ASTRONOMY CLUB OF TULSA

# OBSERVER

## December 2023

*Bringing Stars to the eyes of Tulsa*

*since 1937* *Editor – John Land*


## The Pinwheel galaxy M 33 ( NGC 598 ) image by Tim Gilliland

**M 33 is a lovely face on spiral galaxy in the constellation of Triangulum. It is often overlooked due to the proximity of its large neighbor M 31. Modern measurements place its distance lies at about 3 million light years with a diameter of 50,000 light years and contains between 30 to 40 billion stars. M 33 can be seen naked eye in pristine dark skies like Okie-Tex**

**Tim made this image with an Orion EON 80ED telescope on a CGE Pro Mount**
**Camera SBIG ST-8300M using Filters IR-Cut · Green · Blue · BAADER Red**
**Processing Software - photoshop · Pixinsight 1.8 · PHD2 Guiding · Sequence Generator Pro**

***Astronomy Club Events*** **Check our website AstroTulsa.com events section for updates**

## Observatory Stargazing Nights

**Our GUESTS & Members nights are open to anyone. We do ask guests to try to RSVP.**
**Large groups need to make separate arrangements.**

**Members Only Nights are Open to members and their family**
**Details, Times and Direction Maps are posted on our Website**

**https://www.astrotulsa.com/events**

**Astronomy Club Meeting - FRIDAY Dec 1 - 7:00 PM - IN PERSON club meetings.**
**At Jenks High School planetarium 105 E B Jenks OK - Guests Welcome**
*** If Jenks schools are closed due to weather the event will be cancelled.**

**Program will feature a presentation by astronomer Lauren Herrington about her summer work a Pisgah Astronomical Research Institute – see details on page 3**

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## Observatory Visitation Star Nights

**Friday** Dec 8 6:00 PM Members Only night
Open to our members and their immediate family

**SATURDAY** Dec 16 4:30 PM Guest and Members Night –
Guest requested to RSVP -

**SATURDAY** Jan 6 5:00 PM Guest and Members Night –
Guest requested to RSVP -

**Friday** Jan 12 6:00 PM Members Only night
Open to our members and their immediate family

**Astronomy Club Meeting - FRIDAY Jan 19 - 7:00 PM - IN PERSON club meetings.**
**At Jenks High School planetarium 105 E B Jenks OK - Guests Welcome**

**Always check website before heading to an event for cancellations due to cloudy conditions or hazardous conditions.**

# Telescope 101 Workshop

**Saturday Feb 17, 2024**

**Details registration will be posted soon on our website.**

The workshop is for new telescope owners or people wanting to learn how to better use their current telescope. Participants can register for a 30 minute 1 on 1 session with a member of our astronomy club.

**Friday Dec 1st - 7:00 PM Jenks High Planetarium**
**105 E B St, Jenks, OK**

**Our guest presenter will be Lauren Herrington telling us about the Pisgah Astronomical Research Institute. Better known as PARI (pronounced "*Perry*"), is North Carolina's best-kept secret. Once a top-secret government spy station, it now serves the local community as a radio observatory and science museum. From the hidden archives in the basement to the radical hilltop prototype of the next generation of telescope, there's much more to PARI than meets the eye. Lauren tells us that spending the summer working at PARI gifted her with an insider's view, and she has collected a slew of stories to share. Awe, history, and mystery—this is PARI. She hopes that we'll find the place as thought-provoking as she does.**

**Lauren Herrington is an astronomer from near Grand Lake O 'The Cherokees, OK. She works part-time for the American Association of Variable Star Observers, *AAVSO* , coordinating an educational lecture series and taking care of their spectroscopic database, AVSpec. She also works as a remote assistant for Professor Sara Seager at MIT, writing code and making graphs so that Prof. Seager can focus on the difficult problems of exoplanet science. Earlier this year, Lauren received the opportunity to become a summer camp counselor at the Pisgah Astronomical Research Institute (PARI), where her job duties included working in PARI's historical glass plate archive, leading planetarium shows, and operating a 25" telescope."**

**At our May 2023 meeting she gave us a very scholarly presentation about the H-R diagram and the life cycle of the different star types. She illustrated these with images of stellar spectra she had taken herself. Lauren's interest in all things astronomy was ignited when she was 13 and borrowed a small refractor from a family friend. She soon acquired an 8-inch telescope and began sharing views at outreach events hosted by the Houston Astronomical Society. Her energetic enthusiasm resulted in the HAS leadership creating a new elected position of "Youth Director" so that she could serve despite being under 18 at the time. Lauren has continued to expand her involvement in astronomy. If you would like to know more about her techniques and important contributions to astronomy read her website at https://tiedyeastronomer.com/**

