpentis: Two blue-white stars.

Challenge Object

NGC 6144: Faint Class XI globular cluster just 40' NW of Antares.

Clayton Anderson To Serve As President And CEO Of Strategic Air Command & Aerospace Museum

"We look forward to establishing new relationships, along with rekindling and strengthening past relationships with all those who love the heavens!"

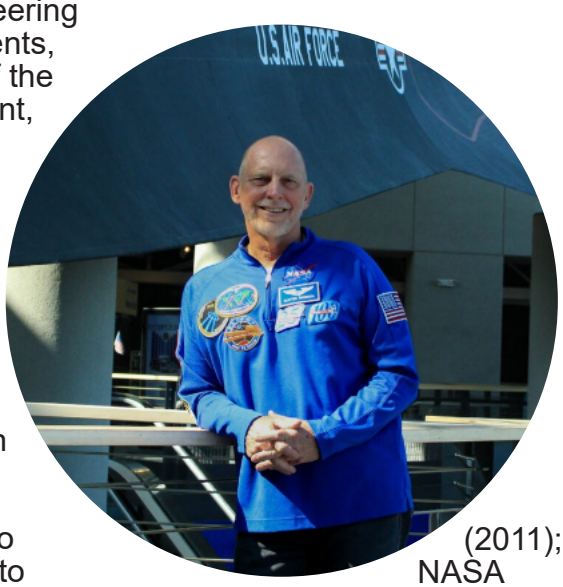
The Strategic Air Command (SAC) & Aerospace Museum welcomes Clayton "Astro Clay" Anderson, Nebraska's only NASA astronaut, as its president and chief executive officer. Anderson started his new position at the beginning of May.

"The stars have aligned to have Nebraska's first — and currently only — astronaut lead the Strategic Air Command & Aerospace Museum. Clay's unique professional experiences align perfectly with the mission of the Museum," said Gary Gates, Chair of the Museum's Board of Directors. "One of the exhibits at the Museum is a celebration of Clay's space exploration. We are very excited to have Clay's visionary skillset at the helm of the organization."

Anderson succeeds Jeffrey Cannon, who led the Museum since 2018. Cannon stepped down

due to health reasons. Cannon's tenure at the Museum includes advancing the Museum's education efforts and the successful response to the COVID-19 pandemic.

Succeeding in one of the most difficult and coveted jobs in the world, Anderson's tenure at NASA spanned three decades. As an astronaut, he was a part of four space missions enabling him to spend 167 days in space, executing six spacewalks. Anderson retired from NASA in 2013. Anderson is a Professor of Practice at Iowa State University teaching intro to Aerospace Engineering for first-year students, including topics of the Space Environment, the History and Future of Space, Spacecraft Environmental Control Systems, Ethics, and Teamwork. He is also the author of five books, three written for children about space.



"The opportunity to come back home to Ashland, Nebraska, to lead the Strategic Air Command & Aerospace Museum is the culmination of a career dedicated to space exploration and education," Anderson said. "As we head toward the Museum's 25th anniversary in 2023, I look forward to collaborating with communities throughout the region to tell the powerful story of Nebraska and America's role in military command and its relationship with our nation's aerospace exploration."

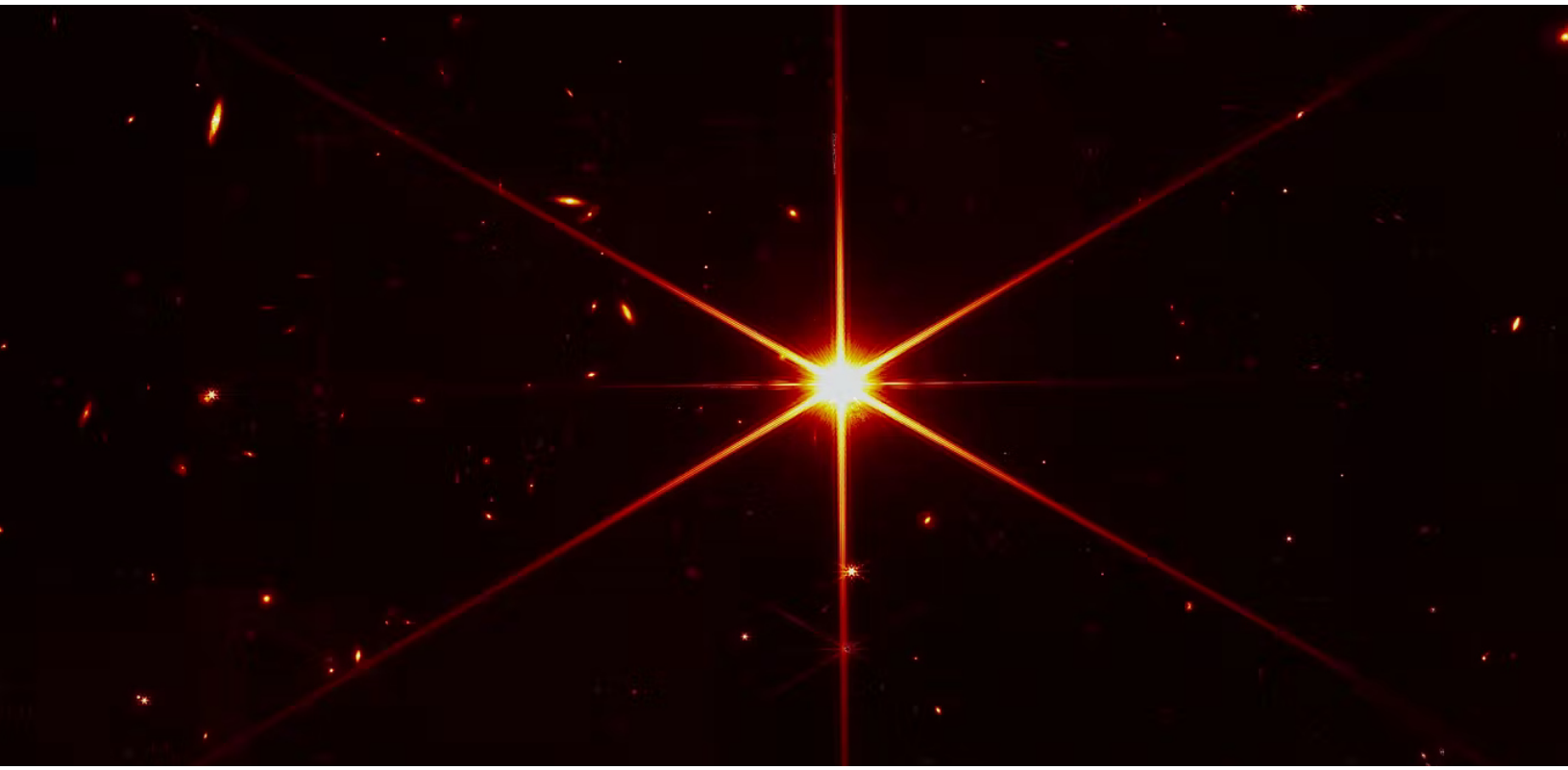
Anderson graduated cum laude with a Bachelor of Science degree in Physics from Hastings College and received a Master of Science degree in Aerospace Engineering from Iowa State University. Throughout his career, he has earned numerous honors and awards including the Ak-Sar-Ben Court of Honor (2011); NASA Spaceflight Medal (2008, 2011); NASA Exceptional Service Medal (2008, 2011); and Outstanding Alumnus at Iowa State University (2008) and Hastings College (2008) among other recognitions.

