ASTRONOMY CLUB OF TULSA
85 Yrs

OBSERVER

September 2022

Bringing Stars to the eyes of Tulsa since 1937

Editor – John Land

The Trifid Nebula M20 - NGC 6514 in Sagitarius by Mike Blaylock

The Trifid is a favorite of both observers and imagers. Hydrogen gases heated by newly forming stars produce its pink emission nebula. Starlight relfecting off instellar dust produces the blue reflection nebula and dark lanes of opague dust trisect it giving it its name. Its image frequently appeared out the window of early Star Trek episodes for an other worldly appearance.

You won't see the colors visually in a telescope but you can see its intragate structure.
The Trifid lies toward the center of our galaxy 5,200 light years away.

This image was take Aug 15, 2015 using a Cannon EOS 600D / Rebel T3i / Kiss X5 Camera On a Losmandy G-11 Mount Mike took 35 – 180 second frames (1 hr 45') then combined them to produce this beautiful image.

In this Issue

Astronomy Club Events

Check our website AstroTulsa.com events section for updates

Observatory ONLY OPEN for SCHEDULED EVENTS. **Click for Observatory Map**

OBSERVING NIGHTS will be scheduled on
Friday with Saturday as a backup night for weather cancellations.
NOTE: Please check our website for Weather Cancellations before heading out.

Astronomy Club Meeting - Friday September 9 - 7:00 PM - IN PERSON club meetings.
At Jenks High School planetarium 105 E B Jenks OK - Guests Welcome

Friday Sept 16 7:00 PM Guest and Members Night - Guest requested to RSVP

Autumn Equinox Weds Sept 21 8:03 PM CDT

Friday Sept 23 7:00 PM Members Only night
Open to members and their immediate family

Astronomy Club Meeting - Friday Oct 14 - 7:00 PM - IN PERSON club meetings.
At Jenks High School planetarium 105 E B Jenks OK - Guests Welcome

Saturday Oct 15 6:15 PM Guest and Members Night - Guest requested to RSVP

Friday Oct 21 6:15 PM Members Only night
Open to members and their immediate family

TUESDAY Oct 18 6:30 to 9:00 Starlight in the Tulsa Botanical Gardens
Open to Public Registration and Admission Fee required
We will need volunteers to set up telescopes.

Registrations Deadlines Closing Soon.
for the 39th Annual Okie-Tex Star Party Sept 23 – Oct 1
Amateur astronomers from all over the country and beyond come to enjoy a weeklong "Star Fest" under some the darkest sky on the planet.

OBSERVING NIGHT GUIDELINES

Children and young teens need to stay with adult family members. When approaching a telescope ask it owner if you can look at what they are viewing. With the Summer Travel Session well under way the number of Covid cases is on a sharp rise again. We want to keep our guests and members safe. We ask you to please be thoughtful of the health safety of others around you. If you or a person in your household is showing signs of illness, please postpone your visit for another date.

Personal Hygiene, Social Distancing and Mask wearing are effective means of preventing spread.

Order Your 2023 Calendars Now $ 10 ea

Place your order by Sept 30 by sending an email to
Astrotulsa.tres@gmail.com
Send your Name – Email and Phone Number
Plus how many you would like to order

Calendars can be picked up In Person at our Oct 14 Jenks High school meeting or at either our Nov or Dec Jenks meetings. Payment will be made when you pick up your order.
We will not be mailing or delivering orders.

The Deep Space Mysteries Calendar is filled with dramatic images of nebulae, spiral galaxies, planets, star-forming regions, and other mysteries of deep space. Each month details planet visibility, meteor showers, conjunctions, and other observing opportunities and major astronomical events. Size is 13" x 10.5" Calendars sell online for $ 12.99

Volunteers Needed

Our Astronomy Club gets invitations several times a year to bring telescopes for events or Organizations. This gives us an opportunity to share our love of astronomy and invite astronomy enthusiast to come explore or club. You don't have to be an expert or have a fancy telescope. Volunteers can also help by just greeting guests or helping at our Observatory Guest nights.

If you would like to volunteer send your name – email and phone # to
Tulsaastrobiz@gmail.com USE SUBJECT LINE – EVENT VOLUNTEER

Sept 30 or Oct 1 – We need 6 or 7 Telescopes plus greeting volunteers for the Public Star Night at the Voyage Solar System Walkway in Broken Arrow
Many of our regular volunteers will be at Okie-Tex so your help desperately needed

Tues Oct 18 – Tulsa Botanical Gardens – Starlight in the Gardens night. –
6 or 7 Telescopes plus greeting volunteers Runs from 6 to 9 PM

Oxley Nature Center is Looking for Volunteer to help their volunteers learn more about the sky and constellations. They have a Monthly Full Moon Walk on the Nature Trails talking about the night sky and enjoying the night sounds of nature. Contact Mary Seaborne at 918-596-9054 mseabourn@cityoftulsa.org

We have also had requests from Scout Groups & Homeschool Networks for the fall.