# President's Message
## Don Bradford

**My first act as president was to say a few words at the club's annual dinner held Saturday, November 11. The "program" consisted of a tribute to John Land who has decided to pass the presidency to others but to continue as editor of the monthly newsletter. The program was a well deserved tribute to John, and many members spoke of their personal relationship with John and their history with him and the club. For me (as a relative newcomer to the club) it was a warm and uplifting experience to hear John's long and impressive history with the club from the mouths of those who knew him best as well as from John himself.**

**At the dinner we also introduced the new officers and directors, who have been described in the previous newsletter ( see pictures next page ). If you don't already know them, be sure to introduce yourself to them as soon as possible.**

**My plan for this year as president is to establish a set of goals (short and long term) and to establish reachable priorities for those goals. To do that, the officers and directors will need your ideas for the future and your feedback on current progress. So my first goal is to begin facilitating more member interaction, both through the club website (communications in both directions) and at meetings (more member interaction).**

**In that connection at our December 1 meeting at the Jenks High School Planetarium, in addition to the speaker Lauren Herrington (described on the preceding page), we plan to present an open Q & A for those attending (members and guests) to ask questions to a panel of experienced members. Questions and comments are open-ended and can range from topics such as *"what's a good beginners telescope" to "how can light have both wave and particle characteristics"*. We hope this and other innovations will continue to stimulate interaction from members and the public which is so necessary for us to reach any of our goals. In short: *This is your club and it has to have your involvement and support.***

**I look forward to doing whatever I can to help you accomplish the Club's mission.**

*"Bringing Stars to the Eyes of Tulsa since 1937"*

*Don Bradford - President*

# Meet our New Astronomy Club Officers & Board Members

Don Bradford
President

Jonathan Fussell
Vice President

Cathy Grounds
Treasurer

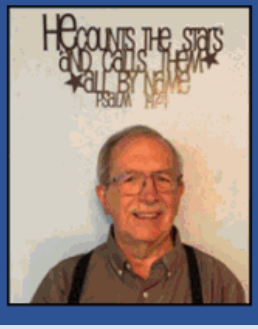
Skip Whitehurst
Secretary

Michael Blaylock

Jerry Cassity

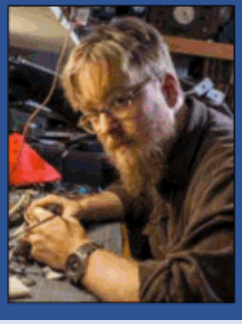
Bryan Kyle

John Land




Jack Reeder

James Taggart



# Vice President Message
## Jonathan Fussell

**Salutations all,**

**My name is Jonathan Fussell, and it is both an honor and a privilege to serve you as the Tulsa Astronomy Clubs Vice President.**

**With over a decade of dedicated stargazing experience, I bring a wealth of passion and knowledge to our beloved club. Recently, I had the privilege of founding and presiding over the Oral Roberts University Astronomy Club, witnessing its remarkable growth to over 200 members. During my tenure as President, my focus was on fostering a culture of camaraderie, curiosity, and collaboration, values that I am committed to upholding as your Vice President.**

**In the forthcoming messages from me, anticipate engaging content covering the latest celestial events, updates within the field of astrobiology, and noteworthy studies from the astronomical community. My goal is to continue the tradition of our club as a hub of exploration and discovery for generations to come.**

**I am excited about the journey ahead and eager to contribute to the flourishing spirit of our astronomy club.**

**Clear skies and Godspeed,**

*Together, Let's reach for the Stars!*

*Jonathan Fussell - Vice President*

# Observing Chairman
## Brad Young

Earn your **SOLAR ECLIPSE OBSERVING CHALLENGE** certificate

The Astronomical League is offering an Eclipse Observing certificate for any League member who observed the Oct 14, 2023 partial solar eclipse or making plans to observe the April 8, 2024 eclipse.

You can read the requirements for applying for the certificate at https://www.astroleague.org/solar-eclipse-observing-challenges/
Our club Observing Chairman, Brad Young, is coordinator of the Eclipse observing program.
Your Tulsa Astronomy Club membership includes membership in the Astronomical League for all full adult memberships and students who choose the AL option. There are many other observing award programs you can explore at https://www.astroleague.org/alphabeticobserving/
A chart of observing program ranked by difficulty
https://www.astroleague.org/observing-program-selector-grid/

# BOTH SIDES NOW **by Brad Young**

*I've looked at clouds from both sides now – Joni Mitchell*

**If you have read any of my earlier articles, you noticed that for many years I was an adamant visual observer. I said everyone should star hop and not use any kind of assistance in positioning. To me, astrophotography was an impediment to "real" observing. Of course, over the years I have let go of hardline attitudes as technology improved and my distaste for technology decreased. In fact, I now find it rewarding to identify and better understand Deep Sky objects by comparing their images to my direct observations, sketches, and descriptions.**