The Museum has exciting summer programs for students, families, flight enthusiasts, historians, and others. Helicopter Day is May 21, 2022, and visitors will see helicopters arrive, land, and the opportunity to visit with the pilots to learn more about the amazing machines. Registration is still open for a variety of Summer Camps, and programming includes aerospace, drones, gaming, weird science, robotics and more. Explore the Strategic Air Command & Aerospace Museum's webpage to learn more.

Left: NASA astronaut Clayton Anderson conducts the third spacewalk of STS-131. Photo credit: NASA.

The James Webb Space Telescope is finally ready to do science – and it's seeing the universe more clearly than even its own engineers hoped for

June 15, reprinted from The Conversation.



NASA is scheduled to release the first images taken by the James Webb Space Telescope on July 12, 2022. They'll mark the beginning of the next era in astronomy as Webb – the largest space telescope ever built – begins collecting scientific data that will help answer questions about the earliest moments of the universe and allow astronomers to study exoplanets in greater detail than ever before. But it has taken nearly eight months of travel, setup, testing and calibration to make sure this most valuable of telescopes is ready for prime time. Marcia Rieke, an astronomer at the University of Arizona and the scientist in charge of one of Webb's four cameras, explains what she and her colleagues have been doing to get this telescope up and running.

Photo: The mirror on the James Webb Space Telescope is fully aligned and producing incredibly sharp images, like this test image of a star. NASA/STScI via Flickr/

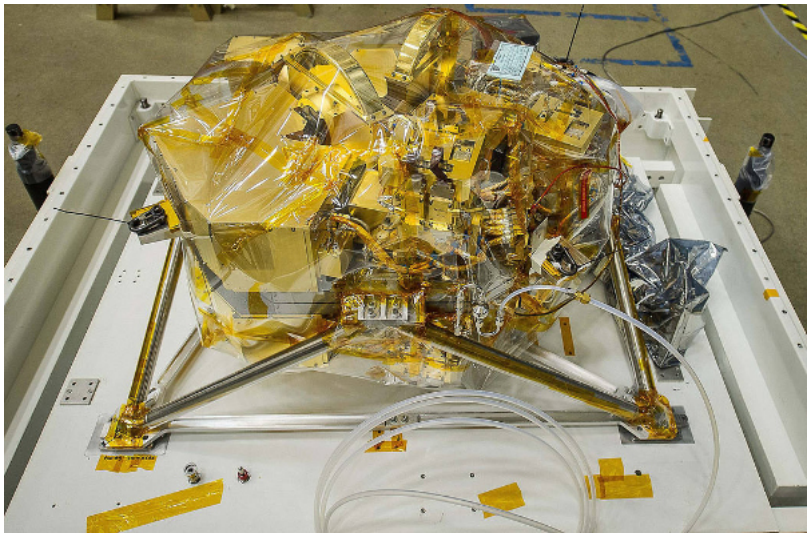
1. What's happened since the telescope launched?

After the successful launch of the James Webb Space Telescope on Dec. 25, 2021, the team began the long process of moving the telescope into its final orbital position, unfolding the telescope and – as everything cooled – calibrating the cameras and sensors onboard.

The launch went as smoothly as a rocket launch can go. One of the first things my colleagues at NASA noticed was that the telescope had more remaining fuel onboard than predicted to make future adjustments to its orbit. This will allow Webb to operate for much longer than the mission's initial 10-year goal.

The first task during Webb's monthlong journey to its final location in orbit was to unfold the telescope. This went along without any hitches, starting with the white-knuckle deployment of the sun shield that helps cool the telescope, followed by the alignment of the mirrors and the turning on of sensors.

Once the sun shield was open, our team began monitoring the temperatures of the four cameras and spectrometers onboard, waiting for them to reach



The NIRCam on Webb was the first instrument to go online and helped align the 18 mirror segments. NASA Goddard Space Center/Wikimedia Commons

temperatures low enough so that we could start testing each of the 17 different modes in which the instruments can operate.

2. What did you test first?

The cameras on Webb cooled just as the engineers predicted, and the first instrument the team turned on was the Near Infrared Camera – or NIRCam. NIRCam is designed to study the faint infrared light produced by the oldest stars or galaxies in the universe. But before it could do that, NIRCam had to help align the 18 individual segments of Webb's mirror.

Once NIRCam cooled to minus 280 F, it was cold enough to start detecting light reflecting off of Webb's mirror segments and produce the telescope's first images. The NIRCam team was ecstatic when the first light image arrived. We were in business!

These images showed that the mirror segments were all pointing at a relatively small area of the sky, and the alignment was much better than the worst-case scenarios we had planned for.

Webb's Fine Guidance Sensor also went into operation at this time. This sensor helps keep the telescope pointing steadily at a target – much like image stabilization in consumer digital cameras. Using the star HD84800 as a reference point, my

colleagues on the NIRCam team helped dial in the alignment of the mirror segments until it was virtually perfect, far better than the minimum required for a successful mission.

