



DECEMBER 2023

# NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

## HAC HOLIDAY PARTY

Instead of a December general membership meeting HAC will hold its annual holiday party Friday, December 1 at the home of Penny and Thomas Brondum, 4071 S. Huron Pl. in Sierra Vista from 5:30 to 9 pm. For those who could not attend we wish you and yours a Happy Holiday Season.

## WELCOME OUR NEW MEMBERS

Andrea and Del Akin of Tombstone and Seven Grey of Bisbee joined the club in November. Kent, Julie, Theo and Mary Hinchcliff of Sierra Vista, Tracy Hernandez and Alicia Montoya of Hereford and Charles and Shirley Thomas of Elgin AZ, joined at the telescope swap meet. Welcome, we are glad you joined!

## 2024 DUES

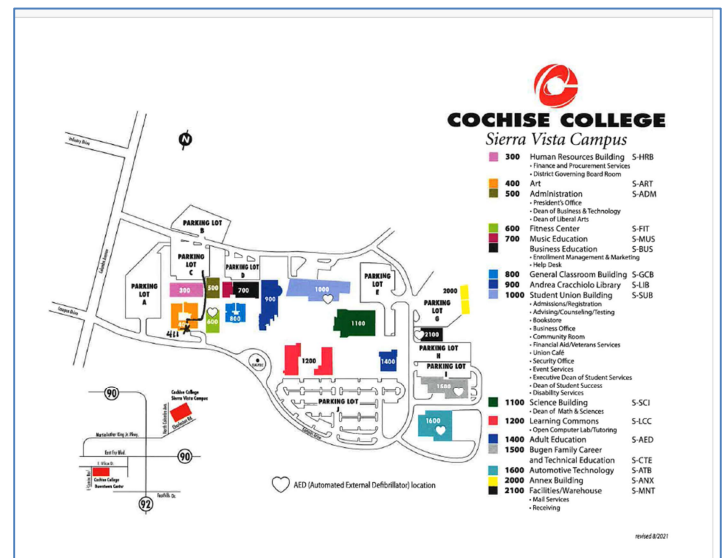
Most HAC memberships expire each December. If you have already paid your 2024 dues, thank you. If you still need to pay, there are several options.

1. You can pay your dues in person by cash or check made out to Huachuca Astronomy Club. See the treasurer, Ted Forte, at a meeting or event.
2. You can mail your dues check to the Huachuca Astronomy Club PO Box 922, Sierra Vista AZ 85636
3. You can pay online by visiting [www.hacastronomy.org](http://www.hacastronomy.org) and pulling down the membership menu. You'll be directed to Pay Pal where you can use your Pay Pal account OR your credit card.
4. If you have a Pay Pal account, you can use PayPal Direct to send your payment to [paypal@hacastronomy.org](mailto:paypal@hacastronomy.org)
5. If you have a Zelle account with your bank, you can make a dues payment by transferring funds to [twforte@powerc.net](mailto:twforte@powerc.net)

If you are unsure of your dues status, contact the treasurer, Ted Forte by email [tedforte511@gmail.com](mailto:tedforte511@gmail.com).

## GENERAL MEETINGS

Our usual meeting room at the Downtown campus is being refurbished as a computer lab. Our January 26 meeting will be held in room Art 411 on the main Cochise College campus 901 N Colombo Avenue.



We should be back in our regular room, A102, Downtown Campus, 2600 E Wilcox Drive for our February 23 meeting.

Our meetings have shifted to later in the month because our formula is to schedule meetings for the Friday closest to full moon.

## TELESCOPE SWAP MEET

We had a very successful telescope swap meet in November. Thank you to all that worked to put the event together and a special thank you to everyone that purchased items. The money we raised will fund our donations to the University South Foundation's scholarship fundraisers like Dine Under the Stars and the Golfing Fore Cyber Security golf tournament. Funds might also be earmarked to help build the HAASP Observatory at Kartchner Caverns State Park.