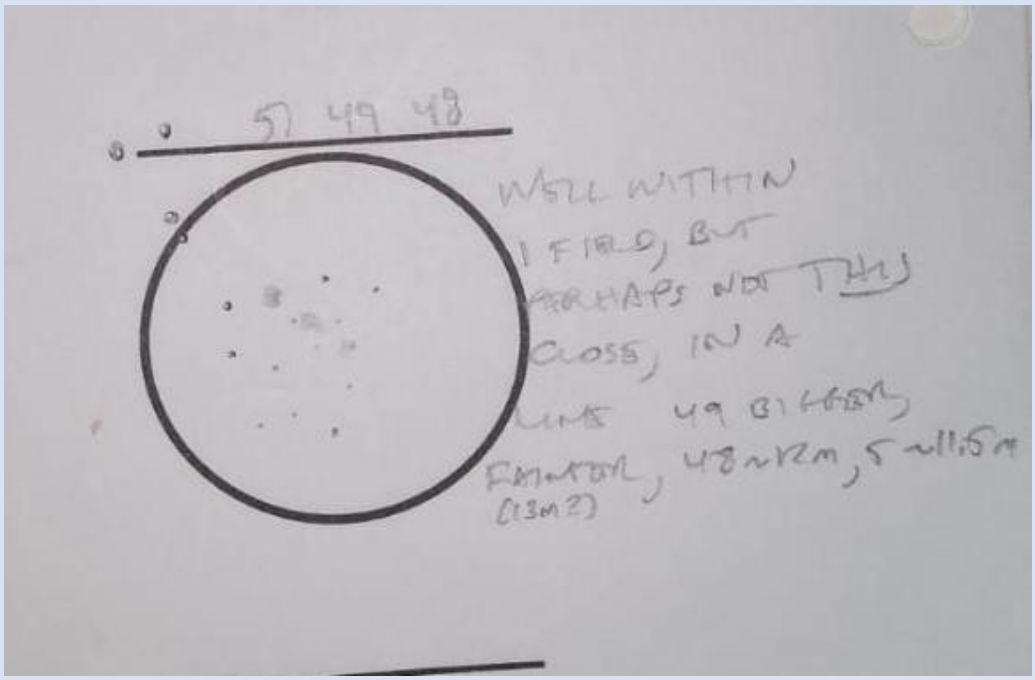
**Don Bradford and I have started using this process recently. If I notice a group of galaxies, extra galactic supernova or other items that would be good candidates for imaging, I mention this to Don. Of course, it can go the other way. Sometimes, he will image an item and ask me what my visual impression of the object is. In many cases, I have visually revisited the object based on details or other input from Don that made me curious enough to search for it again.**

**As mentioned in my previous articles, the initial driving force for my dipping my toe into imaging was the requirements of the Astronomical League Observing Programs I was doing. In particular, the Near Earth Object program "Target Asteroids!" required imaging. Because I was very interested in these type objects, I relinquished my bias against imaging, albeit with a chip on my shoulder. But to be honest, after chasing down 100 "normal" asteroids using visual means for the Gold Level Asteroid Program, I was not too upset about using a new tool.**

**Later, I figured out that remote imaging was the only way, unless I planned on traveling all over the world several times, that I would ever be able to see some of the artificial satellites I'm interested in. Eventually, I started using remote imaging regularly to look at items that were out of my reach geographically or visually. Not only did this solve the geography problem, but sky condition issues, event timing and the vagaries of outdoor observing in weather were partly abated.**

**In some cases, I use imaging to support visual observing projects. For instance, before I started visually finishing the NGC objects (still have 900+ to go in October 2023) I surveyed the previously unseen ones using remote imaging. That way I had an idea of what I'd be looking at. I was even able to use a radio telescope for a short time at Green Bank observatory. Using that dish, I could image several active radio targets. I still have those files, and one of these days I'll try to understand more clearly what they're telling me.**

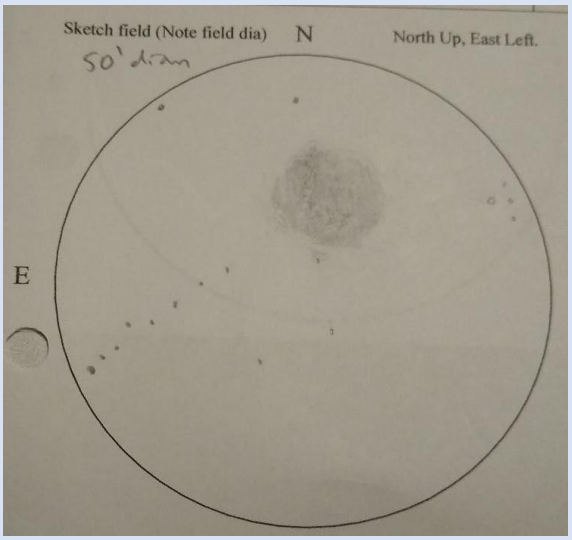
**Those detached methods are not quite what I do with Don and others now. On the observing field, I can directly, visually observe an object in my 22" Dobsonian. Then, I describe to Don what it is I saw, or show him a sketch made at the eyepiece. He will often follow up with an image and we can compare the two methods to provide confirmation of my sighting and improved enjoyment of the object.**



