



OBSERVER

APRIL 2021

*Bringing Stars to the eyes of Tulsa
since 1937 Editor - John Land*



A Galaxy Trio in Leo - M65 - mag 9.16 - 42 million L yrs - top right
M 66 - mag 8.9 - 31 million L yrs - middle right
NGC 3628 - mag 9.13 - 35 million L yrs - Left

Image Michael Blaylock using a Williams Optics GT102 mm scope on a Losmandy G11 mount
Taken in LRGB with a one-shot (color) SBIG 8300 camera. 24 subframes, 20 min each.

Read the articles on "Star Hopping" to learn how to get started finding these and other hidden treasures in the night sky Pages 6, 7, 8 & 10

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See our [2020 Newsletter INDEX](#) to all the 2020 Astronomy Club Newsletters at

Astronomy Club Events

Check our website AstroTulsa.com events section for updates

Observatory ONLY OPEN for SCHEDULED EVENTS. [Click for Observatory Map](#)

CAUTION: **DO NOT** use GPS it will likely send you on some nearly impassible back roads

Members ONLY Events continue with Social Distancing Guidelines in Effect

We are limiting our Observatory nights to our MEMBERS ONLY. Please observe Social Distancing and we strongly recommend wearing a mask when around other people. PLEASE WEAR a MASK when in the heated CLASSROOM. Please keep minor family members within your observing area.

No guests – other than immediate family – no large family groups. Be sure to review the map directions carefully. When you arrive be aware of people on the field and telescopes set up. Check website for changes due to weather.

In April we will return to having FRIDAY observing Nights with Saturday as backup night

Friday, April 2, 7:30 PM
Friday, May 7, 7:45 PM

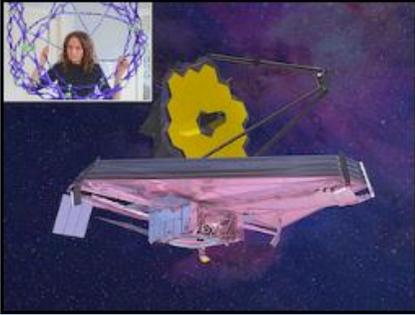
Friday, April 9, 7:30 PM
Friday, May 14, 8:00 PM

**Saturday Only - May 29, 8:15 PM * Date Change to accommodate MSRAL convention
Weather Backup observing nights on Saturday resume in April**

NOTE: If weather conditions are unfavorable or hazardous events may be postponed or cancelled. Please check our website before heading out.

Tuesday April 20 - 7:00 PM Monthly Club Zoom Meeting - Dr. Kelly Lepo will update us with the latest on the James Webb Space Telescope due for launch in October. The long-awaited James Webb Telescope is the new tennis court sized infrared space telescope soon to orbit beyond the moon. ZOOM LINK POSTED LATER.

Tuesday April 20 - 7:00 PM - Monthly Club Zoom Meeting.



Join us to hear Dr. Kelly Lepo update us with the latest on the James Webb Space Telescope. NASA Night Sky Network Webinar recording.

The James Webb Space Telescope is NASA's next flagship space observatory, which will launch in October 2021. In this presentation, Dr. Lepo will discuss the science and challenges of infrared astronomy, as well as the big questions that the Webb telescope will help to answer: What were the first galaxies like? How do galaxies change over time? How do stars and planets form in those galaxies? What are the atmospheres of planets around other stars made of?



June 4-6, 2021 MidStates Regional astronomy Conference will be held at the NSU campus in Broken Arrow.

Fellow astronomy enthusiasts from a five-state region will gather to hear a variety of presentations. We will also have an opportunity to learn and share ideas from other clubs in our region.

A youth conference is also planned in tandem with the adult sessions for students, from 6th grade to 12th grade

Registration and program information is now available at:

- <https://msral2020.wixsite.com/register4msral2020>

Register Early as it will be limited to 125 adults and 25 students.