## 2024 OFFICERS

Congratulations to the 2024 club officers. Serving this year will be President Penny Brondum, Vice President Jim Reese, Secretary Katherine Zellerbach, Treasurer Ted Forte and Members at Large: Gary Grue, Richard Lighthill, Mike Morrison and Vince Sempronio. David Roemer remains Past President.

Farewell to outgoing Vice President Karen Madtes and Member at Large Mark Orvek. Thank you for serving.

## SOLAR SATURDAY

We've been holding a solar observing event at Patterson every second Saturday. These events have not attracted much public interest.

Starting with January 13, 2024 we hope to be moving this event to the Sierra Vista Library. At the time of this writing the library has not confirmed with us. If management agrees, we will hold Solar Saturday at the library from 10 am to noon every second Saturday of the month.

We will not hold a Solar Saturday in December 2023.

## DECEMBER OUTREACH

At the time of this writing, here are the outreach events scheduled for December, 2023:

December 7, 5:30 PM to 8:00 PM: Open house at Patterson Observatory for the Garden's "Cocoa with Santa" event.

December 14, 6:00PM to 9:00 PM: Public Night at Patterson Observatory

## PATTERSON OBSERVATORY ACCESS

There is still no access to the back of the observatory. The only path is reserved for construction and emergency access. This will be the case for the foreseeable future apparently. The foundation will eventually build an access road, but that could be more than a year in the future.

We greatly appreciate the patience and cooperation of our volunteers participating at Patterson events. Please know that alleviating the inconvenience is very high on the list for the foundation leadership, but a number of business considerations are complicating the matter.

## INFORMATION FOR FIGHTING LIGHT POLLUTION

### Cochise County Light Pollution Code:

[https://cochisecounty.municipalcodeonline.com/book?type=ordinances#name=2.45\\_LIGHT\\_POLLUTION](https://cochisecounty.municipalcodeonline.com/book?type=ordinances#name=2.45_LIGHT_POLLUTION)

### Sierra Vista Outdoor Light Control

[https://codelibrary.amlegal.com/codes/sierravista/latest/sierravista\\_az/0-0-0-19938](https://codelibrary.amlegal.com/codes/sierravista/latest/sierravista_az/0-0-0-19938)

### Sierra Vista Electronic Message Centers (Sign Code)

[https://codelibrary.amlegal.com/codes/sierravista/latest/sierravista\\_az/0-0-0-19777](https://codelibrary.amlegal.com/codes/sierravista/latest/sierravista_az/0-0-0-19777)

## BEGINNING ASTRONOMY

By Karen Madtes

I'm learning to see many beautiful wonders in the sky over my head,

But sometimes it's very hard to accept a few of the things I've read.

What they SAY I can see is NOT what I see when I go out to look

So which source is really correct - my eyes or the book?

When looking thru the eyepiece, is it backwards left and right

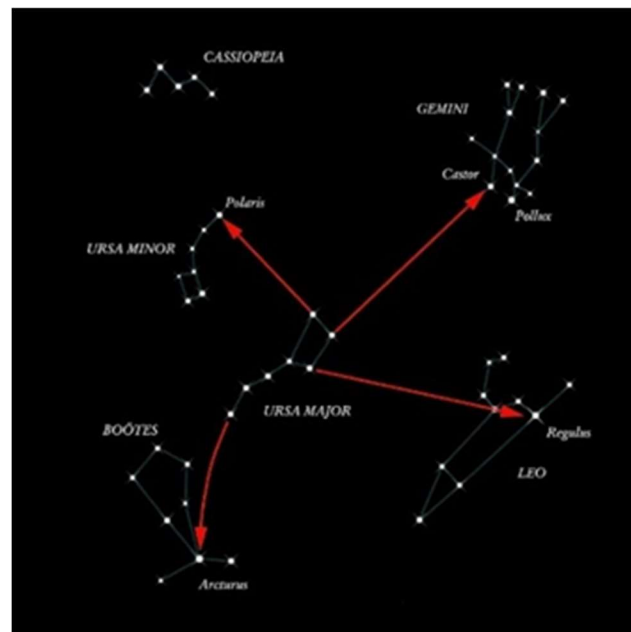
Or a topsy-turvy flip of what was in the sight?