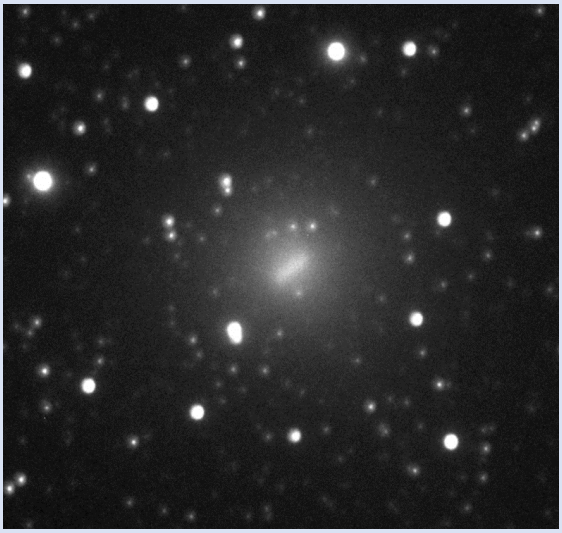

**My sketch of the NGC 49/51/52 group, using my Obsession 22" UC at 240X at ACT Observatory.**

**Don's image of the same area, using his CMOS setup, also at ACT.**

**As a result of such improved technology in imaging, EAA (Electronically Assisted Astronomy) has become a third method for visually exploring the sky. With sensitive cameras one can have almost immediate gratification from shorter exposure times coupled with real time, basic processing. This results in smaller (lighter) telescopes able to capture quick images of deep sky objects normally obtainable only by much larger telescopes. Don has been using his 4" refractor with a sensitive camera to compare images to observations through my 22" Dobsonian. But the results are the same, I have a better idea of what I'm looking at and can learn more about it.**




**My sketch of Comet C/2023 H2 Lemmon, same setup, but 100X.**



**Don Bradford's image of Comet Lemmon**

**Mark Jemmett, another club member, has thrown his hat in the ring with images of the new comet C/2023 H2 Lemmon. With his DSLR, we can compare yet another imaging setup on a different kind of object, with my visual sketch, and Don's CMOS.**

**Mark's image of Comet Lemmon, he states the details are:**

- **Celestron NexStar+ tracking mount**
- **Nikon D5600 DSLR**
- **Nikon AF-P Nikkor 70-300mm 1:4.5-6.3G ED lens @300mm f/6.3 zoom (~6x magnification)**
- **30 second exposure time per image**
- **ISO 6400, +5 exposure compensation, flat profile**

**The single frame image has been post-processed using Adobe Lightroom for enhancement.**

**I hope to convey to the reader by relating my experiences that the more tools you appreciate and use, the more information and enjoyment you can get from amateur astronomy. You don't have to hem yourself in to specific types of objects or even specific tools for observing. There are numerous tools available to us, especially with the advances in technology. If you enjoy imaging, you might try visual astronomy again, or EAA, to see how they compare both in results and process. If you have become exclusively immersed in the joys of astrophotography, you should rediscover the incomparable joy of direct observing. The techniques are not mutually exclusive! Learning about the sky and how it works from all angles can indeed be a rewarding process.**

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## TWO TELESCOPES FOR SALE

**Celestron NexStar 8 SE - Purchased Fall 2020 - Like New only used a few times Features newest go-to SkyAlign computer and the most advanced optical coatings available. The SkyAlign system makes it easy to quickly align the scope to the sky. Its compact design makes it an ideal scope for backyard viewing and easy transportation to your favorite dark sky site.**
**Also includes a case of several eyepieces and color filters and the original shape formed padded shipping case and star atlas.**

**Asking $ 1000 Contact John Land at Tulsaastrobiz@gmail.com to arrange to meet with the owner.**

**Celestron C8 with StarBright XLT coating and is compatible with the Fast Star imaging adapter.**

**Advanced GT (GoTo) mount with Celestron power tank.**

**price $800 with many extras**

**Contact Steve Chapman at stewachap@aol.com**


**Click on these images to links on the Internet**



***** The NEW CLEAR OUTSIDE icon above is a link to an extensive site showing cloud cover %, Seeing, Transparency, Moon Phase, Temp in $^{O}$ C and many other useful tools**