3. What sensors came alive next?

As the mirror alignment wrapped up on March 11, the Near Infrared Spectrograph – NIRSpec – and the Near Infrared Imager and Slitless Spectrograph – NIRISS – finished cooling and joined the party.

NIRSpec is designed to measure the strength of different wavelengths of light coming from a target. This information can reveal the composition and temperature of distant stars and galaxies. NIRSpec does this by looking at its target object through a slit that keeps other light out.

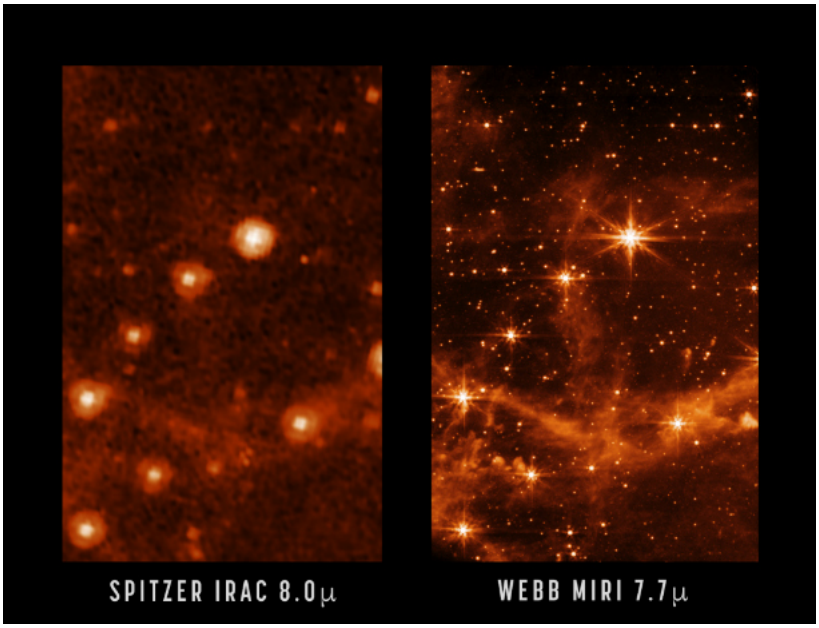
NIRSpec has multiple slits that allow it to look at 100 objects at once. Team members began by testing the multiple targets mode, commanding the slits to open and close, and they confirmed that the slits were responding correctly to commands. Future steps will measure exactly where the slits are pointing and check that multiple targets can be observed simultaneously.

NIRISS is a slitless spectrograph that will also break light into its different wavelengths, but it is better at observing all the objects in a field, not just ones on slits. It has several modes, including two that are designed specifically for studying exoplanets particularly close to their parent stars.

So far, the instrument checks and calibrations have been proceeding smoothly, and the results show that both NIRSpec and NIRISS will deliver even better data than engineers predicted before launch.

4. What was the last instrument to turn on?

The final instrument to boot up on Webb was the Mid-Infrared Instrument, or MIRI. MIRI is designed to take photos of distant or newly formed galaxies as well as faint, small objects like asteroids. This sensor detects the longest wavelengths of Webb's instruments and must be kept at minus 449 F – just 11 degrees F above absolute zero. If it were any warmer, the detectors would pick up only the heat from the instrument itself, not the interesting objects out in space. MIRI



The MIRI camera, image on the right, allows astronomers to see through dust clouds with incredible sharpness compared with previous telescopes like the the Spitzer Space Telescope, which produced the image on the left. NASA/JPL-Caltech (left), NASA/ESA/CSA/ STScI (right)/Flickr, CC BY

has its own cooling system, which needed extra time to become fully operational before the instrument could be turned on.

Radio astronomers have found hints that there are galaxies completely hidden by dust and undetectable by telescopes like Hubble that captures wavelengths of light similar to those visible to the human eye. The extremely cold temperatures allow MIRI to be incredibly sensitive to light in the mid-infrared range which can pass through dust more easily. When this sensitivity is combined with Webb's large mirror, it allows MIRI to penetrate these dust clouds and reveal the stars and structures in such galaxies for the first time.

5. What's next for Webb?

As of June 15, 2022, all of Webb's instruments are on and have taken their first images. Additionally, four imaging modes, three time series modes and three spectroscopic modes have been tested and certified, leaving just three to go.

On July 12, NASA plans to release a suite of teaser observations that illustrate Webb's capabilities. These will show the beauty of Webb imagery and also give astronomers a real taste of the quality of data they will receive.

After July 12, the James Webb Space Telescope will start working full time on its science mission. The detailed schedule for the coming year hasn't yet been released, but astronomers across the world are eagerly waiting to get the first data back from the most powerful space telescope ever built.

Club Member Profile: Jim White

Jim has been a member of PAC since 2018

I was born and raised in Lincoln, NE. I graduated from Lincoln Southeast High School and Southeast Community College. I am a journeyman Tool and Die Maker and do tooling design at Lincoln Machine. I enjoy distance running (although my knees no longer allow me to participate), I enjoy playing golf, astrophotography, and spending time with family and friends. I am married to my wife Theresa and we have a son who is a computer programmer.

My first visit to Hyde observatory was in 2016 or 2017 leading up to the August 2017 solar eclipse. The solar eclipse was what got me interested in astronomy, astrophotography and becoming a PAC member.

I joined PAC in late 2018 after attending a few monthly meetings and talking to members at the meetings. I joined PAC

Jim White, continued.

out of a basic interest in astronomy and an interest in photography that I have had since high school.

I purchased my first telescope in the summer of 2019. I have a Celestron 925 EdgeHD SCT with a Celestron CGX goto mount. I found that starting out down the astrophotography road would have been easier if I would have started with a shorter focal length telescope, but I haven't regretted what I have done so far. The 925 has a focal length of 2350 mm which means good polar alignment and guiding are required for any long exposure astrophotography. I have spent lots of time researching and learning quite a few different programs needed for mount control and image processing and still have lots to learn but to me that is part of the enjoyment and sometimes frustration. I have also found out that astronomy and astrophotography are like any hobby you have a passion about - they can be a pretty deep rabbit hole.

