

The Prairie Astronomer

February 2023 Volume 64, Issue #2



Night Sky Network



The Newsletter of the Prairie Astronomy Club

The Prairie Astronomer



The next regular meeting is February 28th at 7:30pm at Hyde Observatory

NEXT MEETING AND PROGRAM

Our speaker will be David Hostetter.

“Stuff That Never Flew”

It’s easy to think of space history as a steady progression to where we are today, but there were a lot of interesting projects that never made it to the launch pad.

UPCOMING PROGRAMS

March: NASA’s New Horizons Mission

April: Nancy Grace Roman Space Telescope

May: Annual Club Dinner

June: Solar Star Party

CONTENTS

3 Meeting Minutes	15 Member Profile
5 President’s Message	18 StarSplitters
6 Outreach	19 Webb
8 Event Photos	23 NuStar
9 Mantrap Skies ARP52	25 Astrophotography
13 Focus on...	29 From the Archives
14 March Observing	30 Club Information

Cover: Comet 2022 E3 (ZTF) from 2-10-23 near Mars, Branched Oak Observatory. By Brett Boller. Canon T7i, Red Cat 51mm telescope, 51 60sec images, ISO 1600, Stacked and aligned in Deep Sky Stacker and processed in Photoshop.

CALENDAR

PAC Meeting
 February 28th 7:30pm at Hyde Observatory
 Program: Stuff that Never Flew - David Hostetter

PAC Meeting
 March 28th, 7:30pm at Hyde Observatory
 Program: NASA's New Horizons Mission - Nathaniel Cunningham

PAC Meeting
 Tuesday, April 25th, 7:30pm at Hyde Observatory
 Program: Nancy Grace Roman Space Telescope - Kevin Gallagher

2023 STAR PARTY DATES

	Date	Date
January	13	20
February	10	17
March	17	24
April	14	21
May	12	19
June	9	16
July	7	14
NSP	7/16	7/22
August	11	18
September	8	15
October	6	13
November	3	10
December	8	15

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

CLUB OFFICERS

President	Jason O'Flaherty jflaher@gmail.com
Vice President	Brett Boller proboller86@yahoo.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	Christine Parkyn cpparky@gmail.com
Website and Newsletter Editor	Mark Dahmke mark@dahmke.com

Night Sky Network



www.prairieastronomyclub.org

Meeting Minutes

Jim White

Jason started the meeting at 7:35 pm. This is our first meeting since November because of the holidays although we did have a nice turnout at Tanners for our holiday party in December.

We had a number of guests and a couple of new members show up for tonight's meeting and also had participants join the meeting via Zoom.

Jim Kvasnicka (the club observing chair) was unable to attend tonight's meeting so Jason presented Jim's February observing report for him. Club star parties for the month are on Friday, February 10th and Friday, February 17th. The February 10th star party is scheduled as the make up date for our "How To Use Your Telescope" star party that got postponed from January due to weather and will be held at Branched Oak Observatory if weather

permits. Weather permitting the star party on the 17th will be held at the Clatonia recreation area unless the "How To Use Your Telescope" star party on the 10th is postponed again in which case the star party will be held at Branched Oak Observatory. Star parties for March are scheduled for the 17th and the 24th. Comet C/2022 E3 (ZTF) will be closest to earth on February 2nd and is expected to reach magnitude 5-6 and should be able to be viewed in binoculars and possibly with the naked eye from a dark site. On February 10th the comet will be close to Mars. Jim's complete observing report can be found in this newsletter.

At 7:44 Jason turned the meeting over to John Reinert for the treasurer's report. John started his report with an announcement that up through 2022 club members were only able to pay their club dues

with checks and cash but now we are all participants in the new economy. Thanks to the collaboration between John and Mark Dahmke, our webmaster, our website has been updated and connections made to electronic funds processors to allow members to now pay their dues online electronically. The new update also allows new members to join PAC through the website. John did say that those who still wish to pay their dues the old-fashioned way may still do so. John is learning how to track and report the new electronic transactions. We have had about seven people use the new system to date. The question was asked if there are fees associated with doing the transactions electronically and John's answer was yes but at the present time this fee is being paid by the club and not charged to the person

paying their dues. It's time for a yearly audit and John is tentatively looking to do the audit on February 11th. John will be reaching out to a couple of club members to participate in the audit. John was asked by a newer member about when dues were due, whether everyone renewed in January or how our system is set up? John responded that we currently are a lunar cycle driven club. Currently everyone's dues for renewal come up on their anniversary month of joining the club. There are ideas floating around about possibly setting a particular month of the year for everyone's dues to be renewed and prorating dues to normalize the month when dues would be renewed. At this time no decision has been made on normalizing dues it has just been brought up in conversation. Jason mentioned that in a recent survey that he sent out a majority of

respondents were in favor of normalizing dues to one time of the year for all members and that this is a topic to discuss at an upcoming board meeting. John's personal view on this topic is that since we are a club that is appealing to families and that they generally structure their year from fall to fall, their academic year, that having a renewal date of August or September may work well for families and also work well for the club. Having all dues up to date in August or September would mean that as a club with elections in October the newly elected club officers would know our membership statistics as our club year starts out. If you have any ideas, please bring them forward.

Upcoming events are the "How To Use Your Telescope" class at the star party on February 10th. Parks and recreation have an

upcoming event for the 60th anniversary of the Pioneers Park Nature Center and would like some participation from the club possibly involving some solar observing, the tentative date for the event is April 29th. The meeting ended at 8:00 pm.

Tonight's program is being presented by club member Mark Dahmke on his recent trip to Svalbard in Norway, the title of his presentation is "Northern Lights and his Trip to the Arctic". Svalbard is the northernmost permanent settlement in the world.