**GOT A NEW TELESCOPE? Here are some sites to help you get started with you telescope.**

**Getting Started with Your New Telescope**
**https://skyandtelescope.org/astronomy-news/getting-started-with-your-new-telescope-2/**

**Astronomy for Beginners | Night Sky Facts, FAQs & Resources**
**https://skyandtelescope.org/astronomy-information/**

**What to Know Before Buying a Telescope**
**https://skyandtelescope.org/astronomy-news/what-to-know-before-buying-a-telescope/**

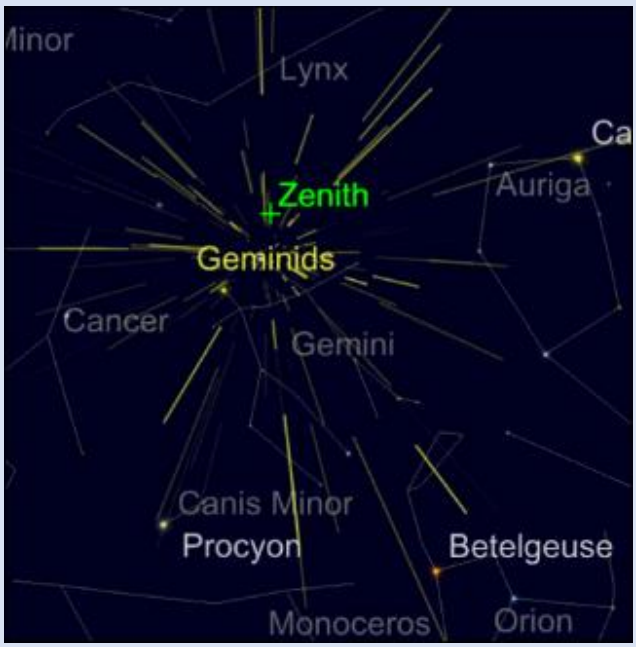
**See Website Observation Station for a collection of Interactive Sky Watching Tools**
**Moon phases - Sun rise & Set - Make your own custom interactive sky chart and more**
**Great website for printable Finder Charts of Solar System objects https://in-the-sky.org/**

**December - Moon Phases - - 3rd Q Dec 4 - - New Dec 12 - - 1st Q Dec 19 - - Full Dec 26**

**DECEMBER PLANETS – VENUS is still blazing bright as our morning "star" easily visible in the SE as you begin your morning commute. The waning crescent moon can be seen nearby on the morning of Dec 9th. MARS passed behind the Sun at superior conjunction on Nov 17 so it won't be available to observe until January. Mark your calendar for the morning of Jan 27 when Mars and Mercury will be only 1/4 degree apart. Moving to the evening sky MERCURY has its greatest evening elongation from the Sun on Dec 4th. You'll need a clear horizon to the SW to find it about 8 degrees up in the soon after sunset. Binoculars will help you pick it out in the evening dusk. SATURN is still a beautiful sight midway up in the SSW at dusk. It sets about 10:30 PM in mid-December. Look for a waxing crescent moon nearby on Dec 17th. JUPITER is the bright beacon in the east at sunset. It's location in Pisces carries it 2/3rds of the way up in the south about 9:00 PM. Make a sketch on the positions of its moons in the early evening and return to look again a couple of hours later. You will likely notice they have changed alignment. Sky and Telescope has a nice App "Jupiter's Moons" that does an accurate job of identifying them. It also gives you a list of events for the evening such as shadow transits of best times to see the Red Spot. There is also one "Saturn's Moons" The waxing gibbous moon is near Jupiter on Dec 21 and 22. URANUS is about 12 degrees to the east of Jupiter. It was at opposition Nov 1. At magnitude 5.6 it can be seen in binoculars. In a telescope it has a distinctive light green hue. Magnify it over 100x and you can begin to see it as tiny orb. Imagers might want to zoom in on it and catch a couple of it moons. Jupiter and Uranus have a very close conjunction during the April 8 solar eclipse. Finally, NEPTUNE can be found in the region between Aquarius and Pisces in the SW. Although 8th magnitude it can be identified by its pale bluish tint. Magnify it to see its color better.**