Our Tulsa Club will be hosting the MidStates Convention June 9 to 11, 2023

We will need planning committees and volunteers to begin preparing this fall. Publicity, Website Design, Registration, Door Prizes, Guest Speakers, Preparing our Observatory, Snacks and Meals, Saturday Night Banquet. We will want to do a great job showing off our Tulsa Astronomy Club and Tulsa.
To volunteer send email to astrotulsa.pres@gmail.com
Subject Line MSRAL Volunteer

President's Message
John Land

Greetings to all our Astronomy Club of Tulsa Members and Guests.

While the Summer heat is still going strong the promise of Autumn's cooler weather and longer nights is just around the corner. Please read our events section and Volunteer Opportunities to become more actively involved in our club and interact with other astronomy enthusiasts.

We had a large turn out for our August 19 Guest night. Over 40 guests enjoyed the evening looking through our telescopes. Despite Clouds most of the afternoon, the sky cleared before sunset and the Milky Way was the best that I've seen it in some time. We've had several people expressing interest in joining our club. About 25 members and families turned out for our members picnic on Saturday August 27th. See images later in the newsletter.

John Newton has faithfully served as our club treasurer since November 2018. He has been instrumental in upgrading the way we keep our records and also meticulous in managing all the details of membership. In addition to his treasurer duties, he has put in many days serving the club as a volunteer at events and workdays. John is stepping down as treasurer and he and his wife are planning to soon be enjoying the country life in Missouri.

I am pleased to announce that Mike Blaylock has volunteered to accept the role as our club treasurer. In order to make a smooth transition of the duties of treasurer the board voted to appoint Mike associate treasurer so that he and John could work together the next couple of months.
Mike has been a member of the club since 2009. He has severed on our board for several years. He is an accomplished Astro-photographer and always willing to help others by sharing tips.

In August my wife and I got to spend 10 days in western Canada for our two-year delayed 50th anniversary trip. Unfortunately, we returned two days before a major outbreak of Northern lights ☹ One thing I was pleased with is that even the Million plus metropolitan cities we were in Vancouver and Calgary all had well shielded street lighting. From the upper floors in our hotels, I could see the streets were illuminated but I wasn't looking at glaring streetlights from above. Sadly, on our landing approach to Tulsa's Airport, at nearly midnight, I saw numerous EMPTY Large Parking lots with glaring lighting visible from the plane. Recently my local news was touting a story about PSO replacing the street lighting with even brighter lights. Surely, we can invest in smarter lighting designs.

Let us continue our 85 years of

"Bringing Stars to the Eyes of Tulsa since 1937"

John Land - President

Our Astronomy Club Picnic was Saturday Aug 27

A big thank you to the voluteers of our Picnic Organization Team

Cathy Grounds, Gary Wayland, Mahogany Jones, Dennis Spraque and Don Bradford
about 25 members enjoyed visiting and celebrating the clubs 85th anniversary

Click on these images to links on the Internet

See our website observing page 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/

Sept. - **Moon Phases - - 1st Q Sept 3 - - Full Sept 10 - - 3rd Q Sept 17 - - New Sept 25**

September Planets –SATURN is in eastern Capricorn. It reached opposition on August 14 and is visible in the SE sky at dusk. **JUPITER is now in Pisces rising in the East. It reaches opposition Sept 26.** The two planets are now 45 degrees apart. Most of you will recall that these two planets passed within 1/10 of a degree on Dec 21, 2020. **MERCURY** reached its maximum evening elongation from the Sun on August 27 and is rapidly sinking back toward the sun for inferior conjunction on Sept 23. You might still be able to catch it low on the western horizon just after sunset in early September. **VENUS** hugs the eastern horizon at dawn making it difficult to observe. It reaches superior conjunction passing behind the Sun on Oct 23. As September begins **MARS** shines at + 0.1 magnitude in Taurus. It will make a long retrograde loop westward in Taurus. Staying in that region until March of 2023. Look for it high in the sky before dawn near Aldebaran. By the end of September, it will be rising about 11:00 PM and shining brightly at – 0.5 magnitude. Plan to start observing Mars as it continues to draw closer to Earth. At opposition on Dec 7, it will shine brightly a - 1.9 mag.