The meeting rooms spacious allowing for Social Distancing Guidelines to be observed.

Keynote - **Dr Kat Gardner-Vandy** - Planetary Scientist - OSU Assistant professor of Aviation & Space

Others include: **Don Ficken Jr** - International Dark Sky Association

Gary Fugman - NE Nebraska club, **Bill Murrell** OKC club

Seth Fenderson, Horkheimer/O'Mera award winner

Peggy Walker - Astronomical League.

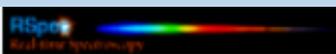
2021 Zoom Meeting Recordings online



March 23 - Amateur Astronomer Searching for Exoplanets

https://youtu.be/iwplvh_zdsM

Amateur astronomer and retired teacher **Philip Scott** shares his successful quest to search for and discovery of an Exoplanet candidate planet orbiting a red dwarf star. Phillip discusses the history of planet discovery, what it takes to detect new planets and how he got involved with a worldwide network of amateur astronomers looking for nearby habitable planets.

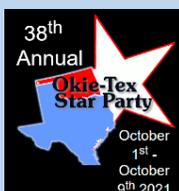


Tom Field of www.RSpec-astro.com gave an entertaining and informative presentation about how astronomers and chemists have

learned to read the composition stars by examining the spectrum of starlight. Also tells how amateurs can imagine and examine these spectra.



A YouTube of our [January 19 Zoom meeting](#) is now available online
Featured short talks **Stacking Digital Photos**, **Books for Novice astronomers**, **Meteorites samples**. Main program - [NASA's Search for Meteorites in Antarctica](#)



Mark your calendars <http://www.okie-tex.com/>

Friday Oct 1st to Saturday Oct 9th

The Oklahoma City astronomy club has announced plans for the 2021 Okie-Tex Star Party dark skies at the western tip of the panhandle

PRESIDENT'S MESSAGE

BY TAMARA GREEN

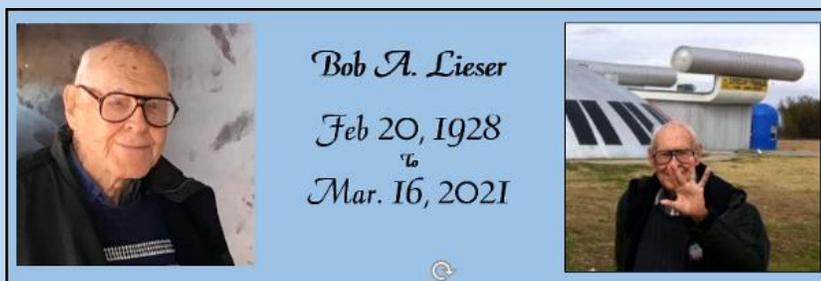


Hey y'all, Now that the COVID vaccine is available to all people aged 16 and over, it is my hope that more and more people will get vaccinated and we can finally achieve this "herd immunity" that I keep hearing about! It's about time!

I hope that we can resume our public events soon. We are AIMING FOR sometime in the Fall, but I cannot promise anything at this time. We need to see how this all plays out and continue to follow CDC guidelines. We hope to be able to bring back public nights, Sidewalk Astronomy, and REAL General Meetings at the Planetarium again later this year. We will just have to see.

In the meantime, stay safe and be good to each other. I hope to see you all soon!

Stay Safe and Clear Skies, Tamara Green



Our Astronomy Club bids farewell to a dear member of our club. Robert A. Lieser Jr and his wife Judy have been members of our club since 1977. They regularly attend meetings. They love to come to observatory nights enjoying stargazing and chatting with members. They loved to travel and were frequently seen at Okie-Tex and other astronomy conventions.