The President's Message

Jason O'Flaherty

Hello from the shortest month of the year. Mother Nature has been in full swing this month, ranging from near-record highs to freezing cold and piles of snow in just a few days. It looks like we're in for more of a weather roller coaster as March starts like a lion, but that's part of what makes it Nebraska. Hopefully, it'll hold to the saying and go out like a lamb.

Fortunately, we had clear weather for our "How to use your telescope" class on February 10th. In contrast to our snowy, overcast attempt in January, the sky was cloud free and provided excellent viewing for the first part of the night. All of the social media sharing and word of mouth paid off. By my count, we had nine guest scopes with around 18-20 visitors, which is a great turnout.

Thank you to everyone who volunteered to help, especially those who didn't even bring their own scope and just came to assist others.

We certainly had some learning to do with a few of these newer models that used a mounted phone for navigating. Also, thank you to Branched Oak Observatory for letting us use your outdoor facilities. The concrete pad PAC donated was the perfect spot for our guests to set up their scopes.

The day this newsletter goes out, I have our annual board meeting scheduled to review the results from our survey last November and discuss any plans for the rest of the year. Then a week later, we have our February club meeting at Hyde. I have already sent out Zoom invites via email if you cannot attend in person. We'll be welcoming Dave Hostetter. Dave retired in 2020 from a 45-year career in planetariums, including 40 years as Curator of the Planetarium at the Lafayette Science Museum in Lafayette, LA. He will present "Stuff that never flew," a talk on the interesting projects that never



made it to the launch pad.

Our April is quickly filling up with outreach events. Several organizations have asked us to participate in Astronomy Day on Saturday, April 29th. It's great to see this much interest in astronomy, and I appreciate everyone willing to volunteer to help spread the joy of this hobby we love so much. Lastly, registration is now open for the 30th Annual Nebraska Star Party, which takes place July 16th - 23rd. You can sign up and get more information from the website <https://www.nebraskastarparty.org/>.

Sincerely yours,

Jason

Outreach Opportunities

Christine Parkyn

Here are the upcoming outreach events. To volunteer to support an event, let Christine Parkyn know at cpparky@gmail.com.

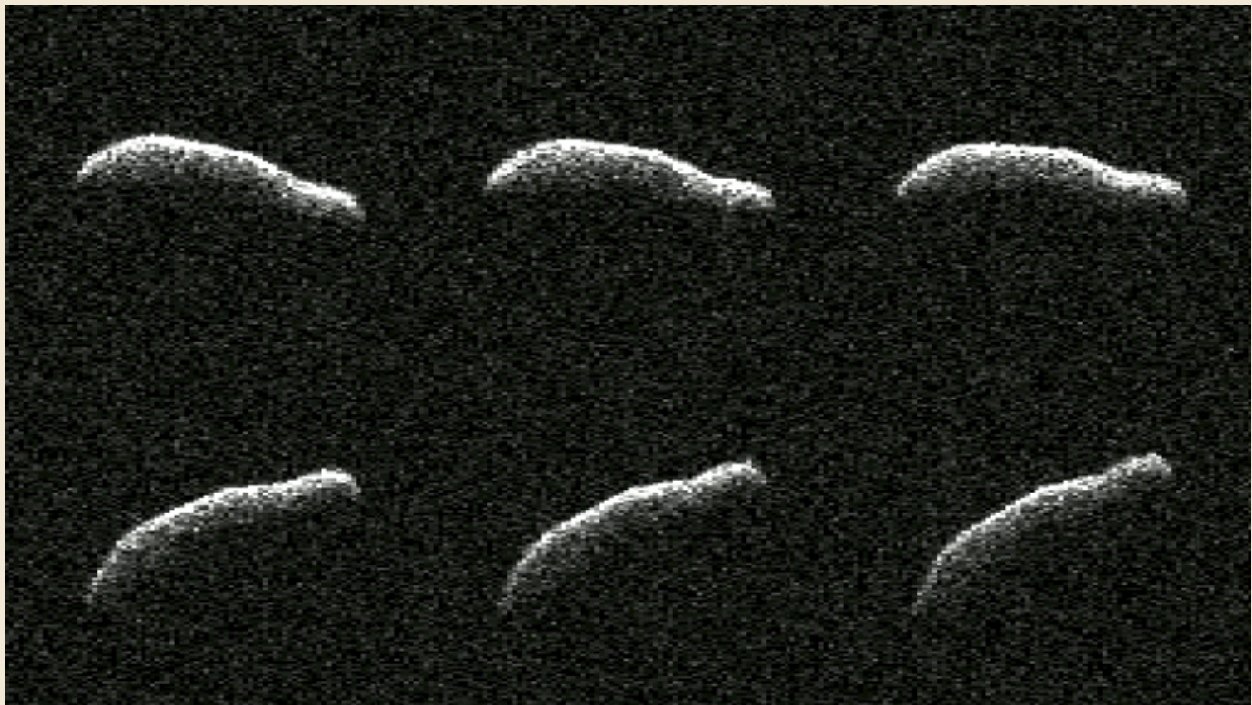
Astronomy Night: April 15, 2023 (Change in Original Date from April 22) at Morrill Hall from 6 to 9 p.m. Have 3 volunteers; would like 1 more.

Wild Adventures: April 29, 2023 at Pioneers Park from 1 to 4 p.m. Have 1 volunteer; would like 2-3 more. Solar observers desired for this daytime event.

Deep Sky Stargazing: April 29, 2023 at Filley Stone Barn from 8:30 to 10 p.m. Have 1 volunteer; would like 3 more.

Constellation Talk/Stargazing: June 27, 2023 at Camp Carol Joy Holling from 10:30 to 11:30 p.m. Have 1 volunteer; would like 2-3 more.

Constellation Talk/Stargazing: July 25, 2023 at Camp Carol Joy Holling from 10:30 to 11:30 p.m. Have 1 volunteer; would like 2-3 more.