The MOON is near Saturn on Sept 7, Jupiter on Sept 10 & 11, and Mars on September 17

The planet **NEPTUNE** and asteroid **3 JUNO** both reach opposition in September. At 8th magnitude both are accessible in small telescopes. **3 Juno** reaches opposition on **Sept 7** and **Neptune on Sept 16**. Both are in the constellation of Aquarius. ***See larger location image on next page***. **Neptune** is more easily identified by its steely blue gray color. Once you think have found it, increase your magnification to 100 X or more and see if you can make out its tiny disk. To find **Juno** examine the finder chart and make a sketch of the stars in your eyepiece field of view. Come back a night or two later and see which one moved. The same will work for Neptune. Then make sketches of those areas for a few weeks to watch their motions. Both are in retrograde (westward) motion. Juno's motion will be greater since it is much closer than Neptune. **Printable Finder Charts at**
NEPTUNE - https://in-the-sky.org/findercharts/10neptune_2022_1.pdf

3 JUNO - https://in-the-sky.org/news/asteroids/20220907_14_100_1.pdf
Asteroid 4 VESTA lies about 10 degrees below Saturn. At magnitude 7.5, it is easily accessible in small telescopes and even binoculars.
Finder chart - **https://in-the-sky.org/news/asteroids/20220822_14_100_1.pdf**

Comet C/2017 K2 will be skirting the edge of Scorpio's claw in September. Currently it is around 9th magnitude. You'll need a clear view to the SSW to observe it well.
Printable Finder Chart **https://in-the-sky.org/comets/20220804_CK17K020_1.pdf**

Astronomical League Observing Challenge - Special Awards

The Summer **GLOBULAR CLUSTER Observing Challenge**
Began July 1 and must be completed by **Sept 30, 2022**. Click the link above for details for to earn the award.

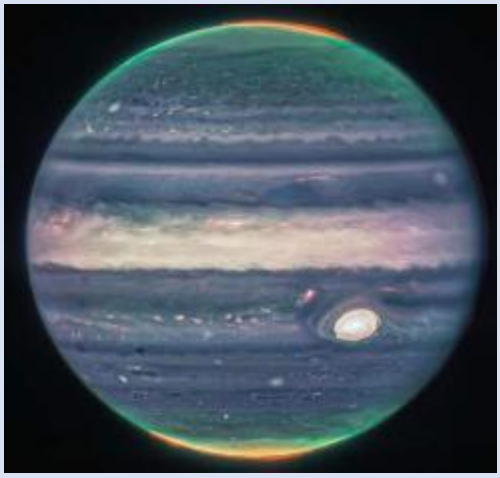
Here is a PDF of the **38 Globular Clusters**
You will also want to review details about **Rating Seeing and Transparency**
Learn more about other **Astronomical League Observing Certificates** available

OBSERVING NOTES Brad Young

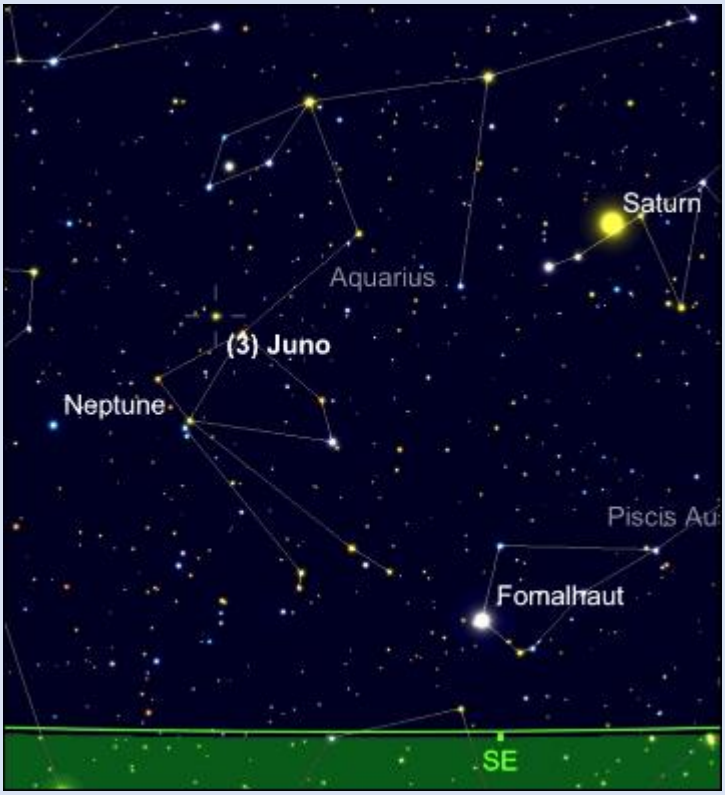
At our Sept 9th Jenks meeting our Observing Chairman Brad Young will be doing a presentation entitled "Seeing the Deep Sky" and will discuss methods and tips on doing so. If you missed either of the two presentations given over the summer, they are available at https://hafsnt.com/index.php/observing-presentations/ Hope to see you there!

Two recent images of Jupiter

Hubble Telescope



James Webb Telescope



The Hubble image is taken in visible light. The James Webb image is taken in several wavelengths of infrared and uses a false color pallet so that we can see the features. Note the polar Aurora glow in the James Webb image.