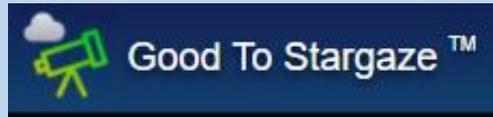
John Land - Bob was a longtime librarian at the main library downtown. He worked on the reference floor. Long before the Internet and Google, one had to search reference books to find information. The reference floors held a treasure trove of all sorts of scientific works. On the morning of Dec. 26, 1979, a thin crescent moon had a grazing occultation of the planet Venus visible just south of Tulsa. Bob directed us to large paper geological contour maps to help us locate the perfect observing spot right. Several members of the club witnessed Venus pop in and out of the valleys along the rim of the moon. I've enjoyed many nights since visiting with Bob and sharing his love for the sky. Bob did indeed "Live Long and Prosper"

K C Lobrecht - I was thinking.....first talking to Bob when he worked for the Library and was asking about research level Astronomy Map books. So long ago, remember his smooth soft voice. He always so kind asking "How was my Dave?" Bob and Judy always where there when I went for observing, many times arriving before me. Always brought a smile of constancy. Judy and Bob at Art Sweeney's studio when I started to attend the club meetings in '79. I thought Judy was the only other female back then.

Richie Shroff - I remember Bob bringing books to the meeting from the library and giving a short review

Brad Young - Please add my memory of Bob as an inspiration to always get out and observe - he and Judy always showed up and enjoyed the night.

Maura & Ron Wood - Thanks so much for letting us know of Bob's passing. We are saddened by the news. I don't remember him ever missing a Messier Marathon here at Tuva. He and Judy usually sat somewhere near Bart and I often sat and talked with them. I also remember Bob as one of the ACT donors for the last coating of Bart's mirror. Most of all I will remember him for his amazingly calm and gentle nature. Farewell indeed.



New additions on our [website observing page](#) Click each image to see what's new.

A collection of [Interactive Sky Watching Tools](#) from Sky & Telescope
Moon phases - Sun rise & Set - Jupiter or Saturn moons and more
[Make your own custom interactive sky chart](#)

April Skies - the winter constellations of Orion and Taurus are sinking lower in the west each evening and will soon be gone. The Spring sky is sprouting up in the east. The Big Dipper stands proudly on its handle in the NE. Leo, Virgo and the other spring constellations will soon dominate the sky.

Much dimmer MARS at 1.4 magnitude remains our lone evening planet low in the west passing from Taurus into Gemini. **Saturn** and **Jupiter** are now rising in the SE high enough before dawn for a couple

Selected Jupiter Mutual Satellite Events			
Date	Time (UT)	Event	Mag change
April 1	13:17 – 13:23	Ganymede occults Io	0.6
April 6	11:46 – 11:51	Europa eclipses Io	0.3
April 11	10:01 – 10:11	Io eclipses Callisto	0.4
April 12	11:51 – 12:13	Io eclipses Callisto	0.5
April 15	10:08 – 10:16	Ganymede eclipses Europa	0.5
April 18	9:52 – 9:58	Io eclipses Europa	0.6
April 25	12:06 – 12:11	Io eclipses Europa	0.6
April 29	12:13 – 12:27	Ganymede eclipses Callisto	0.4

of hours of good viewing. Mid-April Saturn rises at 3:40 AM and Jupiter about 4:30 AM

A thin crescent moon joins the pair the mornings of April 6 & 7.

The orbits of Jupiter's moons are lined up this month for a series of eclipses where the shadow of one moon falls on the another. The best ones visible from Tulsa are April 11 - 15 and 18

Table from April Sky & Telescope

Venus and Mercury are too close to the sun for viewing the first half of the month. **Venus** will start emerging low in the WNW twilight in mid-month. **Mercury** will soon join Venus. The pair will be within 2 degrees of each other the evenings of April 24, 25 & 26. Mercury will continue to rise higher making its best evening separation from the Sun (*eastern elongation*) on May 17. You'll need a clear western horizon and likely binoculars to spot them. Venus will become our bright evening star the rest of 2021.

The Lyrid Meteor shower is peaks the morning of April 22 but members are visible a few days either side. A bright gibbous moon will decrease the number of meteors visible <https://earthsky.org/?p=158735>



International Dark sky week is April 5 to 12

Discover the night sky by trying some the "Sky Bingo" activities and win some prizes. Lots of other ideas too.