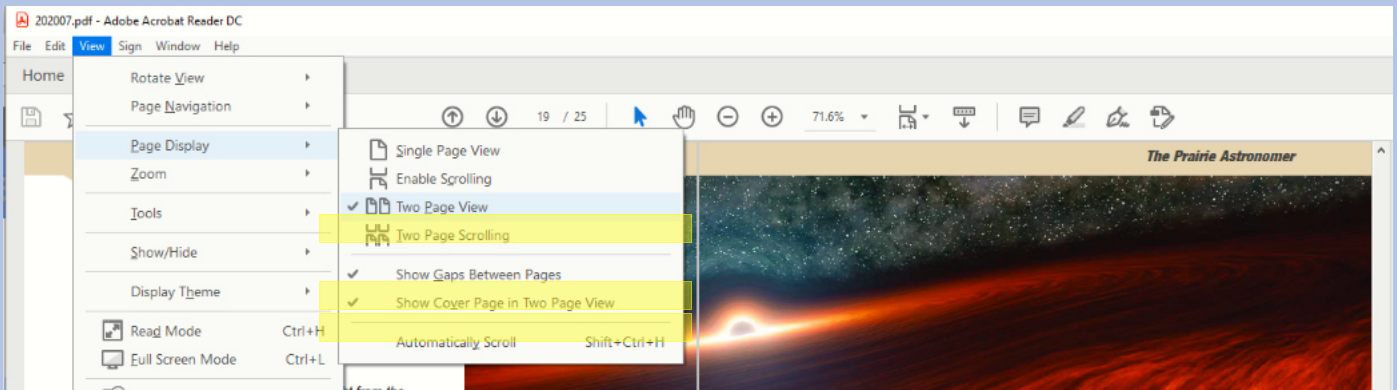


This collage shows six planetary radar observations of 2011 AG5 a day after the asteroid made its close approach to Earth on Feb. 3. With dimensions comparable to the Empire State Building, 2011 AG5 is one of the most elongated asteroids to be observed by planetary radar to date. Credit: NASA/JPL-Caltech

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>

Pay Dues Online

<https://www.prairieastronomyclub.org/pay-dues-online/>

If you're already a member and are renewing within 30 days of your anniversary date, select the early renewal option for a discount.

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

How to Use Your Telescope Event at BOO



We had a good turnout at our Prairie Astronomy Club's "How To Use Your Telescope" event on Friday February 10th on the grounds of Branched Oak Observatory.

ARP 52

The Mantrap Skies Image Catalog



Rick Johnson

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 52 is one of the dud Arp galaxies, at least for my system. I needed a good night that would support 0.5" imaging. I've had more than usual of such nights but not the night I imaged it so I settled for my standard 1" pixel size. Arp 52, CGCG 421-027, doesn't have any classification that I can find nor could I find a paper on it. It seems no one but Arp finds it interesting. He classed it as a spiral with a high surface brightness companion on its arm. That's the blue dot at the 1 o'clock position. Though it appears it may be a foreground galaxy. I find no separate identity or info for this companion. It's just that most catalogs show "Arp 52 as a galaxy with companion". Without further data, there's no way to know if the two are related or not. Both are blue which might indicate they are interacting and thus have triggered the creation of a lot of young super hot blue stars. But without any literature to check there's no way to know.

Arp 52 is about 380 million light-years away and seen against the stars of Orion, not far from his left armpit, Bellatrix. There are three other

ARP52, continued.

galaxies in this image that are located at about this same distance and are thus likely part of the same group. Two are down near the bottom left corner and are very obvious reddish S0 type galaxies, the brightest two in the field besides Arp 52. The third is near the top of the frame a bit right of Arp 52 and below the brightest star in the area. It too appears to be a spiral but far more blue than the other two at the lower left and

smaller as well. While I mention the lower two as looking like S0 I found no classification for any galaxy in this image, Arp 52 included.

Due to extreme cold, the set screws that hold the camera on the scope had contracted enough to allow the camera to tilt some. Due to the way it mounts to the scope it can't fall off when this happens but it can and did tilt. This meant the left and right edges of the frame were

very blurred so I cropped them out. This is why the image is narrower than normal. It is still at my standard 1" per pixel. The left side was further out of focus than the right but I cropped it evenly to leave Arp 52 in the center. So you will see the stars on the left side are rather fuzzy due to this problem, especially in the upper left corner.



This is a small section of Curiosity's 360-Degree View of Marker Band Valley. NASA's Curiosity Mars rover used its Mastcam to capture this 360-degree panorama of "Marker Band Valley" on Dec. 16, 2022, the 3,684th Martian day, or sol, of the mission. The rover sits in the center of the image; below its raised robotic arm is a spot where it twice attempted to drill into the rocks here. [Click here](#) to see the full panorama.