**The Moon is near is near Venus the morning of Dec. 9, Saturn Dec 17, Jupiter Dec. 21 - 22**

**Chart of Uranus positions** **Chart of Neptune positions** **Calculator for Jupiter's moons**



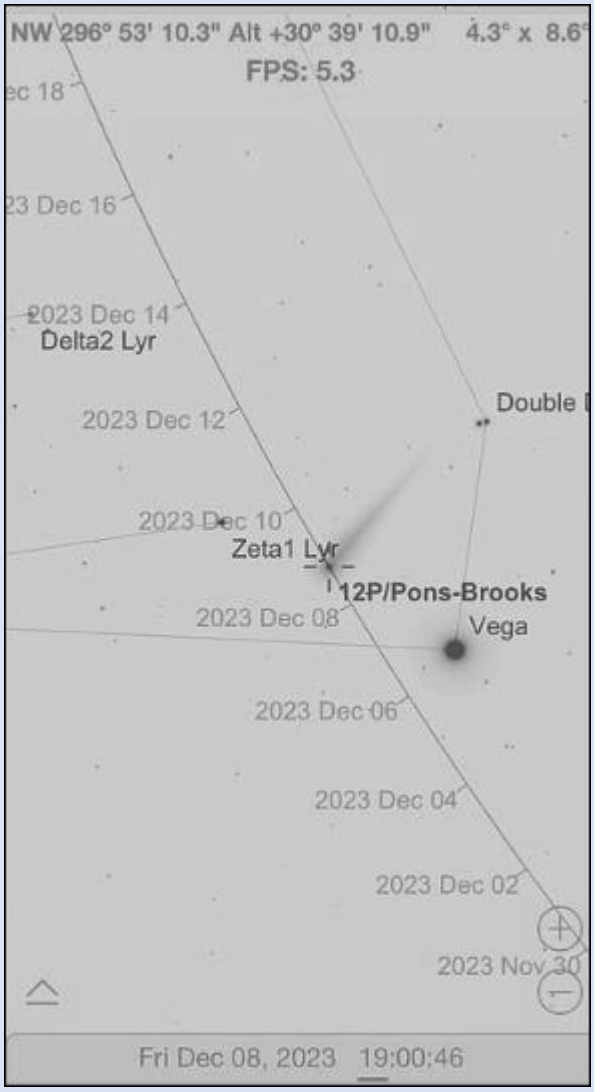

**The Geminid Meteor shower is one of the two most active showers of the year. In 2023 the shower activity peaks on the night of Weds Dec 13 into the morning of Dec 14. However, the shower is active a few days on either side. This year the New Moon is on the 12th so we will have dark sky all night. In dark sky up to 100 meteors per hour can be seen. Start watching about 8 to 9 PM toward the east. Expect more activity as the radiant in Gemini is highest at 2:30 AM.**

**When To See The Geminids At Their Best**

**Most meteor showers are associated with debris left behind in a comet's orbit. The Geminid shower originates from a rocky asteroid named 3200 Phaethon which orbits the sun every 1.4 years.**

**See**

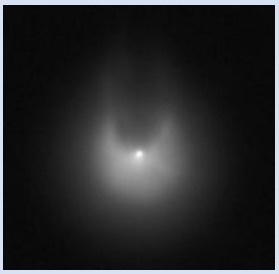
**Did an Asteroid Collision Make the Geminid Shower**




**Comet 12P / Pons-Brooks is putting on a good show this winter. This is a Halley class comet with an orbit of 70.68 years. This year it has already been observed to have at least four outburst which has raised it brightest by a factor of 100. Latest observations place it at about 9th magnitude – within reach of moderate size telescopes. You may have seen references to it on the Internet comparing its appearance to the Millennium Falcon spaceship. Its horn shaped coma is thought to indicate active cryovolcanoes spewing out jets of gases.**

**It will be well placed near the star Vega at our Dec 8 member's observing night.**

**The website SpaceWeather.com has featured images from Nov 16 thru 19 – plus a gallery on more.**



# Treasurer Report
# Cathy Grounds

**As of November 15, 2023, we had 243 members, 63 New members for 2023**
We welcome this month's newest members – **Kenneth Adcock, Carson Coomer, and Brian Egan, Kyle Hallam, Raina Rush Hello and welcome to ACT !**

**Have you changed you Contact Information? Email, Phone, Postal Address ?**
Please help us to maintain our records by sending an email to **AstroTulsa.Tres@gmail.com**

**Accounts as of Nov 15, 2023**
**Checking: $ 2,586.39**
**Savings: $ 2,793.47**
**Investments: $ 32,138.98** (Value tends to fluctuate with markets).

You can JOIN or RENEW memberships or magazine subscriptions ONLINE using ANY MAJOR CREDIT CARD.
The transactions are processed through PayPal but you Do Not need a PayPal account.
Fill out the registration form at **https://www.astrotulsa.com/join**
Click Submit and you will be given the choice of either MAILING in your dues with a check or paying online with most major credit cards. A modest processing fee is added to online transactions.