I have been to many PAC star parties at the club observing site and BOO. I had the opportunity this spring to join a group of club members and members of a couple of other clubs at Lord's Ranch south of Valentine. The location is amazing but unfortunately for six out of the ten people that went we were a day to late to have suitable observing weather. We had high winds, high temperatures, cold temperatures with rain and snow and lots of clouds. I definitely want to go back and hopefully enjoy some of the weather the four people enjoyed that went up a day earlier. I haven't been to NSP yet but that is on my list of things I want to do.

I really enjoy going to star parties and getting to visit with fellow astronomers while doing your own thing but close enough to others to be able to share in what they are doing which may be totally different from what you are doing. I have found that a lot of the things I have learned about astronomy have come from interacting with others at star parties. I did not have a big science background before getting interested in astronomy and astrophotography. At this point I haven't worked on any observing programs but will probably get into that at some point.

From the Archives

June, 1969

Two members of our club, Monte Cole and I, are presently building an 8 inch Buchroeder catadioptric telescope as described in the November Sky and Telescope.

The primary mirror is currently in fine grinding. We have just begun work on the secondary mirror and the lenses. The lens blanks were purchased from Coulter Optical Co. and the diopter tools were bough-t from Simonds Machine Co. in Southbridge, Mass.

We hope to have the optics completed by the end of this summer.

Advantages of this design include achromatism, compactness without resorting to a very fast system, spherical optical surfaces for ease of figuring, and lack of detectable coma.

Furthermore, the usable image size of the 200 inch telescope is the size of a penny. But if it was of this Buchroeder design, it would be two feet in diameter.

We have just purchased a mirror and lens grinding machine from Coulter Optical Co. and expect shipment early July.

This machine will grind and polish spherical surfaces up to

8 inches. For simple aspheric surfaces only slight final correction will be required.

Ed Woerner

The 1969 Mid-States Convention was a huge success. Ten members of the club were on hand for the ceremonies. Eric Rudd received a 16.3 mm eyepiece for the best equipment display. Jess Williams gave a very interesting talk and demonstration of his rotating solar filter. Rick and I showed our slides again, although several of our own club members walked out when the show began. The majority of the audience stayed and greatly enjoyed the show.

The greatest honor came to our club when we were named hosts of the 1970 Mid-States Convention. I am Regional Chairman for the coming year and Bob Allen, of the Omaha club, is my Co-Chairman for the coming event.

This coming year will be a busy one. Committees will be formed for the many tasks before us and our club will be put to a severe challenge. Lets all work together end make the 1970 Mid-States Convention one of the best of all time!