Credit: NASA/JPL-Caltech/MSSS

THE PLANET KILLER

COMET ICE MARGARITA

INGREDIENTS

4,000 OIL TANKERS FULL OF TEQUILA



1,000 TANKERS FULL OF ORANGE LIQUEUR

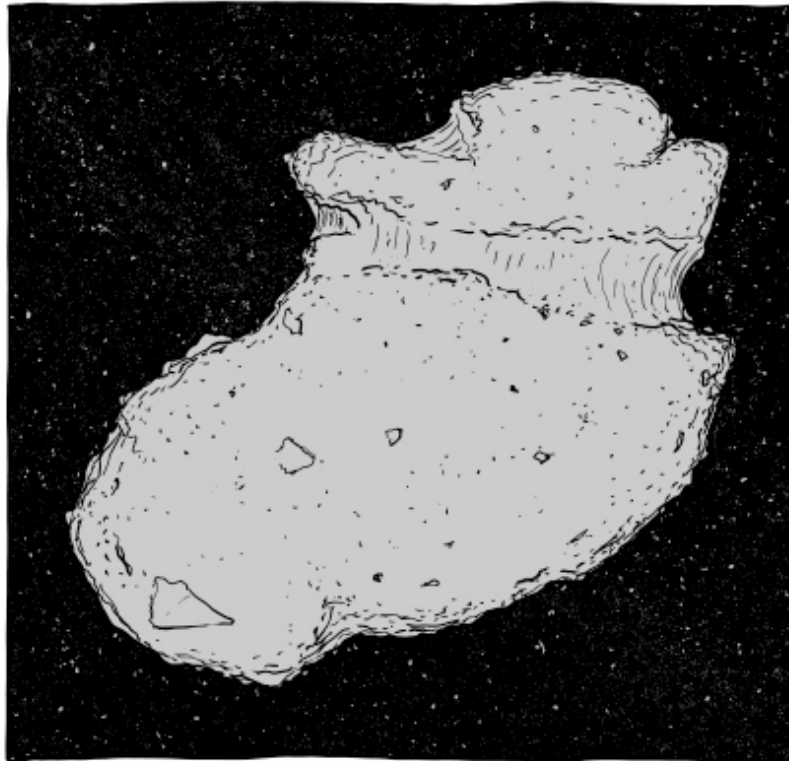


1,000 TANKERS FULL OF AGAVE



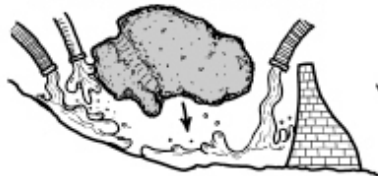
THE JUICE FROM 20 TRILLION LIMES

ONE COMET NUCLEUS

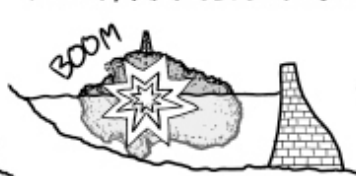


INSTRUCTIONS

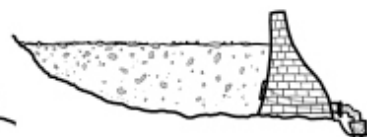
① DRAIN LAKE MEAD, COMBINE INGREDIENTS BEHIND HOOVER DAM



② DETONATE COMET USING BRUCE WILLIS'S DRILLING RIG FROM ARMAGEDDON (1998)



③ DISPENSE DRINK THROUGH HOOVER DAM TURBINES



Focus on Constellations: Auriga

Jim Kvasnicka

Auriga the Charioteer is easy to locate with the bright star Capella, the 5th brightest star in the sky and its location above Orion and Gemini.

Auriga has many open clusters in it because the Milky Way runs through it. Some well-known open clusters are the three Messier objects in Auriga, M36, M37, and M38. Another open cluster NGC 1893 is next to IC405, the Flaming Star Nebula.

Showpiece Objects

Open Clusters: M36, M37, M38

Mythology

Auriga is one of the oldest constellations and has always been associated with a charioteer in many cultures. According to one Greek myth, Hera had a son who was born lame. Disgusted, she threw him out of

Heaven to Earth, where he became the famous lame smith, Hephaestus, who fashioned beautiful ornaments and armor for the gods. It is said that because he was lame he invented the chariot so that he might get around better.

Number of Objects Magnitude 12.0 and Brighter

Galaxies: 0

Globular Clusters: 0

Open Clusters: 17

Planetary Nebulae: 3

Dark Nebulae: 3

Bright Nebulae: 2

SNREM: 0



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

March Observing

Jim Kvasnicka

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

Planets

Venus and Jupiter: Low in the west at evening with Venus climbing higher and Jupiter sinking lower. On March 1st they are separated by $\frac{1}{2}^\circ$.

Mercury: Low in the evening sky after sunset.

Mars: In Taurus.

Uranus: Sinking lower in the west in Aries.

Saturn and Neptune: Not visible in March.

Messier List

M41: Open cluster in Canis Major.

M44: The Beehive Cluster in Cancer.

M46/M47: Open clusters in Puppis.

M48: Open cluster in Hydra.

M50: Open cluster in Monoceros.

M67: Open cluster in Cancer

M81/M82: Galaxy pair in Ursa Major.

M93: Open cluster in Puppis.

Last Month: M1, M35, M36, M37, M38, M42, M43, M45, M78, M79

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

NGC and other Deep Sky Objects

NGC 2438: Planetary nebula, foreground object in M46.

NGC 2440: Planetary nebula in Puppis.



NGC 2451: Open cluster in Puppis, bright and irregular.

NGC 2452: Planetary nebula in Puppis, just south of open cluster NGC 2452.

NGC 2477: Bright open cluster in Puppis.

NGC 2537: The Bear Paw Galaxy in Lynx.

NGC 2683: Edge on galaxy in Lynx.

NGC 2775: Galaxy in Cancer.

Double Star Program List

Epsilon Canis Majoris: White and light blue pair.

Delta Geminorum: Wasat, yellow and pale red stars.

Alpha Geminorum: Castor, white primary with a yellow secondary.

12 Lyncis: Close pair of yellow-white stars.

19 Lyncis: White stars.

38 Lyncis: White primary with a yellow secondary.

Zeta Cancri: Yellow and pale-yellow stars.

Iota Cancri: Yellow and pale blue pair.

Challenge Object

NGC 2350: A faint, small elongated galaxy in Canis Minor.

Club Member Profile: David Dickinson

David joined PAC in 2022



In 1993, I founded a bank consulting company (Banker's Compliance Consulting) I travel this great country as a motivational speaker, educator on banking regulations and I help businesses and organizations improve their culture.

My wife, Karen, and I moved to an acreage two miles south of Branched Oak Lake in the fall of 2021. We have three adult children (none of whom live at home!) & four grandchildren. We also own a house south of Central City, Nebraska that is located between the Platte River and a lake. It's a great place to do observing. When possible, I can be found fishing, making sawdust in my woodshop, playing the guitar or

piano, or exploring the universe in my backyard or at Branched Oak Observatory.