<https://www.darksky.org/dark-sky-week-bingo/>

Planetarium shows are a good way to enjoy astronomy without the hassle of clouds and cold. [Tulsa Air & Space museum](#) planetarium is now open Thursday thru Saturday.

[Jenks High School Planetarium](#) - has a variety of shows from 6:30 to 7:30 PM on Tuesdays
Preregistration is required and seating is limited for social distancing.

By Editor John Land



This is for all you who are new to astronomy or who would like to try something often overlooked when deciding how to view the night sky. When I took up the hobby three years ago, and decided to buy a telescope, the first thing I noticed was how impressive the go-to telescopes were. How, like magic, you could enter into the telescope's software a Messier object or other deep sky object and the telescope would slew to and present it in the eyepiece. Of course, those telescopes are generally more expensive \$\$ than the simple alt-azimuth mounts with a simple refractor or a Dobsonian reflecting telescope.

I was relegated to the less expensive, so a go-to telescope had to wait. In the meantime, I joined the Astronomy Club of Tulsa, after visiting its public sidewalk astronomy meeting in Broken Arrow. There I met a club member, Jerry Cassidy, who demonstrated his well-developed skills at finding various deep sky objects with his 8" dob, and finder scope. He explained how he could look at the night sky, determine the constellation in which a desired object resided, point his finder scope in the general direction, find some nearby stars, and using his finder, move to the more precise location of the yet unobserved object. Then by using a wide-angle eyepiece in his Dobsonian, he could locate the nearby stars, and by using the visible stars as a map, further move his scope to the deep sky object. Simple (at least in theory) and most important, inexpensive!

What I didn't fully appreciate at the time is that such a **"star hopping"** method is not only simple and inexpensive, but it also creates in the viewer a different (and in my opinion) more esthetic level of viewing the night sky. At least in the early stages of learning the night sky, its constellations and hidden deep sky objects, there is nothing quite like sitting in a comfortable chair at a dark sky site and viewing the entire sky at once, recognizing that between those certain uniquely patterned, visible stars lie your favorite deep sky object. And that with some easily acquired skills, you could point your simple telescope, with the aid of a finder scope or pointer, and find that favorite object.

Of course, once these skills are acquired, and the night sky is more fully set in memory, having a go-to telescope would be great. And it offers a faster and easier way to locate and observe those otherwise hard to find deep sky objects. But as a starting point in learning astronomy, skipping the simple star hopping method may leave a gap in your experience. For the beginner, and for those who skipped that star hopping phase, a good way to instill the self-discipline to hone your skill, is to formally engage in one of the many deep sky observing programs offered by the Astronomical League (free to club members). I started the [Messier objects](#) observing program (which requires finding and observing without go-to equipment) after a few months of joining the club. I was able to finish locating, viewing and documenting all 110 objects within a year. This program includes a variety of star clusters, nebulae, and galaxies. All within reach of small or medium sized telescopes. I don't think I would have expanded my experience to that extent without the discipline of that program, and there are many more programs left to explore. At the suggestion of Brad Young, I think the ["Two in the View"](#) observing program is my next challenge.

The [Astronomical League](#) has a large selection of observing programs from novice level to advanced. With warmer weather arriving NOW IS AN EXCELLENT TIME to choose one and get started.

Tips for getting started with Star Hopping.

By John Land

No matter whatever style of telescope or binoculars you observe with, its always useful to know the field of view of your instrument. Smart phone apps or printed star charts can direct you to the area of sky to locate an object. Even if you have a GoTo telescope they often only get you close to the object you want to observe, and some objects are not in their database. Once your scope is pointed in the general location of your goal you need to home in on its exact location.