Why does it move so fast across the field of view?!

And when I try to recover the target, it does a crazy slew?

I'm new, don't let me stew, give me a clue...or even two!

## PRESIDENT'S CONSTELLATION EXPLORATION



This month we wrap up the exploration of constellations based on the graphic which shows how to use stars in the Big Dipper to find four major constellations in the night sky. Last month was Leo (the Lion) so going clockwise this month is Boötes.

Boötes (boh-OH-teez) from Greek via Latin Boötēs which means 'herdsman' or 'plowman' (literally, 'ox-driver'). It is one of the 48 constellations described by the 2nd-century astronomer Ptolemy. Homer mentions Boötes in the Odyssey as a celestial reference for navigation, describing it as "late-setting" or "slow to set".

Boötes is a constellation bordered by Virgo to the south, Coma Berenices and Canes Venatici to the west, Ursa Major to the northwest, Draco to the northeast, and Hercules, Corona Borealis and Serpens Caput to the east. The three-letter abbreviation for the constellation, as adopted by the International Astronomical Union in 1922, is "Boo". Boötes ranks 13th in area and can be seen by the naked eye.

In ancient Babylon, the stars of Boötes were known as SHU.PA. They were apparently depicted as the god Enlil, who was the leader of the Babylonian pantheon and special patron of farmers. Boötes may have represented an animal foreleg constellation in ancient Egypt, resembling that of an ox sufficiently to have been originally proposed as the "foreleg of ox" by Berio.



According to one version in Greek mythology Boötes was a son of Demeter and the twin brother of Plutus, a plowman who drove the oxen in the constellation Ursa Major. The ancient Greeks saw the asterism now called the "Big Dipper" or "Plough" as a cart with oxen. Some myths say that Boötes invented the plow and was memorialized for his ingenuity as a constellation. Later ancient Greek depictions, described by Ptolemy, have Boötes holding the reins of his hunting dogs (Canes Venatici) in his left hand, with a spear, club, or staff in his right hand.

The stars of Boötes were incorporated into many different Chinese constellations. Arcturus was part of the most prominent of these, variously designated as the celestial king's throne (Tian Wang) or the Blue Dragon's horn or "great horn" (Daijiao). Arcturus was given such importance in Chinese celestial mythology because of its status marking the beginning of the lunar calendar, as well as its status as the brightest star in the northern night sky. Dixi, the Emperor's ceremonial banquet mat, was north of Arcturus, consisting of three Boötis stars. Another northern constellation was Qigong, the Seven Dukes, which mostly straddled the Boötes-Hercules border. It included either Delta Boötis or Beta Boötis as its terminus.

Boötes is also known to Native American cultures. In Yup'ik language, Boötes is Taluyaq, literally "fish trap," and the funnel-shaped part of the fish trap is known as Ilulirat.



Colloquially, its pattern of stars has been likened to a kite or ice cream cone.

Boötes is home to many bright stars, including eight above the fourth magnitude and an additional 21 above the fifth magnitude, making a total of 29 stars easily visible to the naked eye and have ancient names.

Arcturus, the constellation's brightest star is the fourth-brightest star in the sky, comes from the Greek word meaning "guardian of the bear". Sometimes Arcturus is depicted as leading the hunting dogs of nearby Canes Venatici and driving the bears of Ursa Major and Ursa Minor. The placement of Arcturus in depictions has also been mutable through the centuries. Traditionally, Arcturus lay between the figure's thighs, as Ptolemy depicted him. However, Germanicus Caesar deviated from this tradition by placing Arcturus "where his garment is fastened by a knot". Arcturus is located a mere 36.7 light-years from Earth, and is an orange giant, an ageing star that has exhausted its core supply of hydrogen and cooled and expanded to a diameter of 27 solar diameters. Arcturus shines with 133 times the luminosity of the Sun and has 2.7 times its diameter.