You can see much more detail and description in the NASA article *Webb's Jupiter Images Showcase Auroras, Hazes*

Details of the Hubble Image can be found at *Hubble Showcases New Portrait of Jupiter*

< Location chart for Neptune and asteroid 3 Juno

Citizen Science Using Remote Telescopes

Part One: Variable Stars

by Brad Young

Amateur astronomers have a huge role to play when it comes to citizen science. However, we don't all have the high-end equipment to involve ourselves in the best opportunities. Remote telescopes offer a solution that may work for you. One definition of a remote telescope is “Go-To Telescopes where the observer is not responsible for maintenance and operation of the telescope”. However, the observer is responsible for the selection, definition, and timing of the observation, and the exposure times, cadence, filters, and processing used to create the final images. They are also responsible for measurements such as astrometry (position), photometry (brightness) and other useful data.

R-COP at Perth Observatory

There are remote telescopes available on a commercial basis, and others available as part of research partnerships. By using remote telescopes, we can add to the knowledge base of astronomy and reach that goal without significant expense on our own part. For this first article, I will discuss below a few examples of one of the major ways to get involved – observing, measuring, and reporting variable stars.

Variable Stars

Variable stars provide several ways to perform citizen science. Measuring variability has taught us the inner workings of stars, set stellar and galactic distances, and helped explain how stars form and die. Some of the best-known targets can be seen naked eye or with a small telescope, such as tracking the variability of long period variables (Mira), eclipsing binaries (Algol), Cepheid variables (Delta Cephei) etc. You may wish at some point to find dimmer and more challenging targets, such as young stellar objects, novae, and spectroscopy. All these things can be done using remote telescopes, and the findings reported to the American Association of Variable Star Observers (AAVSO). Each week, I get a report of who used my observations, and why:

Date	Star name	# obs.	User	Purpose
2022-07-31	MIRA	38	Stu	Analysis
2022-08-01	NOVA PER 2020	4	Pro	Analysis
2022-08-02	EPS AUR	27	Stu	Education
2022-08-03	RS OPH	1	Pro	Figure
2022-08-03	RS OPH	5	Pro	Figure
2022-08-04	EX LUP	18	Stu	Analysis
2022-08-06	R AQL	4	Am	Analysis

Supporting Hubble Missions

One exciting offshoot of this is to provide ground support of missions done by Hubble Space Telescope. The science being done by HST may be adjusted based on this ground support, with changes made or even rescheduling the HST observations based on findings by amateurs. In some cases, a star may be best observed when brightest, or it may have to be delayed if a flare up occurs. Often, the request is for multiband (B,V,R,I) imagery and even spectroscopy. In all cases, the requests are time sensitive.

Don't Stop Helping Hubble!

The AAVSO publishes alert bulletins on upcoming missions that need observations of certain variable stars to support an upcoming or ongoing Hubble mission. The bulletins provide details on the star, the timing, the filters requested, and even have some background on what the observation is about. I've been fortunate enough to get involved in some of them, including the recent ones below:

ALERT	DATE	STAR	MY OBS	REASON
779	6/7/2022	U Sco	11	Recur Nova
780	6/14/2022	IM Lup	19	HST
780	6/14/2022	RX J1556.1-3655	12	HST
780	6/14/2022	Sz100	14	HST
780	6/14/2022	Sz104	11	HST
781	6/14/2022	V0415 Mus	31	Nova
782	7/5/2022	V908 Sco	9	HST
783	7/5/2022	V485 Aqr	1	HST
788	8/1/2022	RU Lup	7	HST