The **first step** of course is to learn the sky. Take time to learn the patterns of constellations and names of their brighter stars. Next you need to have a good idea of the field of view in your finder scope and eyepieces. Below is described a simple way to measure your **FOV - field of view** using just your watch and a calculator. The May 2021 Sky and Telescope magazine has a great article detailing the math of advanced eyepiece designs, but you don't need to be a math whiz to figure it out.



What is the FOV of your finder scope?

If you use a zero-power red spot finder it can also help you get to the general area of sky you need to search.

In the following diagrams the outer circle is 5° degrees, middle is 2° . and inner 1° degree. The two stars on the inner bowl of the Bigger Dipper about 5 degrees apart which is the typical FOV of finder scopes and binoculars. You can look for yourself and judge the FOV of your device.



Next you need to know the FOV of the eyepieces you use on your telescope. Locate a star near the Celestial Equator. The western belt star of Orion, Mintaka is a good choice. Also, the fainter stars in the top of constellation, Sextans, below Leo will work. Or just point your scope due South and 54° up and pick a star.

(Tulsa is 36° N Latitude)



TURN OFF your drive system so that the Earth's rotation will let the stars drift eastward across your FOV. Position your star in your eyepiece so that it drifts along a center diameter of your FOV.

Place it just out of the edge of your view so you can watch it drift into, across and out of view.

Next Time how many seconds it takes to drift across you view. Most phones have a stopwatch feature but a simple watch with seconds will do. **The Earth rotates 1 degree east in 4 mins or 240 seconds.**

Divide your measured time by 240 and that will be the eyepiece's FOV. Exp. $120 \text{ sec} / 240 = 1/2^\circ$

Do the same timing with your commonly used eyepieces and write them down on a card or post it on your scope.

(It's necessary to choose stars near the equator because stars further N or S move slower or faster across the view.)

The Beehive cluster M 44 is about 1 degree wide - the Full moon $1/2$ degree



Practice some Star Hopping to find a trio of galaxies in Leo shown on our April cover, M 65, M 66 and NGC 3628
By John Land



Choose a moonless night. Start by locating the Big Dipper. In April it is rising in the NE. Draw a line from its inner bowl stars to the bright star Regulus in Leo. Regulus is the tip of a backward question mark that forms Leo's mane.

Next, move toward the tail of Leo that forms a triangle of bright stars. The corner of the triangle is the 3rd mag star Chertan.



From there, move your view to mid-way between **Chertan** and **Iota Leo**. There you should see an arc of 3 to 4 stars in your finder. Move a bit to the left and you will be in the right area for see the galaxies.

In moderately dark skies M 65 & 66 may show faintly in you finder scope or a pair of binoculars. You'll need a telescope to see NGC 3628. The trio span an area a little less than one degree so choose an eyepiece with a wide field of view. You likely have to shift your view a bit to see all three.



Don't expect to see bright glowing galaxies like we see in long exposure photos. You can see their shapes and brighter central cores. Move to higher magnifications to make the background darker and see more detail in each one.



A new star in Cassiopeia - NOVA - N Cas 2021 - V 1405 by Stan Davis



On March 18, 2021 a Japanese photographer Yuji Nakamura spotted a nova located in the direction of the constellation Cassiopeia. This discovery has been named V1405 Cas and was shining at about magnitude 9.6. A few days later, the nova has brightened to about magnitude 7.6, making it bright enough to be visible with binoculars. It is close to Messier 52 an open cluster in Cassiopeia. This is what astronomers call a Classic Nova - a close binary composed of a white dwarf siphoning off gases from a companion star. As the gas compacts on its surface it eventually gets hot enough to trigger a massive nuclear fusion explosion on its surface.

Editor Note: Image above and excellent article and star hop charts showing how to locate it.

<https://skyandtelescope.org/astronomy-news/observing-news/bright-nova-erupts-in-cassiopeia/>

This information really excited me, because in November I had imaged M 52 and the Bubble nebula. The location of this Nova is near the center of my image. I thought this would be a great opportunity image it again and compare the two images.