Membership rates for **2023** are as follows:
**Adults: $ 45 per year, includes Astronomical League Membership.**
**Sr. Adult: $ 35 per year for those 65 or older, includes Astro League Membership.**
**Students: $ 30 with League membership; Students: $ 25 without League membership.**
**Additional Family membership: $ 20 with voting rights and League membership.**
**$ 15 with voting rights but without League Membership.**
**The regular membership allows all members in the family to participate in club events but only ONE Voting Membership and one Astronomical League membership.**

**Join Online – Add or renew magazine subscriptions. https://www.astrotulsa.com/join**

**MAGAZINE SUBSCRIPTION RATES and PROCESS has CHANGED !**

**You can get a discount rate as a Astronomy Club member. However, you will need to do so directly using their discount rate web links.** Both Sky & Telescope and Astronomy have options for DIGITAL as well as PRINT subscriptions.

For club member's Discount subscription rates to **Sky and Telescope magazine**
go to **this page**
For club member's Discount subscription rates to **Astronomy magazine**
go to **this page**
Use the DISCOUNT RATE LINKS above instead of their regular subscription pages to MAKE or RENEW your subscription.

**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!

# A Flame in the Sky – the Orion Nebula

By Kat Troche

**It's that time of year again: winter! Here in the Northern Hemisphere, the cold, crisp sky offers spectacular views of various objects, the most famous of all being Orion the Hunter.**

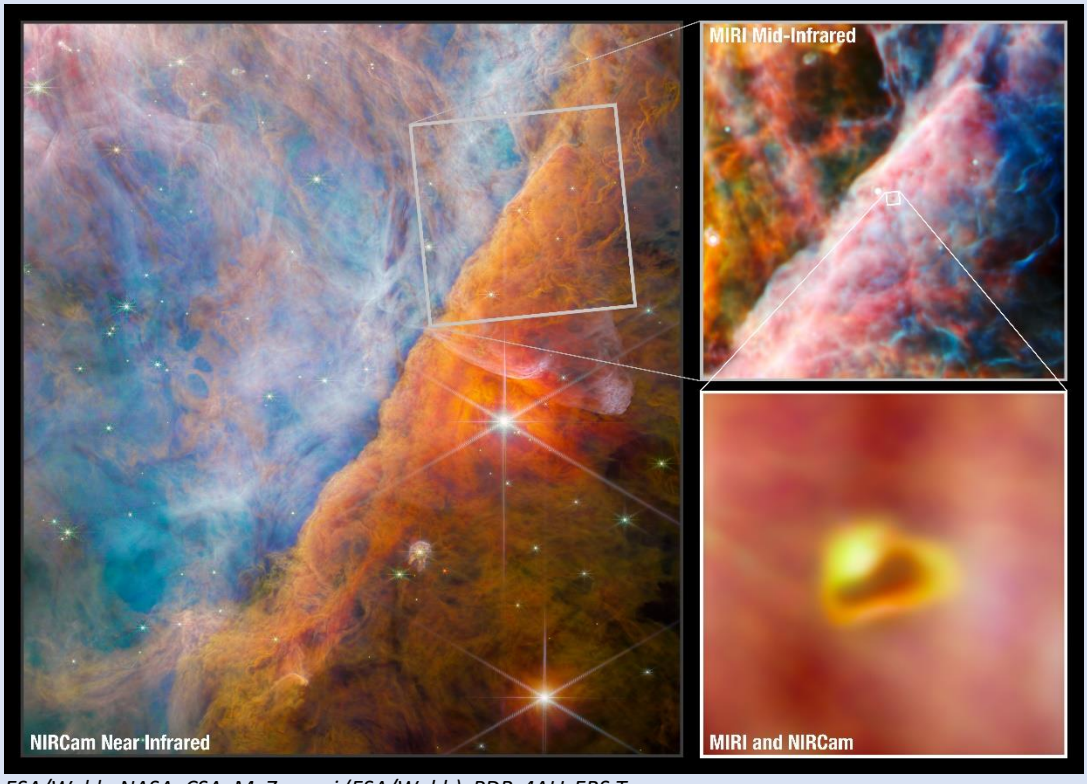

*Credit: Stellarium Web*

**As we've previously mentioned, Orion is a great way to test your sky darkness. With your naked eye, you can easily spot this hourglass-shaped constellation. Known as an epic hunter in Greco-Roman, Orion and all its parts have had many names and meanings across many cultures. In Egyptian mythology, this constellation represented the god *Sah*. The Babylonians referred to it as *The Heavenly Shepard.* In most cultures, it is Orion's Belt that has many stories: *Shen* in Chinese folklore, or *Tayamnicankhu* in Lakota storytelling. But the Maya of Mesoamerica believed that part of Orion contained *The Cosmic Hearth* – the fire of creation.**