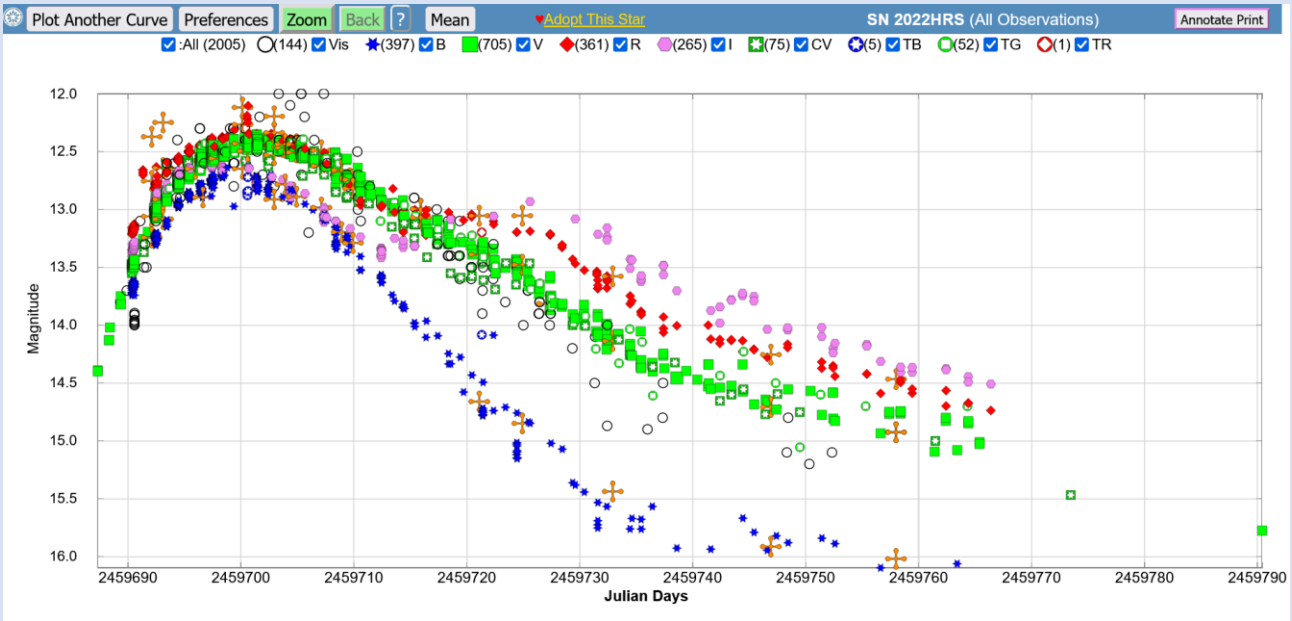
Note: if you want to look up any of my observations on the AAVSO website, my ID is YBA

Extragalactic Supernovae

Another exciting way to observe variable stars are the extra galactic supernova (EGSN). The Milky Way just won't give us a supernova since the invention of the telescope, but we have developed the equipment to see several a year in other galaxies. One famous one this year (SN 2022rms) occurred in NGC 4647; a galaxy right next to Messier 60.

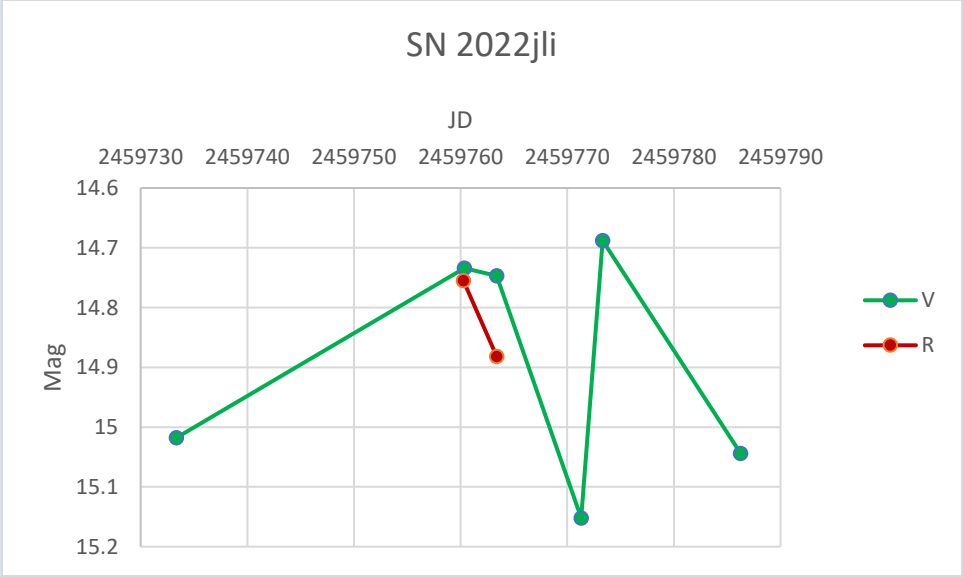
Image by Author

Not only was the supernova brighter than its host, but the location made it easy to observe. I touched on that in a short article earlier this year, and one of my friends in the Astronomy Club of Tulsa, Stan Davis just wrote a great article on his observations of it (using his own equipment). The latest light curve looks like this (with my observations as crosses):



There have been other EGSN this year that I've been able to observe including SN 2022jli in NGC 157. Although poor weather limited the number of observations, I was able to see the double peak indicative of a Type Ic supernova. I'm not claiming to have identified it as such, but it was nice to see this verified by others using its spectrum.