It turns out that in November Cassiopeia is high up and easy to image from my location in Skiatook, OK, but in March she is near the horizon. I decided that the evening of March 26 and morning of March 27 was my best chance to see this before it dimmed. Earlier in the week the weather was not cooperating, so this was my first change to try to image it.

Well, it turns out the full moon and trees were my biggest problem. The evening of the 26th it was right smack in the trees to northeast of my setup. I was hoping it would rise above them in by early morning. I went ahead and took some images through the trees anyway. I set my alarm and got up at 4:00 AM and went back out and took some more shots. It was just on the edge to the trees. I took a few more images anyway. Lowered my ISO and exposure time. They were actually bright because the moon light and pending sunrise. I messed around continuing to take them until about 6:00 AM.

The image that I decided to process shows M52, but the moonlight was too bright for the bubble nebula to show up. It also decreases the number of stars and the background is blue versus the normal black. A comparison of the two images will not work.

I was able to identify the Nova using a star chart from the [AAVSO website](#). Scroll to the “Pick a Star” box and enter **V1405 Cas**, then click on Create a finder chart. It can then be easily downloaded or printed. Below is the chart I got from this site. I am also including my image. It is not great, but it allowed me to log my first Nova. It was fun and I plan to try again during new moon. I hope it will still be shining then.

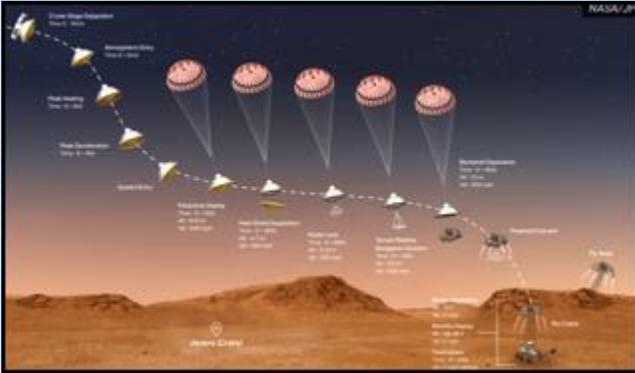
Keep looking up. Stan Davis

As of March 30 the Nova was magnitude 7.7

For latest magnitude estimates > <http://astro.vanbuitenen.nl/transient/71946>

Mars Perseverance Rover Program

by John Newton



While we patiently wait for the James Webb Telescope launch date, now planned for October 31, 2021, it is nearly impossible to overlook the recent excitement surrounding the Mars Perseverance Rover. What is in common between these two projects is that everything must work as planned because there is no way of reaching them physically once they leave Earth's orbit should repairs be needed.

The Mars Perseverance Rover's main mission, which launched on July 30th, 2020, is to search for biosignatures of ancient microbial life within specific rock types known to preserve signs of life over time. Mars, which is too far from the Sun to be within the habitable green zone, once had flowing liquid water on its surface. However, robotic space missions in the past have found evidence of ancient lakes, and minerals that could only have been formed by water. In 2018, scientists declared that they found evidence for a subsurface lake using radar from the European Space Agency's Mars Express spacecraft while orbiting the planet. If liquid water is there it may be possible that life still exists in subterranean cavities on the planet.

Starting on February 18th, 2021, "Persy", the Mars 2020 Perseverance science lab rover, made a flawless stunt filled landing procedure known as the 'Seven Minutes of Terror', much like Curiosity did when it landed in 2012. Due to their size and weight, the best approach for landing these crafts was through a combination of specifically timed aero-braking, deployment of supersonic parachutes to reduce the speed to 200 MPH. Then to finally use rockets to slow the craft to 1.5 MPH and dropping it on the surface of Mars as it hung by tethers from a sky crane. The mission is expected to run for no less than one Mars year, or about 687 Earth days. The rover is well equipped to perform tests across the Martian surface conducting mineral examinations and atmospheric tests to uncover and possibly confirm many of these mysteries.