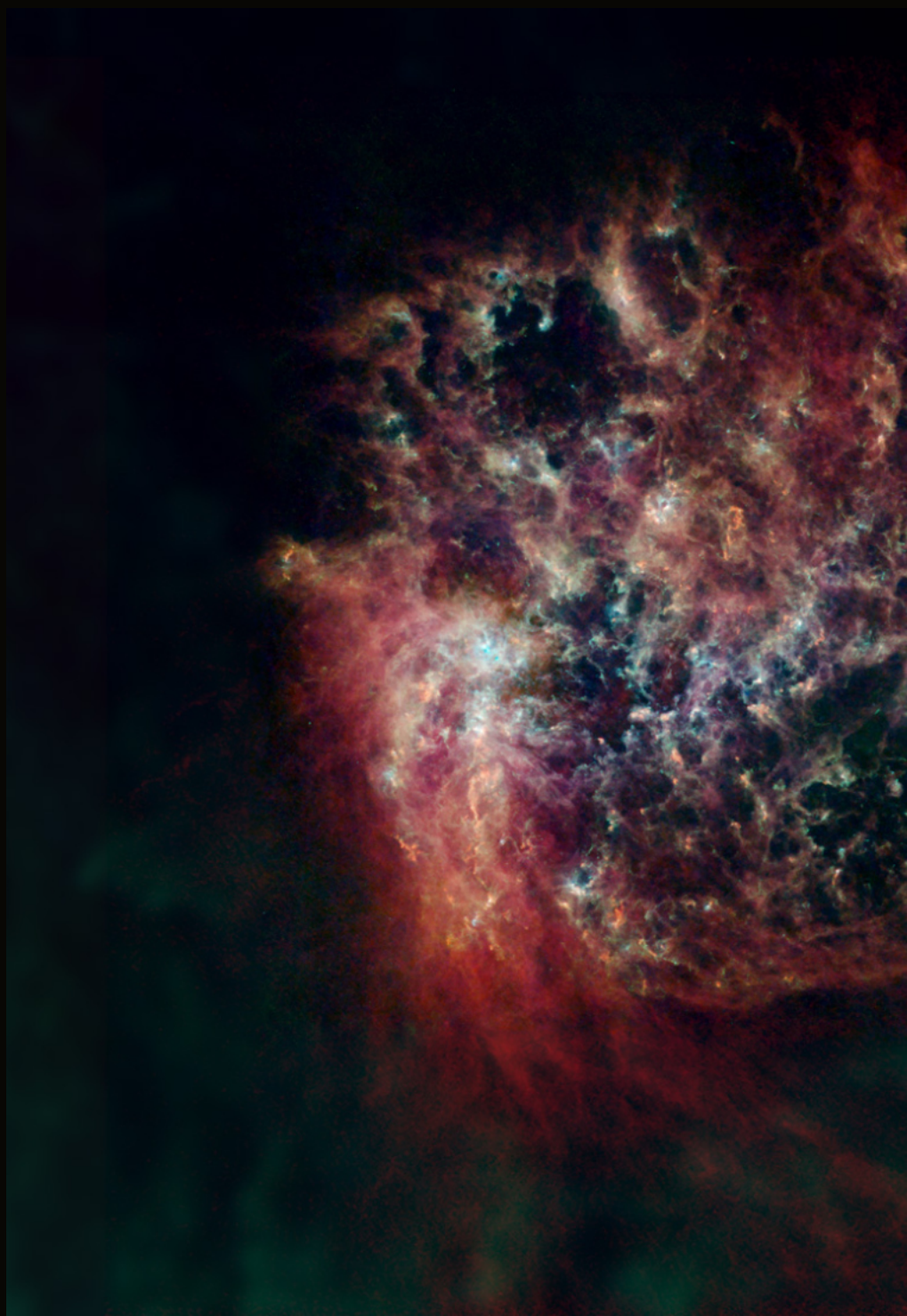
Earl Moser

New Images Using Data From Retired Telescopes Reveal Hidden Features

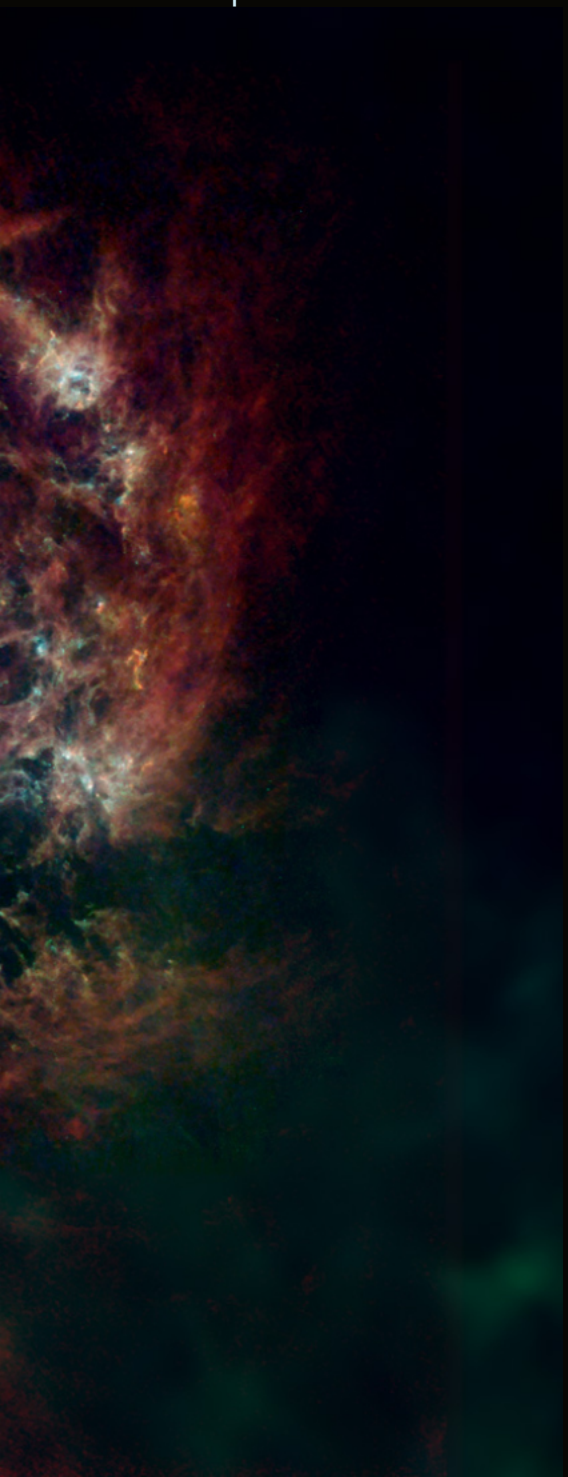
The stunning perspectives show four of our galactic neighbors in a different light.

New images using data from ESA (European Space Agency) and NASA missions showcase the dust that fills the space between stars in four of the galaxies closest to our own Milky Way. More than striking, the snapshots are also a scientific trove, lending insight into how dramatically the density of dust clouds can vary within a galaxy.

With a consistency similar to smoke, dust is created by dying stars and is one of the materials that forms new stars. The dust clouds observed by space telescopes are constantly shaped and molded by exploding stars, stellar winds, and the effects of gravity. Almost half of all the starlight in the universe is absorbed by dust. Many of the heavy chemical elements essential to forming planets like Earth are locked up in dust grains in interstellar space. So understanding dust is an essential part of understanding our universe.



The new observations were made possible through the work of ESA's Herschel Space Observatory, which operated from 2009 to 2013. NASA's Jet Propulsion Laboratory in Southern California contributed key parts of two instruments on the spacecraft. Herschel's supercold instruments



thermal glow of dust, which is emitted as far-infrared light, a range of wavelengths longer than what human eyes can detect.

Herschel's images of interstellar dust provide high-resolution views of fine details in these clouds, revealing intricate substructures. But the way the space telescope was designed meant that it often couldn't detect light from more spread out and diffuse clouds, especially in the outer regions of galaxies, where the gas and dust become sparse and thus fainter.

For some nearby galaxies, that meant Herschel missed up to 30% of all the light given off by dust. With such a significant gap, astronomers struggled to use the Herschel data to understand how dust and gas behaved in these environments. To fill out the Herschel dust maps, the new images combine data from three other missions: ESA's retired Planck observatory, along with two retired NASA missions, the Infrared Astronomical Satellite (IRAS) and Cosmic Background Explorer (COBE).

The images show the Andromeda galaxy, also known as M31; the Triangulum galaxy, or M33; and the Large and Small Magellanic Clouds – dwarf galaxies orbiting the Milky Way that do not have the spiral structure of the Andromeda and Triangulum galaxies. All four are within 3 million light-years of Earth.