Image by Author



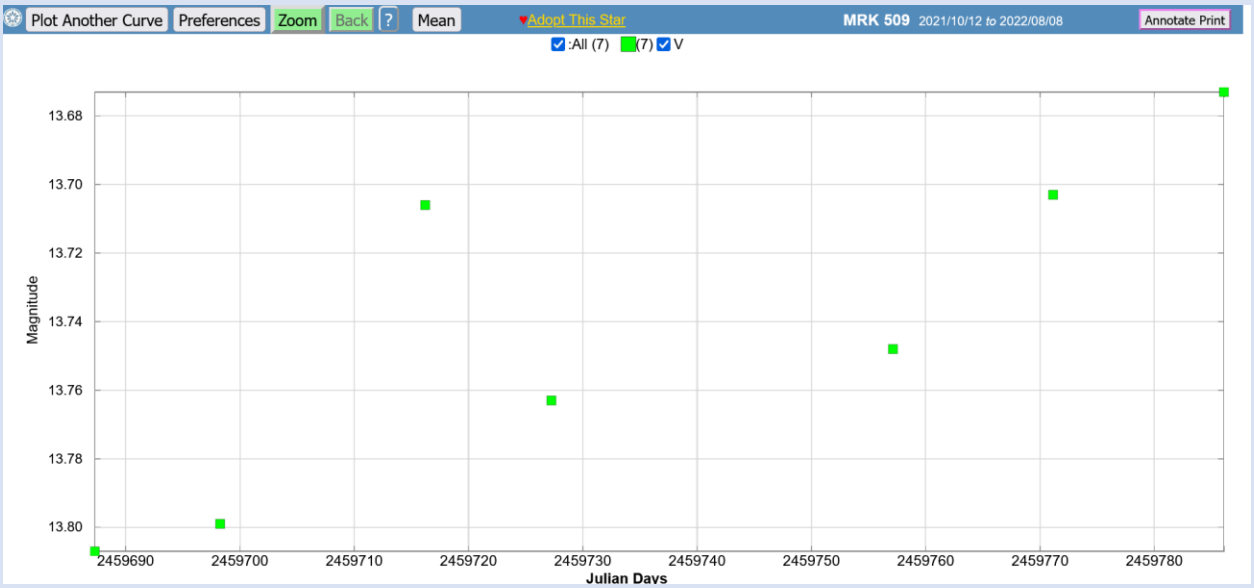
Active Galactic Nuclei

There is also a group of variables known as active galactic nuclei which are not the same as EGSNs but indicative of variability in the nucleus itself. This group includes objects such as quasars, blazars, BL Lacerta objects, and more:

Features of different types of galaxies										
Galaxy type	Active nuclei	Emission lines		X-rays	Excess of		Strong radio	Jets	Variable	Radio loud
		Narrow	Broad		UV	Far-IR				
Normal (non-AGN)	no	weak	no	weak	no	no	no	no	no	no
LINER	unknown	weak	weak	weak	no	no	no	no	no	no
Seyfert I	yes	yes	yes	some	some	yes	few	no	yes	no
Seyfert II	yes	yes	no	some	some	yes	few	no	yes	no
Quasar	yes	yes	yes	some	yes	yes	some	some	yes	some
Blazar	yes	no	some	yes	yes	no	yes	yes	yes	yes
BL Lac	yes	no	no/faint	yes	yes	no	yes	yes	yes	yes
OVV	yes	no	stronger than BL Lac	yes	yes	no	yes	yes	yes	yes
Radio galaxy	yes	some	some	some	some	yes	yes	yes	yes	yes

Source: Wikipedia

These usually have AAVSO identifiers and can be easily reported, although many of them are faint and require larger scopes and/or long exposures. One good example is Mrk509; I have shown my recent reporting as a light curve below:



Of course, these objects and many others can also be observed remotely using radio telescopes, though use of those instruments is often more difficult to acquire.

Next Article

In the next article (Part 2) I will review how remote telescopes can help track and identify minor planets of all kinds for several different uses by science. I will also discuss tracking lost spacecraft and the debris in high orbit that may pose issues for spaceflight. And remember those comets you never got to see? Image them remotely, and you can help by reporting that data too.

Acknowledgement and Thanks

Most of the citizen science work I've done over the last six years has been with the use of a telescope at the Perth Observatory in Western Australia. They have been highly supportive of all my efforts and continue to help me and their other research partners throughout the world to add to our knowledge of the universe.

References:

https://www.astroleague.org/content/terms-common-usage-al-observing
http://www.warrenastro.org/was/newsletter/WASP-2022-05.pdf
https://www.astrotulsa.com/CMS_Files/2022-08.pdf
https://www.wis-tns.org/object/2022jli/classification-cert
https://en.wikipedia.org/wiki/Active_galactic_nucleus

You are invited to come join us to learn more about
Astronomy and view the wonderful sights in the night sky.
Check our Events Page of Dates **Link to Events Page**

During the school year our club holds a
Monthly General Club meetings at
Jenks Public Schools Planetarium
205 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 individuals and families.
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. **Link to Events Page**
New Directions map to Observatory
CAUTION: **DO NOT use GPS** it will likely send you on some nearly impassible back roads.