In retrospect, Persy has many similar designs and scientific goals to that of Curiosity. Both are car-sized nuclear-powered rovers, so not dependent on solar power. Both can determine whether life ever arose on Mars, characterize the climate and the geology of Mars, and ultimately prepare for future human exploration.

Although there are many technical advancements in the new rover, the three main differences between Persy and Curiosity is the larger robotic arm on the front of the rover and how tests are being performed. Perseverance will collect rock core samples and save them for possible future study by scientists. These samples will be collected and stored to be returned to Earth on a future mission. Whereas Curiosity studied samples collected onsite, using the rover's onboard laboratory.

Second, Perseverance has a larger "hand," or turret. This turret has the coring drill and two science instruments attached, plus a high-def color camera for close-up surface inspections and for taking "selfies" for engineering health checkups, which Curiosity did not.

Last, the mobile lab is equipped with a 4-pound helicopter that was attached to the underbelly of the rover. The helicopter is a technology demonstration to test the first powered flight on Mars.

To date, the helicopter has successfully separated itself from the main rover. It still needs to unfold from its stowed position, maintain itself during cold nights of -130°F, charge itself using solar batteries during the day, while keeping in contact with flight operations on Earth.

Conditions of the thin Mars atmosphere is less than 1% in density to that of Earth's, where the helicopter will attempt to fly for up to 90 seconds, to distances of almost 980 feet at a time, and about 10 to 15 feet from the ground. That is no small feat compared to the first 12-second flight of the Wright Brothers' airplane. In fact, the helicopter, named *INGENUITY*, will carry a piece of history. A postage stamp-size piece of fabric that covered one of the wings from the Wright brothers' *Flyer 1* is attached to a cable beneath the helicopter's solar panel. While history repeats itself, a different piece of the wing's material, known as "Pride of the West" -- along with a splinter of wood from the *Flyer* was flown on *Apollo 11* in 1969, traveling to the moon and back.

While images from the mission continues to flow in, other plans for the rovers ground mission are just getting started, and news of the first Mars powered flight by the helicopter, no earlier than April 8th, conducting one or more flights but not lasting more than 30 days should be coming in soon. More information on *Perseverance* and *Ingenuity* can be found at

<https://mars.nasa.gov/mars2020/>



NASA hid a secret message on the parachute that landed its *Perseverance* rover down on the surface of Mars in February. Allen Chen, the entry, descent, and landing lead for the mission confirmed in the briefing that there was a hidden message, and he dared the public to decode it.

Colored patterns in the parachute used for landing appears to have been secretly inscribed with the phrase "Dare mighty things," a motto used by the *Perseverance* team at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, which serves as mission control for the *Perseverance* rover mission. Also embedded in the message are the geographic coordinates for JPL:

Latitude 34°11'58" N Longitude 118°10'31" W.

Read article to discover FIVE other hidden secrets.

<https://www.space.com/perseverance-rover-mars-parachute-secret-message-solved>



Jet Contrails and Astronomy.

In the book, *The Last Stargazers*,
By Emily Levesque - She recounts her first experience on Kitt Peak. Her advisor, Phil Massey pointed out that "contrails can gage the quality of the night sky. If they are long and fluffy, there is a lot of moisture to stir up and interfere with starlight. If they are short you will be in for a crisp clear night."





This article is distributed by NASA Night Sky Network April 2021

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Watch the Lion: Celestial Wonders in Leo by David Prosper

Leo is a prominent sight for stargazers in April. Its famous sickle, punctuated by the bright star Regulus, draws many a beginning stargazer's eyes, inviting deeper looks into some of Leo's celestial delights, including a great double star and a famous galactic trio.