When I was in Junior High, I was in an Astronomy Club in Central City, Nebraska. I also attended a 2-week astronomy camp at the University of Kansas when I was in high school. I enjoyed astronomy but once I graduated from high school, I didn't pursue it anymore.

In April 2021, I was driving by Branched Oak Lake and saw a sign for the Branched Oak Observatory (BOO). I looked up BOO on the internet and corresponded with Michael Sibbersen, the CEO of BOO at that time. Michael offered me a tour of BOO and asked me if I'd like to

volunteer. I became very involved at BOO and now serve as the CFO and am the Treasurer of the Board.

While doing some online research, I found PAC's website. I also had become friends with Brett Boller and Brian Sivill and I had heard them mention the PAC. I joined PAC in early 2022 because of the amazing educational opportunities that are provided at each monthly meeting. I'm very impressed with The Prairie Astronomer publication and read it from cover to cover each month.

I'm passionate about sharing my love of the universe with others. It's fulfilling when someone sees the Saturn, the Crab Nebula or the Triangulum Galaxy (one

of my favorites) and you watch the joy and awe spill out of them. I also want to learn as much as I can so I can be a resource to others. I often say I'm the dumbest guy at BOO (it's true), but I am constantly learning. When someone asks me a question that I don't know the answer to, I find another volunteer that does, and we both learn.

As a member of the BOO Executive Team and Board Member, it is my desire to build a strong alliance between the BOO and the PAC. Both are amazing organizations that are full of wonderful people that share the same passion for astronomy, so it only makes sense to me that the two work together.

After volunteering at BOO for about a year, I knew I wanted to purchase a telescope of my own, but I really didn't know what type until Dr. Kendra Sibbersen showed me her Unistellar eVscope. I immediately knew that was the telescope for me. The only "problem"

was convincing my wife. In March 2022, we had a party at our house to celebrate my birthday. Along with many other friends, I invited several volunteers from BOO and asked Dr. Sibbersen to bring her

objects while staying inside our house. After the party was over my wife said, "you want one of those don't you?" When I answered yes, she said, "sounds like the perfect birthday gift for yourself." I ordered



eVscope. It was a perfect night for observing and many of our friends downloaded the Unistellar app. Several friends were able to view Messier

the eVscope 2 the next morning and it arrived five days later!

In early April 2022, we held a Messier Marathon at the BOO. I

Club Member Profile, continued.

was able to observe 82 Messier objects that night! If it wasn't for the clouds that rolled in around 3:30 AM, I'm confident I would have seen them all. Brett Boller wrote an article about this event for The Prairie Astronomer (see pages 17-20 of the April 2022 edition).

At most public events, I connect my eVscope to an iPad and put the iPad on a music stand. This allows many people to easily see what the telescope is viewing. The scope relays the picture to the iPad and stacks images every four seconds. The iPad app also has a lot of information about the object that I can

convey to the viewers.

I am frequently involved at numerous star parties at the BOO. Additionally, I helped with several PAC events in 2022. My favorite was the event at the Lazy Horse Brewing and Winery in Ohio, NE. I have not yet been to the NSP but am planning to attend it this summer.

I've completed the Brightest Galaxies and Globular Cluster observing challenges in 2022.

I'm very much a newbie to astronomy, but I'm passionate about learning. I appreciate all of the PAC Members helping me and for the

mentor program that was set up last year.

I'm excited about the next Messier Marathon and understand that many variables have to work out perfectly to see all 110 objects, but I'm going to give it another shot this year.

When I look at the numerous marvelous things in our universe, it makes me worship the Creator! I think Psalm 19:1 says it best: The heavens declare the glory of God; the skies proclaim the work of his hands. That's what I love most about astronomy!

Neighbors: The StarSplitters

Don Hain

Over the past year or so since joining PAC, I have been attempting to also get familiar with some of the other groups in the area that pay attention to the worlds beyond our own. One of the groups I first came across was one whose home base is nestled along the spot where the Wisconsin and Mississippi river come together. It is located nearly on the path between Lincoln and Madison WI that my wife and I regularly travel since we have family in both spots. That group calls itself the StarSplitters (<http://www.starsplitters.org/>). The group seems to be quite active, meeting groups of folks at their observing location out at Wyalusing State Park (<https://dnr.wisconsin.gov/topic/parks/wyalusing>). That park contains the Huser Astronomy Center (<https://dnr.wisconsin.gov/topic/parks/wyalusing/recreation/>

astronomy).

The group does a great job helping the community of folks around them keep in mind what astronomy can teach us. There are two reasons beyond that why this group has kept my attention. Both have to do with the group's association with the concern and wonder about our place on earth we as humans have. I chat about the first of those reasons below. If all goes well, I'll chat about the other connection that draws me to the group in a future newsletter.

As the group mentions on their web site, "The StarSplitter" is a poem by Robert Frost. I really latched onto the constellation of Orion as I started reading about the sky, and started looking through the scopes I recently got. Frost's lead into the poem caught my eye ...

*"You know, Orion
always comes up
sideways,*

*Throwing a leg up over
our fence of mountains,*

*And rising on his hands
he checks in on me ... "*

Like many of us, Brad McLaughlin, the protagonist in the poem, has noticed Orion too. Brad is a man who at times needs the light from a smoky lantern chimney to finish chores he should have completed by daylight. Orion apparently leads Brad to consider who he is, who we are. He ends up burning down his house to fund his purchase of a telescope.

I don't think very many of us have burnt down our houses in order to obtain a telescope, but perhaps some crazy loon at one time did ?? ... or was such an idea as crazy as we first might imagine?

StarSplitters, continued.