**1,500 light years away from Earth sits the star-forming region and crown jewel of Orion – Messier 42 (M42), the Orion Nebula. Part of the "sword" of Orion, this cloud of dust and gas sits below the first star in Orion's Belt, Alnitak, and can easily be spotted with the naked eye under moderate dark skies. You may also use binoculars or a telescope to**

**resolve even more details, like the Trapezium: four stars in the shape of a baseball diamond. These young stars make up the core of this magnificent object.**

**Of course, it's not just for looking at! M42 is easily one of the most photographed nebulae around, by astrophotographers here on the ground, large ground-based observatories, and space telescopes alike. It has long been a place of interest for the Hubble, Spitzer, and Chandra X-ray Space Telescopes, with James Webb Space Telescope joining the list in February 2023. Earlier this year, NASA and the European Space Agency released a new photo of the Orion Nebula taken from JWST's NIRCam (Near-Infrared Camera), allowing scientists to image this early star forming region in both short and long wavelengths.**




*ESA/Webb, NASA, CSA, M. Zamani (ESA/Webb), PDRs4ALL ERS Team*

**But stars aren't the only items photographed here. In June 2023, JWST's NIRCam and MIRI (mid-infrared instrument) imaged a developing star system with a planetary disk forming around it. That's right – a solar system happening in real time – located within the edges of a section called the Orion Bar. Scientists have named this planet-forming disk d203-506, and you can learn more about the chemistry found here. By capturing these objects in multiple wavelengths of light, we now have even greater insight into what other objects may be hiding within these hazy hydrogen regions of our night sky.**

**In addition to our Dark Sky Wheel, a fun presentation you can share with your astronomy club would be our *Universe Discovery Guide: Orion Nebula, Nursery of Newborn Stars* activity. This will allow you to explain to audiences how infrared astronomy, like JWST, helps to reveal the secrets of nebulae. Or, you can use public projects like the NASA-funded MicroObservatory to capture M42 and other objects.**

**Learn more about what to spy in the winter sky with our upcoming mid-month article on the Night Sky Network page through NASA's website!**

You are invited to come join us to learn more about
Astronomy and view the wonderful sights in the night sky.

**Check the EVENTS section at https://www.astrotulsa.com/**


**During the school year our club holds a**
**Monthly General Club meetings at**
**Jenks Public Schools Planetarium**
**105 East B St, Jenks, OK**
**Located North of the intersection of**
**1st and B St**

**Meetings begin at 7:00 PM**

**When you enter the building lobby,**
**take the elevator to the 3rd floor.**

**Click for Google Map Link**

**ASTRONOMY CLUB OBSERVATORY**
Located on a hilltop about 25 miles SW of Tulsa
Features: classroom, restroom, dome with 14-inch telescope and an acre to set up your telescopes.

Weather permitting, we host two types of observing nights.

**GUEST OBSERVING NIGHT** – RSVP requested
This event is open to our Guest – both individuals and families as well as our regular members. Several of our club members set up telescope for public viewing.
***** Groups need to make separate arrangements.

**MEMBERS OBSERVING NIGHT** usually on a Friday near new moon
Reserved for club members and their families to allow them to pursue observing projects.
The Observatory is ONLY OPEN for SCHEDULED EVENTS.

**Check the EVENTS section at https://www.astrotulsa.com/**
Follow our map directions DO NOT USE GPS

**Two Options for travel to the observatory**

**MOSTLY PAVED ROADS – Hwy 75 to 201st St S – through Mounds OK**

**Most DIRECT ROUTE – Hwy 75 to 241st St S – some coarse gravel & dirt roads**

**ASTRONOMY CLUB OFFICERS:**

**PRESIDENT – DON BRADFORD**
**astrotulsa.pres@gmail.com**

**VICE PRESIDENT – JONATHAN FUSSELL**
**astrotulsa.vp@gmail.com**

**SECRETARY – SKIP WHITEHURST**
**astrotulsa.secy@gmail.com**

**TREASURER – CATHY GROUNDS**
**astrotulsa.tres@gmail.com**

**BOARD MEMBERS-AT-LARGE:**
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**JERRY CASSITY**
**BRYAN KYLE**
**JOHN LAND**
**JACK REEDER**
**JAMES TAGGART**

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**PR AND OUTREACH – Open Position**

**GROUP DIRECTOR – Open Position**

**NIGHT SKY NETWORK – Open Position**

**WEBMASTER JENNIFER JONES**

# Enjoy at Planetarium Show at Jenks High School

## JENKS PLANETARIUM

**Jenks High School Campus**
**205 East B Street, Jenks**

**TICKETS** are $7

Purchase online at
**jenkscommunityed.com**
or call 918-298-0340

**2023 Fall Shows** Go to Show Schedule
**Click the Date Column to sort them by show date**

**Most Shows take place on Tuesday evenings from 7:00 PM to 8:00 PM- a few on Saturday**