In the images, red indicates hydrogen gas, the most common element in the universe. This data was collected using multiple radio telescopes located around the globe. The image of the Large Magellanic Cloud shows a red tail coming off the bottom left of the galaxy that was likely created when it collided with the Small Magellanic Cloud about 100 million years ago. Bubbles of empty space indicate regions where stars have recently formed, because intense winds from the newborn stars blow away the surrounding dust and gas. The green light around the edges of those bubbles indicates the presence of cold dust that has piled up as a result of those winds. Warmer dust, shown in blue, indicates where stars are

The Large Magellanic Cloud (LMC) is a satellite of the Milky Way, containing about 30 billion stars. Seen here in a far-infrared and radio view, the LMC's cool and warm dust are shown in green and blue, respectively, with hydrogen gas in red. Credit: ESA/NASA/JPL-Caltech/CSIRO/C. Clark (STScI)

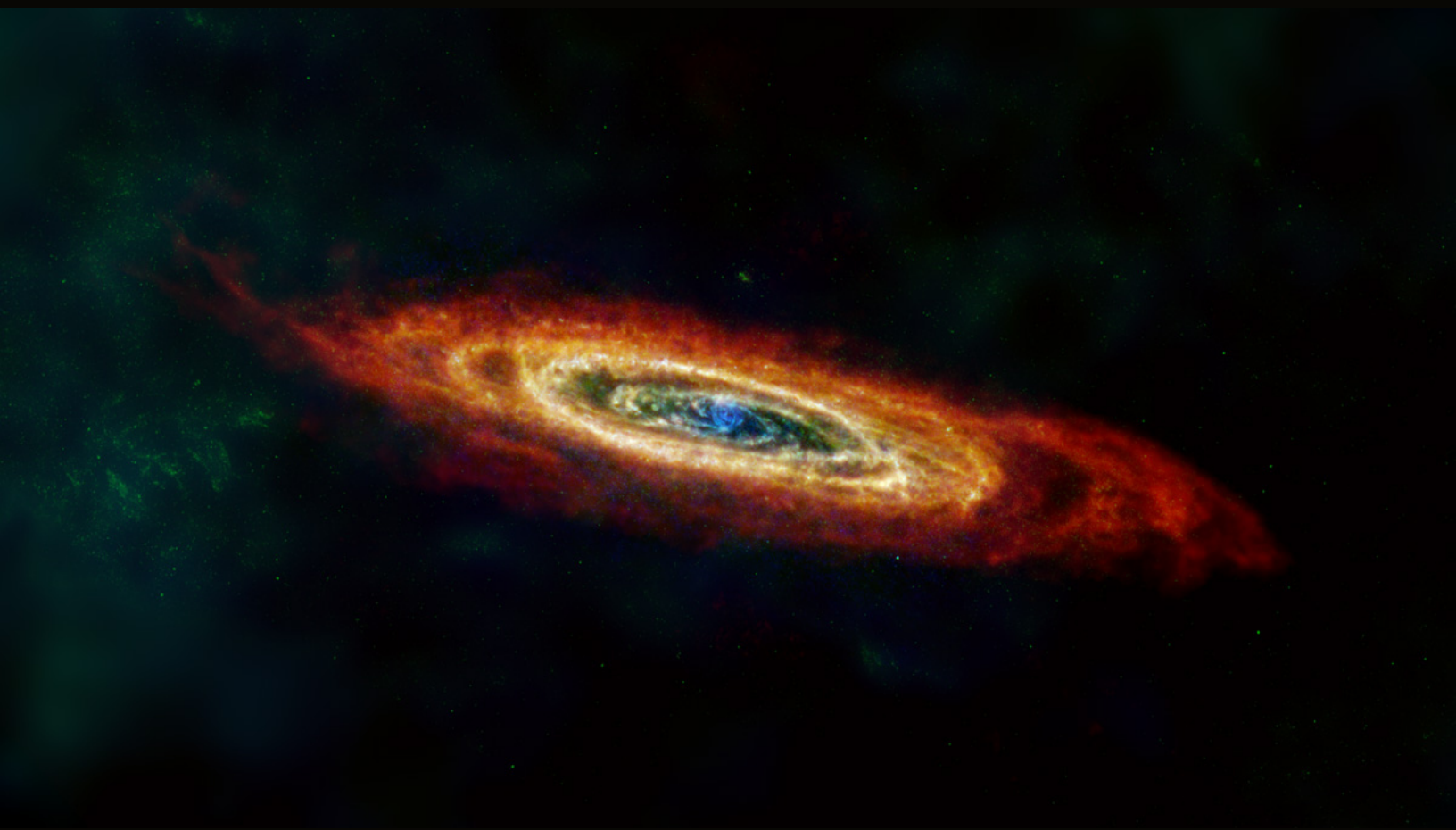
New Images, continued.

forming or other processes have heated the dust.

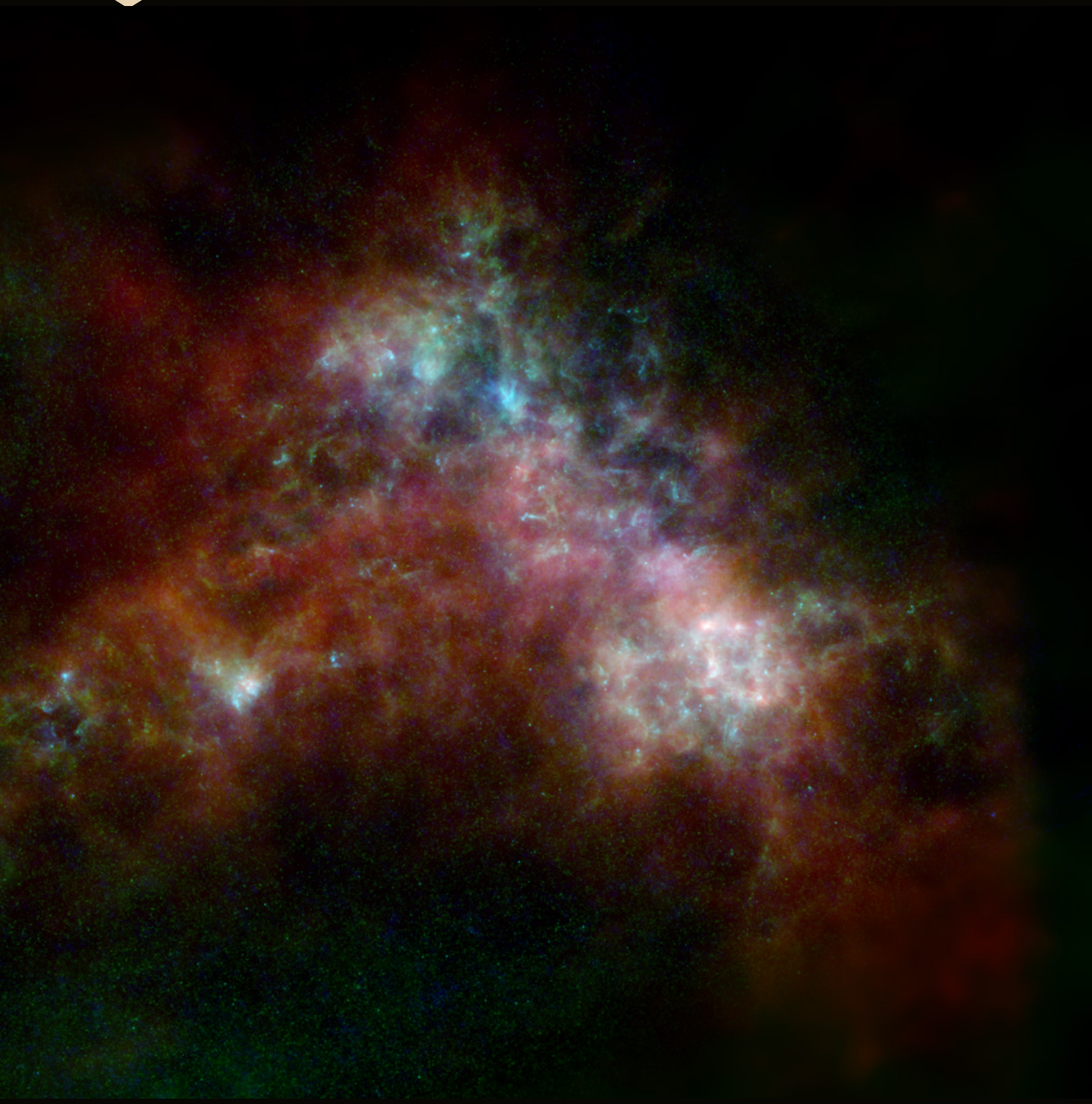
Many heavy elements in nature – including carbon, oxygen, and iron – can get stuck to dust grains, and the presence of different elements changes the way dust absorbs starlight. This, in turn, affects the view astronomers get of events like star formation.