The friend of
McLaughlin's relating
the story goes on to say
later in the poem:

*"Bradford and I had out
the telescope.*

*We spread our two legs
as it spread its three,*

*Pointed our thoughts the
way we pointed it,*

*And standing at our
leisure till the day broke,*

*Said some of the best
things we ever said."*

And the conclusion
Bradford's friend comes
to seems not so
different from what I at
times conclude after a
night of looking at
Orion.

*"We've looked and
looked, but after all
where are we?"*

*Do we know any better
where we are,*

*And how it stands
between the night tonight*

And a man with a smoky

lantern chimney?

*How different from the
way it ever stood?"*

NASA's Webb Uncovers New Details in Pandora's Cluster

Astronomers have revealed the latest deep field image from NASA's James Webb Space Telescope, featuring never-before-seen details in a region of space known as Pandora's Cluster (Abell 2744). Webb's view displays three clusters of galaxies – already massive – coming together to form a megacuster. The combined mass of the

galaxy clusters creates a powerful gravitational lens, a natural magnification effect of gravity, allowing much more distant galaxies in the early universe to be observed by using the cluster like a magnifying glass.

Only Pandora's central core has previously been studied in detail by NASA's Hubble Space Telescope. By combining Webb's

powerful infrared instruments with a broad mosaic view of the region's multiple areas of lensing, astronomers aimed to achieve a balance of breadth and depth that will open up a new frontier in the study of cosmology and galaxy evolution.

"The ancient myth of Pandora is about human curiosity and discoveries that

delineate the past from the future, which I think is a fitting connection to the new realms of the universe Webb is opening up, including

this deep-field image of Pandora's Cluster," said astronomer Rachel Bezanson of the University of Pittsburgh in Pennsylvania,

co-principal investigator on the "Ultradeep NIRSpect and NIRCam ObserVations before the Epoch of Reionization"



Astronomers estimate 50,000 sources of near-infrared light are represented in this image from NASA's James Webb Space Telescope. Their light has travelled through varying distances to reach the telescope's detectors, representing the vastness of space in a single image. Credits: NASA, ESA, CSA, I. Labbe (Swinburne University of Technology) and R. Bezanson (University of Pittsburgh). Image processing: Alyssa Pagan (STScI)

Webb, Continued.

(UNCOVER) program to study the region.

“When the images of Pandora’s Cluster first came in from Webb, we were honestly a little star struck,” said Bezanson. “There was so much detail in the foreground cluster and so many distant lensed galaxies, I found myself getting lost in the image. Webb exceeded our expectations.” The new view of Pandora’s Cluster stitches four Webb snapshots together into one panoramic image, displaying roughly 50,000 sources of near-infrared light.

In addition to magnification, gravitational lensing distorts the appearance of distant galaxies, so they look very different than those in the foreground. The galaxy cluster “lens” is so massive that it warps the fabric of space itself, enough for light from distant galaxies that passes through that warped space to also take on a warped appearance.

Astronomer Ivo Labbe of the Swinburne University of Technology in Melbourne, Australia, co-principal investigator on the UNCOVER program, said that in the lensing core to the lower right in the Webb image, which has never been imaged by Hubble, Webb revealed hundreds of distant lensed galaxies that appear like faint arced lines in the image. Zooming in on the region reveals more and more of them.

“Pandora’s Cluster, as imaged by Webb, shows us a stronger, wider, deeper, better lens than we have ever seen before,” Labbe said. “My first reaction to the image was that it was so beautiful, it looked like a galaxy formation simulation. We had to remind ourselves that this was real data, and we are working in a new era of astronomy now.”

The UNCOVER team used Webb’s Near-Infrared Camera (NIRCam) to capture

the cluster with exposures lasting 4-6 hours, for a total of about 30 hours of observing time. The next step is to meticulously go through the imaging data and select galaxies for follow-up observation with the Near-Infrared Spectrograph (NIRSpec), which will provide precise distance measurements, along with other detailed information about the lensed galaxies’ compositions, providing new insights into the early era of galaxy assembly and evolution. The UNCOVER team expects to make these NIRSpec observations in the summer of 2023.

In the meantime, all of the NIRCams photometric data has been publicly released so that other astronomers can become familiar with it and plan their own scientific studies with Webb’s rich datasets. “We are committed to helping the astronomy community make the best use of the fantastic resource we have in

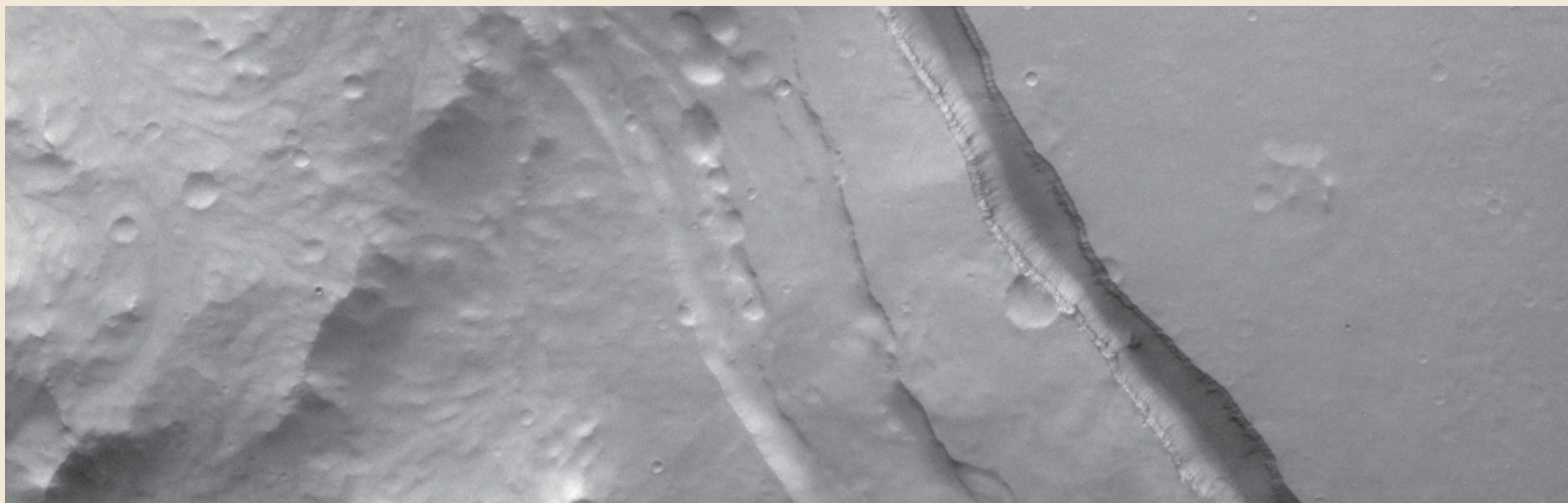
Webb,” said UNCOVER co-investigator Gabriel Brammer of the Niels Bohr Institute’s Cosmic Dawn Center at the University of Copenhagen. “This is just the beginning of all the amazing Webb science to come.”