Associate Treasurer Report
Mike Blaylock

As of August 24, we had 192 members - 32 New members for 2022
We welcome this month our newest members - **Leland Conn, David Fantin, and Alejandra August Hello and welcome to ACT!**

In addition, we want to recognize our long-term members who continue to renew their memberships.
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 August 24, 2022
Checking: $ 3,765.91
Savings: $ 15,787.74
Investments: $ 30,837.57 (Value tends to fluctuate with markets).

This month we paid our **Astronomical League** Dues –
By uniting together clubs can promote astronomy on a national level and provide observing challenge programs to members.

The club now has PayPal available for you to start or renew memberships and subscriptions using your credit or debit cards. Fill out the registration form at **https://astrotulsa.com/page.aspx?pageid=16**
Click Submit and you will be given the choice of either **mailing in your dues** with a check **or using PayPal** which accepts most major credit cards. A modest processing fee is added to PayPal transactions.

You may also renew your membership or join at one of our club events using your credit card by seeing one of our officers. We can take payments with the Square card reader. A small fee is also added on to these transactions.

ALSO NOTE: For our current members who are renewing their memberships, you can now go to a new link on the website to start your renewal process. On the home page, hover over the "Member" tab on the ribbon menu near the top of the page. Then select the "Membership Renewal" link and this will take to a page to fill out your information. Fill this out, submit it, then pay your dues by the method you choose.

NEWS NOTE: Both Sky & Telescope and Astronomy have free Digital subscriptions available with print subscriptions, or Digital subscriptions may be purchased separately. Details - Contact their websites

Membership rates for **2022** 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/page.aspx?pageid=16

Magazine Subscriptions: If your magazines are coming up for renewal, try to save the mailing label or renewal form you get in the mail. Forms are available on the club website. Both magazine now include online access with paid subscription.
Astronomy is $ 34 for 1 year, or $ 60 for 2 years. **www.astronomy.com**
To get the club discount you must go through the club group rate.
Sky & Telescope is $ 33 per year **https://skyandtelescope.org/**
Sky & Telescope also offers a 10% discount on their products.
You can SAVE $ 10 by renewing Sky & Telescope through our club instead of online.

The Summer Triangle's Hidden Treasures

David Prosper

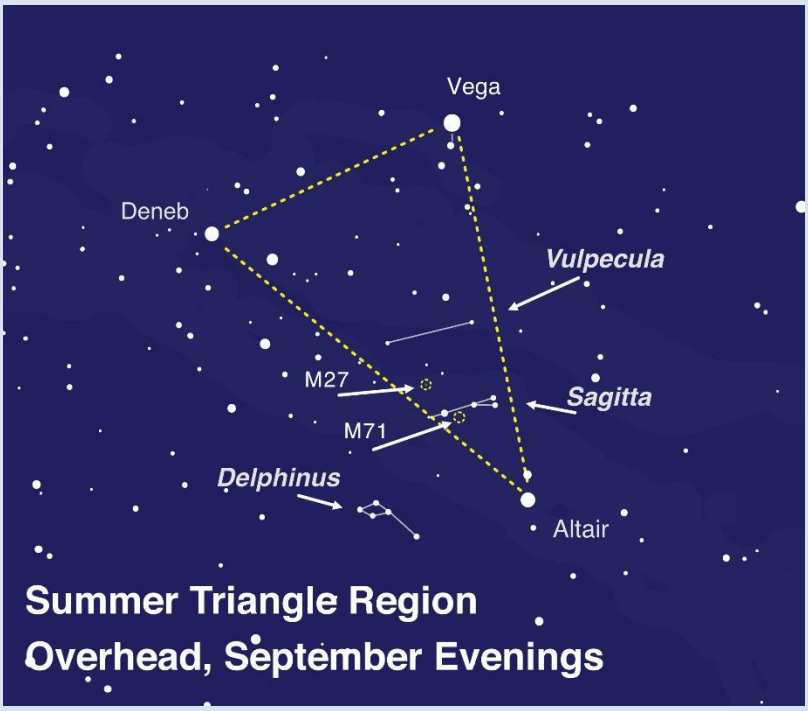
September skies bring the lovely **Summer Triangle** asterism into prime position after nightfall for observers in the Northern Hemisphere. Its position high in the sky may make it difficult for some to observe its member stars comfortably, since looking straight up while standing can be hard on one's neck! While that isn't much of a problem for those that just want to quickly spot its brightest stars and member constellations, this difficulty can prevent folks from seeing some of the lesser known and dimmer star patterns scattered around its informal borders. The solution? Lie down on the ground with a comfortable blanket or mat, or grab a lawn or gravity chair and sit luxuriously while facing up. You'll quickly spot the major constellations about the Summer Triangle's three corner stars: Lyra with bright star Vega, Cygnus with brilliant star Deneb, and Aquila with its blazing star, Altair. As you get comfortable and your eyes adjust, you'll soon find yourself able to spot a few constellations hidden in plain sight in the region around the Summer Triangle: **Vulpecula the Fox**, **Sagitta the Arrow**, and **Delphinus the Dolphin**! You could call these the Summer Triangle's "hidden treasures" – and they are hidden in plain sight for those that know where to look!