In the densest dust clouds, almost all the heavy elements can get locked up in dust grains, which increases the dust-to-gas ratio. But in less dense regions, the destructive radiation from newborn stars or shockwaves from exploding stars will smash the dust grains and return some of those locked-up heavy elements back into the gas, changing the ratio once again. Scientists who study interstellar space and star formation want to better understand this ongoing cycle. The Herschel images show that the dust-to-gas ratio can vary within a single galaxy by up to a factor of 20, far more than previously estimated.

“These improved Herschel images show us that the dust ‘ecosystems’ in these galaxies are very dynamic,” said Christopher Clark, an astronomer at the Space



The Andromeda galaxy, or M31, is shown here in far-infrared and radio wavelengths of light. Some of the hydrogen gas (red) that traces the edge of Andromeda’s disc was pulled in from intergalactic space, and some was torn away from galaxies that merged with Andromeda far in the past. Credit: ESA/NASA/JPL-Caltech/GBT/WSRT/IRAM/C. Clark (STScI)



The Small Magellanic Cloud is a satellite of the Milky Way, containing about 3 billion stars. This far-infrared and radio view of it shows the cool (green) and warm (blue) dust, as well as the hydrogen gas (red). Credit: ESA/NASA/JPL-Caltech/CSIRO/NANTEN2/C. Clark (STScI)

New Images, continued.

Science Telescope Institute in Maryland, who led the work to create the new images.

More About the Missions

NASA's Herschel Project Office was based at JPL. The NASA Herschel Science Center was based at IPAC at Caltech in Pasadena, California. Caltech manages JPL for NASA.

Launched in 1983, NASA's IRAS was the first space telescope to detect infrared light, setting the stage for future observatories like the agency's Spitzer Space Telescope and James Webb Space Telescope. IRAS was a joint project of NASA, the Netherlands Agency for Aerospace Programmes, and the United Kingdom's Science and Engineering Research Council. JPL and NASA's Ames Research Center managed the telescope development. IPAC provided expertise and support for the processing and analysis of data from IRAS, and NASA's Infrared Science Archive (IRSA) at IPAC manages the IRAS archive.

The Planck observatory, launched in 2009, and COBE, launched in 1989, both studied the cosmic microwave background, or light left over from the big bang. The COBE satellite was developed by NASA's Goddard Space Flight Center. NASA's Planck Project Office was based at JPL, which also contributed mission-enabling technology for both of Planck's science instruments. European, Canadian, and U.S. Planck scientists work together to analyze the Planck data. IPAC serves as the U.S. Planck Data Center, hosted at IRSA.

The Triangulum galaxy, or M33, is shown here in far-infrared and radio wavelengths of light. Some of the hydrogen gas (red) that traces the edge of the Triangulum's disc was pulled in from intergalactic space, and some was torn away from galaxies that merged with Triangulum far in the past. Credit: ESA/NASA/JPL-Caltech/GBT/VLA/IRAM/C. Clark (STScI)

Find Hercules and His Mighty Globular Clusters

David Prosper

This article is distributed by NASA's Night Sky Network (NSN). The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Hercules is one of the standout heroes of Greek mythology, but his namesake constellation can be surprisingly hard to find - despite being one of the largest star patterns in our night skies! Once you find the stars of Hercules, look deeper; barely hidden in the space around his massive limbs and "Keystone" asterism are two beautiful globular star clusters: M13 and M92!

Since the constellation itself is relatively dim but bordered by brighter constellations, you can find the stars of Hercules by looking between the bright stars Vega and Arcturus. They are fairly easy to identify, and we have tips on how to do so in previous articles. Vega is the brightest star in the constellation Lyra and one of the three stars that make up the Summer Triangle (June 2020: Summer Triangle Corner: Vega). Arcturus is the brightest star in the constellation Boötes, and can be found by "arcing to Arcturus" from the handle of the Big Dipper (May 2021: Virgo's Galactic Harvest). You may be able to Hercules's "Keystone" asterism first; this distinct pattern of four stars is traditionally shown as the torso of the great hero, though some illustrators prefer marking the Keystone as the head of Hercules. What pattern do you see in the stars of Hercules?