The imaging mosaics and catalog of sources on Pandora’s Cluster (Abell 2744) provided

by the UNCOVER team combine publicly available Hubble data with Webb photometry from three early observation programs: JWST-GO-2561, JWST-DD-ERS-1324, and JWST-DD-2756.

The James Webb Space Telescope is the world’s premier space science observatory. Webb will solve mysteries in our

solar system, look beyond to distant worlds around other stars, and probe the mysterious structures and origins of our universe and our place in it. Webb is an international program led by NASA with its partners, ESA (European Space Agency) and the Canadian Space Agency.



A portion of Sirenum Fossae, Mars. The linear features are tectonic graben. Graben are formed by extension of the crust and faulting. When large amounts of pressure or tension are applied to rocks on timescales that are fast enough that the rock cannot respond by deforming, the rock breaks along faults. In the case of a graben, two parallel faults are formed by extension of the crust and the rock in between the faults drops downward into the space created by the extension. Numerous sets of graben are visible in this THEMIS image, trending from north-northeast to south-southwest. Because the faults defining the graben are formed perpendicular to the direction of the applied stress, we know that extensional forces were pulling the crust apart in the west-northwest/east-southeast direction. The Sirenum Fossae graben are 2735km (1700 miles) long and stretch from eastern Terra Sirenum into western Daedalia Planum.. NASA/JPL-Caltech/Arizona State University.

NASA's NuSTAR Telescope Reveals Hidden Light Shows on the Sun

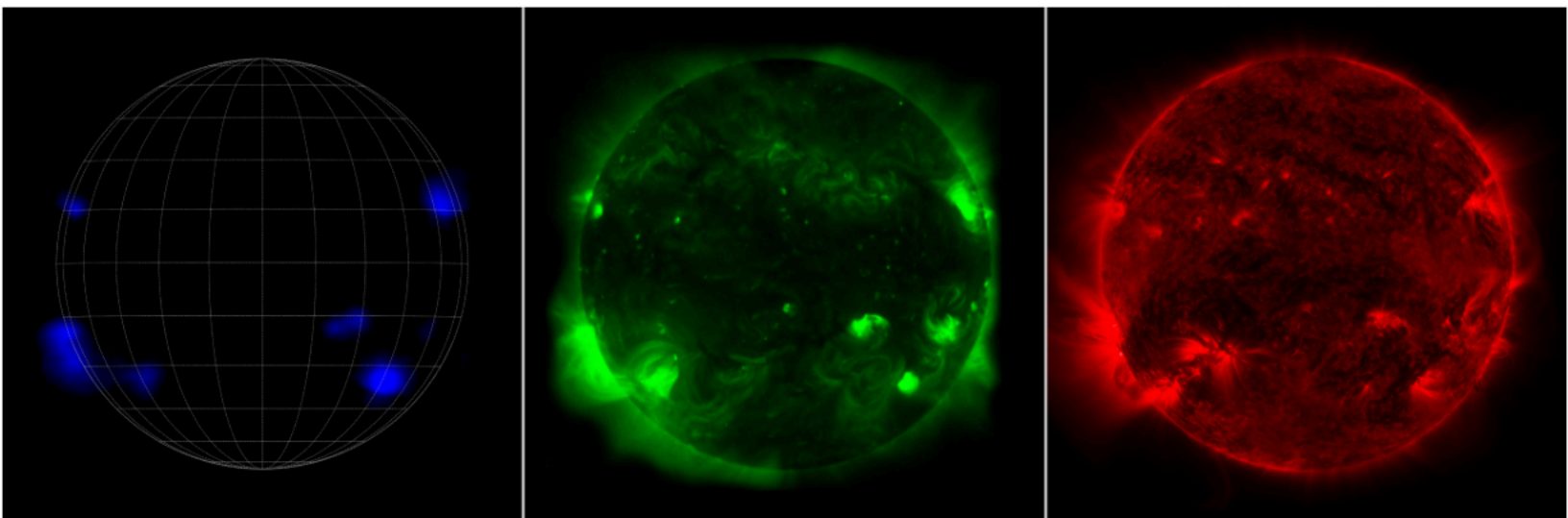
Even on a sunny day, human eyes can't see all the light our nearest star gives off. A new image displays some of this hidden light, including the high-energy X-rays emitted by the hottest material in the Sun's atmosphere, as observed by NASA's Nuclear Spectroscopic Telescope Array (NuSTAR). While the observatory typically studies objects outside our solar system – like massive black holes and collapsed stars – it has also provided astronomers with

insights about our Sun.