Vulpecula the Fox is located near the middle of the Summer Triangle, and is relatively small, like its namesake. Despite its size, it features the largest planetary nebula in our skies: M27, aka the Dumbbell Nebula! It's visible in binoculars as a fuzzy "star" and when seen through telescopes, its distinctive shape can be observed more readily - especially with larger telescopes. Planetary nebulae, named such because their round fuzzy appearances were initially thought to resemble the disc of a planet by early telescopic observers, form when stars similar to our Sun begin to die. The star will expand into a massive red giant, and its gasses drift off into space, forming a nebula. Eventually the star collapses into a white dwarf – as seen with M27 - and eventually the colorful shell of gasses will dissipate throughout the galaxy, leaving behind a solitary, tiny, dense, white dwarf star. You are getting a peek into our Sun's far-distant future when you observe this object!

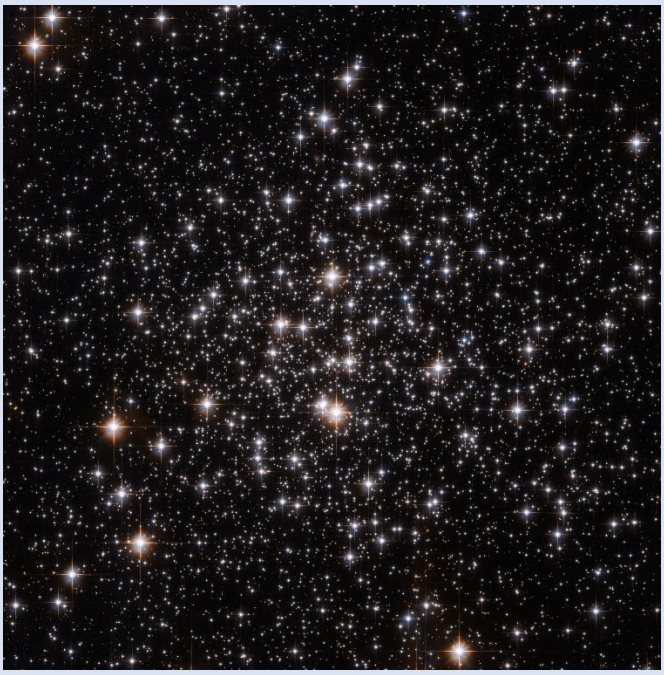
Sagitta the Arrow is even smaller than Vulpecula – it's the third smallest constellation in the sky! Located between the stars of Vulpecula and Aquila the Eagle, Sagitta's stars resemble its namesake arrow. It too contains an interesting deep-sky object: M71, an unusually small and young globular cluster whose lack of a strong central core has long confused and intrigued astronomers. It's visible in binoculars, and a larger telescope will enable you to separate its stars a bit more easily than most globulars; you'll certainly see why it was thought to be an open cluster!

Delicate **Delphinus the Dolphin** appears to dive in and out of the Milky Way near Aquilla and Sagitta! Many stargazers identify Delphinus as a herald of the fainter water constellations, rising in the east after sunset as fall approaches. The starry dolphin appears to leap out of the great celestial ocean, announcing the arrival of more wonderful sights later in the evening.

Want to hunt for more treasures? You'll need a treasure map, and the Night Sky Network's "Trip Around the Triangle" handout is the perfect guide for your quest! Download one before your observing session at bit.ly/TriangleTrip. And of course, while you wait for the Sun to set - or skies to clear - you can always find out more about the objects and science hidden inside these treasures by checking out NASA's latest at nasa.gov.



Search around the Summer Triangle to spot some of its hidden treasures! To improve readability, the lines for the constellations of Aquilla, Lyra, and Cygnus have been removed, but you can find a map which includes them in our previous article, **Spot the Stars of the Summer Triangle, *from August 2019*** **On PAGE 11***. These aren't the only wonderful celestial sights found around its borders; since the Milky Way passes through this region, it's littered with many incredible deep-sky objects for those using binoculars or a telescope to scan the heavens. Image created with assistance from Stellarium: stellarium.org*



M71 as seen by Hubble. Your own views very likely won't be as sharp or close as this. However, this photo does show the cluster's lack of a bright, concentrated core, which led astronomers until fairly recently to classify this unusual cluster as an "open cluster" rather than as a "globular cluster." Studies in the 1970s proved it to be a globular cluster after all – though an unusually young and small one! Credit ESA/Hubble and NASA. Source: https://www.nasa.gov/feature/goddard/2017/messier-71

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