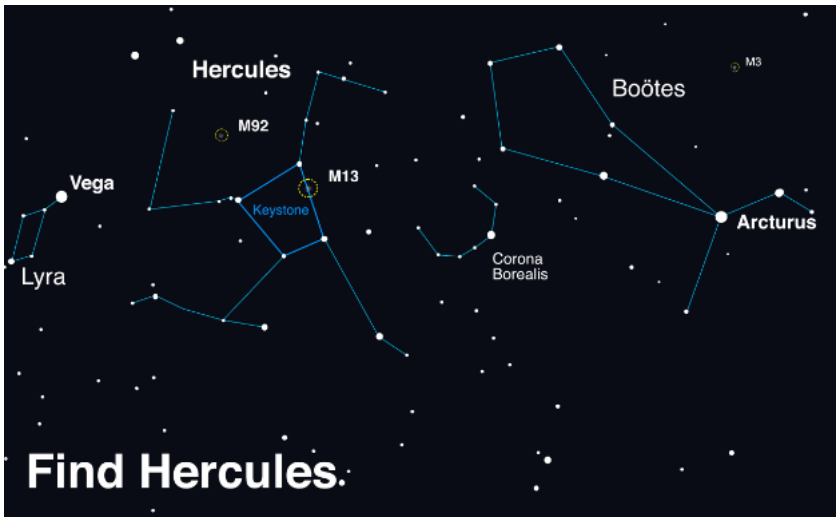
Globular star clusters appear "fluffy," round, and dense with stars, similar to a dandelion gone to seed, in contrast to the more scattered and decentralized patterns of open clusters. Open clusters are generally made up of young stars that are gradually spreading apart and found inside our Milky Way galaxy, while globular clusters are ancient clusters of stars that are compact, billions of years old, bound to each other and orbit around our galaxy. Due to their considerable distance, globular clusters are usually only visible in

Composite image of the dense starry core of M92 imaged in multiple wavelengths. While your own views of these globular clusters won't be nearly as crisp and detailed, you might be able to count some of its member stars. How far into their dense cores can you count individual stars? Credits: ESA/Hubble & NASA; Acknowledgment: Gilles Chapdelaine. Source: https://www.nasa.gov/feature/goddard/2017/messier-92

telescopes, but one notable exception is M13, also known as the Great Cluster or Hercules Cluster. During very clear dark nights, skilled observers may be able to spot M13 without optical aid along the border of the Keystone, in between the stars Zeta and Eta Herculis - and a bit closer to Eta. Readily visible as a fuzzy “star” in binoculars, in telescopes M13 explodes with stars and can fill up an eyepiece view with its sparkling stars, measuring a little over half the diameter of a full Moon in appearance! When viewed through small telescopes, globular clusters can appear orblike and without discernable member stars, similar in appearance to the fuzzy comae of distant comets. That’s why comet hunters Edmund Halley and Charles Messier discovered and then catalogued M13, in 1714 and 1764 respectively, marking this faint fuzzy as a “not-comet” so as to avoid future confusion.

While enjoying your view of M13, don’t forget to also look for M92! This is another bright and bold globular cluster, and if M13 wasn’t so spectacular, M92 would be known as the top celestial sight in Hercules. M92 also lies on the edge of naked-eye visibility, but again, binoculars and especially a telescope are needed to really make it “pop.” Even though M92 and M13 appear fairly close together in the sky, in actuality they are rather far apart: M13’s distance is estimated at about 25,000 light years from Earth, and M92’s at approximately 27,000 light years distant. Since M13 and M92 appear so close together in our skies and relatively easy to spot, switching between these two clusters in your scope makes for excellent star-hopping practice. Can you observe any differences between these two ancient clusters of stars?

Globular clusters are closely studied by astronomers for hints about the formation of stars and galaxies. The clusters of Hercules have even been studied by NASA’s space telescopes to reveal the secrets of their dense cores of hundreds of thousands of stars. Find their latest observations of globular clusters - and the universe - at nasa.gov.



Look up after sunset during summer months to find Hercules! Scan between Vega and Arcturus, near the distinct pattern of Corona Borealis. Once you find its stars, use binoculars or a telescope to hunt down the globular clusters M13 and M92. If you enjoy your views of these globular clusters, you’re in luck - look for another great globular, M3, in the nearby constellation of Boötes. Image created with assistance from Stellarium: stellarium.org

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.

ADDRESS

The Prairie Astronomer
c/o The Prairie Astronomy Club, Inc.
P.O. Box 5585
Lincoln, NE 68505-0585

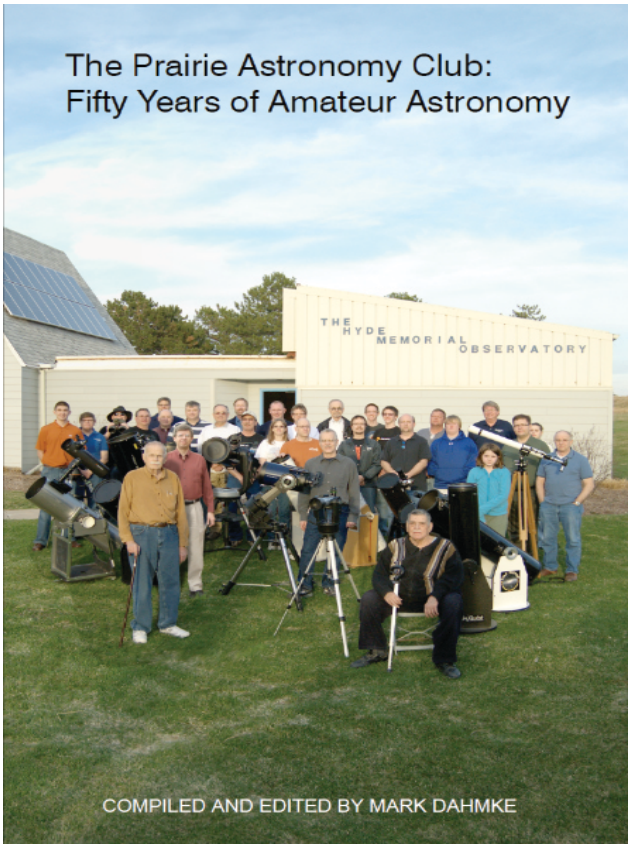
info@prairieastronomyclub.org

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.

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.