In the composite image above (left), NuSTAR data is represented as blue and is overlaid with observations by the X-ray Telescope (XRT) on the Japanese Aerospace Exploration Agency's Hinode mission, represented as green, and the Atmospheric Imaging Assembly (AIA) on NASA's Solar Dynamics Observatory (SDO), represented as red. NuSTAR's relatively small field of view means it can't see the

entire Sun from its position in Earth orbit, so the observatory's view of the Sun is actually a mosaic of 25 images, taken in June 2022.

The high-energy X-rays observed by NuSTAR appear at only a few locations in the Sun's atmosphere. By contrast, Hinode's XRT detects low-energy X-rays, and SDO's AIA detects ultraviolet light – wavelengths that are emitted across the entire face of the Sun.



The Sun appears different depending on who's looking. From left, NASA's NuSTAR sees high-energy X-rays; the Japanese Aerospace Exploration Agency's Hinode mission sees lower energy X-rays; and NASA's Solar Dynamics Observatory sees ultraviolet light. Credit: NASA/JPL-Caltech/JAXA

NuSTAR, Continued.

NuSTAR's view could help scientists solve one of the biggest mysteries about our nearest star: why the Sun's outer atmosphere, called the corona, reaches more than a million degrees – at least 100 times hotter than its surface. This has puzzled scientists because the Sun's heat originates in its core and travels outward. It's as if the air around a fire were 100 times hotter than the flames.

The source of the corona's heat could be small eruptions in the Sun's atmosphere called nanoflares. Flares are large outbursts of heat, light, and particles visible to a wide range of solar observatories. Nanoflares are much smaller events, but both types produce material even hotter than the average temperature of the corona. Regular flares don't happen often enough to keep the corona at the high temperatures scientists observe, but nanoflares may occur much more frequently – perhaps often enough that they collectively heat the corona.

Although individual nanoflares are too faint to observe amid the Sun's blazing light, NuSTAR can detect light from the high-temperature material thought to be produced when a large number of nanoflares occur close to one another. This ability enables physicists to investigate how frequently nanoflares occur and how they release energy. The observations used in these images coincided with the 12th close approach to the Sun, or perihelion, by NASA's Parker Solar Probe, which is flying closer to the our star than any other spacecraft in history. Taking observations with NuSTAR during one of Parker's perihelion passes enables scientists to link activity observed remotely in the Sun's atmosphere with the direct samples of the solar environment taken by the probe.

More About the Mission

NuSTAR launched on June 13, 2012. A Small Explorer mission led by

Caltech in Pasadena, California, and managed by JPL for NASA's Science Mission Directorate in Washington, it was developed in partnership with the Danish Technical University (DTU) and the Italian Space Agency (ASI). The telescope optics were built by Columbia University, NASA's Goddard Space Flight Center in Greenbelt, Maryland, and DTU. The spacecraft was built by Orbital Sciences Corp. in Dulles, Virginia. NuSTAR's mission operations center is at the University of California, Berkeley, and the official data archive is at NASA's High Energy Astrophysics Science Archive Research Center. ASI provides the mission's ground station and a mirror data archive. Caltech manages JPL for NASA.

For more information on NuSTAR, visit:

www.nustar.caltech.edu

Astrophotography



E3 Comet, 2-10-2023, Brett Boller, Branched Oak Observatory, Canon T7i, Red Cat 51mm telescope, 25 120sec images, ISO 1600, Stacked and aligned in Deep Sky Stacker and processed in Photoshop.



M1 Crab Nebula, 2-10-2023, Brett Boller. vBranched Oak Observatory, Canon T7i, 150mm, Skywatcher Esprit telescope, 17 - 240sec images, ISO 800, Guided with off axis guider and PHD2, Stacked and aligned in Deep Sky Stacker and processed in Photoshop.

Astrophotography



M81 and M82 by Jim White. Saturday February 11th, from my back patio. The picture is 92 - 3 minute subs along with 20 bias, 20 darks, 20 flats and 20 dark flats. This was processed in PixInsight.

Astrophotography



A rare opportunity to see Mars in the northern sky. Mars was at 3 degrees east of due north at 2:17pm November 3, 2022. Longyearbyen, Svalbard, 78°13', N 15°38' E. Samsung Galaxy S20, ISO 700, 1/13 second, f/1.8. By Mark Dahmke

From the Archives

February, 1963

President's Message

Our last meeting was held at the University of Nebraska Planetarium, Morrill Hall, 14th and U St. We had a very good turnout. Harlan Franey gave a talk on Time in Astronomy, and Dick Hartley reviewed Mirror Grinding and displayed the tools used.

I think this place for holding our meetings is ideal, from several standpoints. Would be interested in your opinion.

We signed up two new members from Beatrice, Benjamin Rosenbluth and Kennedy Cooper. WELCOME and may our club be the means of bringing good understandable seeing and some of the WHYs to you as well as ourselves. (J.W.)

The highlights for the coming March 6th meeting and program will be a continuation of the discussion of grinding, polishing, and parabolizing a telescope

mirror. Walter Erbach will talk on the art of parabolizing. This being the most difficult part of mirror making, those of you who are in the process of telescope making should find this lecture most interesting. Also, on the same program, Warner Klammer, our good member from Seward, Nebraska, will describe his new mirror grinding machine. At our last meeting, he gave us a hint as to his subject and all of us will be most intrigued to hear about his apparatus. Warner will also give us the dope on a new mirror testing instrument which has been mentioned in one of the last Sky and Tel issues. This is a hot wire tester which combines the accuracy of the Foucault test with the Ronchi test, all in one.

Jess Williams has just completed a new portable mount which has proven most successful. He has

promised to bring this mount to our meeting. It is a combination Refractor and Photo Astrograph Mount. We will try and have a good movie, if possible.

Let's start this next meeting, a review of the Sun, Moon and all the Planets. Let's all be ready to take part. It's fun and you learn more by doing. (D.H.)

-Jess Williams, President

-Dick Hartley, Program Director

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

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.