Leo's distinctive forward sickle, or "reverse question mark," is easy to spot as it climbs the skies in the southeast after sunset. If you are having a difficult time spotting the sickle, look for bright Sirius and Procyon - featured in last month's article - and complete a triangle by drawing two lines to the east, joining at the bright star Regulus, the "period" in the reverse question mark. Trailing them is a trio of bright stars forming an isosceles triangle, the brightest star in that formation named Denebola. Connecting these two patterns together forms the constellation of Leo the Lion, with the forward-facing sickle being the lion's head and mane, and the rear triangle its hindquarters. Can you see this mighty feline? It might help to imagine Leo proudly sitting up and staring straight ahead, like a celestial Sphinx.

If you peer deeper into Leo with a small telescope or binoculars, you'll find a notable double star! Look in the sickle of Leo for its second-brightest star, **Algieba** - also called Gamma Leonis. This star splits into two bright yellow stars with even a small magnification - you can make this "split" with binoculars, but it's more apparent with a telescope. Compare the color and intensity of these two stars - do you notice any differences? There are other multiple star systems in Leo - spend a few minutes scanning with your instrument of choice and see what you discover.

One of the most famous sights in Leo is the "Leo Triplet": three galaxies that appear to be close together. They are indeed gravitationally bound to one another, around 30 million light years away! You'll need a telescope to spot them and use an eyepiece with a wide field of view to see all three galaxies at once! Look below the star **Chertan** to find these galaxies. Compare and contrast the appearance of each galaxy - while they are all spiral galaxies, each one is tilted at different angles to our point of view! Do they all look like spiral galaxies to you?

April is Citizen Science Month, and there are some fun Leo-related activities you can participate in! If you enjoy comparing the Triplets, the "**Galaxy Zoo**" project (galaxyzoo.org) could use your eyes to help classify different galaxies from sky survey data! Looking at Leo itself can even help measure light pollution: **The Globe at Night** project (globeatnight.org) uses Leo as their target constellation for sky quality observations from the Northern Hemisphere for their April campaign, running from April 3-12. Find and participate in many more NASA community science programs at science.nasa.gov/citizenscience. Happy observing!



The stars of Leo: note that you may see more or less stars, depending on your sky quality. The brightness of the Leo Triplet has been exaggerated for the purposes of the illustration - you can't see them with your unaided eye.

TREASURER'S and MEMBERSHIP Report

BY JOHN NEWTON



As of March 27, we had **213 members**. We welcome this month our newest members **Jeffery (Jeff) Masten, Krystal Reyes, Catherine Grounds, Michael Swartz and Tracey and Mycharlyn Stanart**. Hello and welcome to ACT!

In addition, we want to recognize our long-term prominent and well-respected members who continue to renew their memberships with the club, even during these restricted times. We look forward to seeing you all at meetings, even if virtual by Zoom, and at club events throughout the year when possible.

Accounts as of February 25, 2021

Checking: \$ 4,083.57 Note: A cash transfer of \$3000 was made from

Savings: \$ 13,785.42 Checking to Savings on March 6th

Investments: \$ 28,912.62 (Value tends to fluctuate with markets).

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 **2021** 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 may renew Sky & Telescope subscriptions directly by calling their number **-be sure to ask for the club rate**

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NIGHT SKY NETWORK –
Open Position

WEBMASTER JENNIFER JONES



*John Blaesí -
BAS -Bartlesville Club*

**I spy with my little eye,
With binoculars to the sky.
Eleven bright stars up so high,
Only a few do pass us by.**

Name	Apparent Magnitude
Sirius	-1.44
Canopus	-0.62
Rigil Kentaurus	-0.27
Arcturus	-0.15
Vega	+0.02
Capella	+0.07
Rigel	+0.28
Procyon	+0.40
Achernar	+0.54
Betelgeuse	+0.56
Hadar	+0.63

Which of these stars can NEVER
be seen from Tulsa?

Do you have ideas for our club ZOOM Meetings?
Know someone who willing to be a Guest presenter?

We would also welcome YOU to do a short 5-10
minute section of interest or new equipment you'd
like to review.

Create a Cartoon on a Space Theme

Contact our Editor John Land
Tulsaastrobiz@gmail.com

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