Boötis includes several variable stars as well as a class of prototype pulsating variable stars, the anomalous Cepheids. These stars are somewhat similar to Cepheid variables, but they do not have the same relationship between their period and luminosity. Boötes Stars are home to both multiple and single planet systems. Epsilon Boötis, or Izar, is a colorful multiple star popular with amateur astronomers.

Boötes is in a part of the celestial sphere facing away from the plane of our home Milky Way galaxy, and so does not have open clusters or nebulae. Boötes has two bright galaxies that are members of the Virgo Cluster of galaxies. It also has the Boötes Void which is a huge space largely empty of galaxies. Discovered by Robert Kirshner and colleagues in 1981, it is roughly 700 million light-years from Earth. Beyond it and within the bounds of the constellation,

lie two superclusters at around 830 million and 1 billion light-years distant. The Hercules–Corona Borealis Great Wall, the largest-known structure in the Universe, covers a significant part of Boötes.

Boötes contains the radiant point of many meteor showers occurring nearly every month from now to June. The Quadrantid meteor shower is the most prolific annual meteor shower. Quadrantid meteors are dim, but have a peak visible hourly rate of approximately 100 per hour on January 3–4. The Beta Bootids is a weak shower that begins on January 5, peaks on January 16, and ends on January 18. The January Bootids is a short, young meteor shower that begins on January 9, peaks from January 16 to January 18, and ends on January 18. The Alpha Bootids normally begins about April 14, peaking on April 27 and 28, and finishing on May 12. The Phi Bootids is another weak shower radiating from Boötes beginning April 16, peaking on April 30 and May 1, and ending on May 12. The June Bootids, also known as the Iota Draconids shower lasts from June 27 to July 5, with a peak on the night of June 28. Plus other minor showers and meteor bursts.

I hope you have enjoyed discovering how to navigate outward from the Big Dipper to find other nearby constellations.

## THE BUCKET LIST – DECEMBER 2023

BY VINCE SEMPRONIO

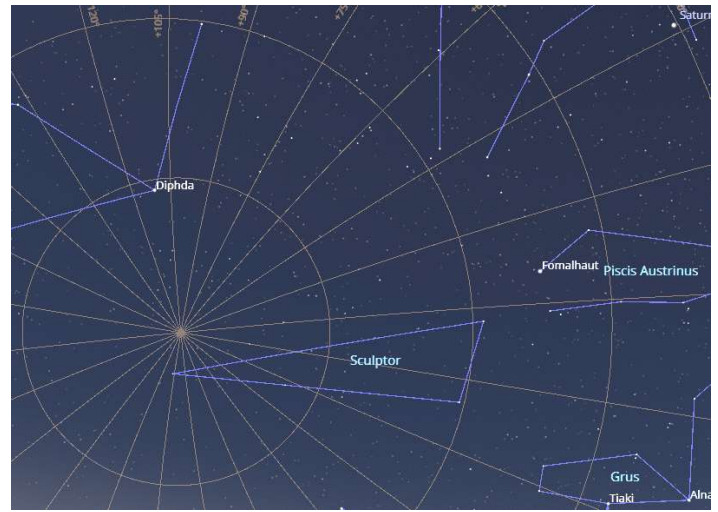
This column highlights interesting non-seasonal nighttime, and sometimes daytime sky events that the reader may not be aware of and may wish to observe. I'll cover one-off events that are special, rare, or uncommon.

### TERM OF THE MONTH

This month's term(s) are the North and South Galactic Poles, or NGP and SGP for short.

### What, the galaxy has poles?

If you look towards Saturn the next clear night, below it and to the left a bit is the 1<sup>st</sup> magnitude star Fomalhaut. Moving to the east there is a point in the sky that marks the south pole of our galaxy. Just as our Earth has poles, so does every other object that rotates. The plane of the Milky Way is the equator, so 90 degrees away from there on either side lie the poles. The poles are named North and South Galactic Poles (NGP and SGP) since one of them is in the northern sky and the other is in the southern. The figure below shows the area of the sky in question. I generated this with Stellarium and enabled the Galactic grid. The NGP is in the constellation Coma Berenices, while the SGP is in Sculptor (below).

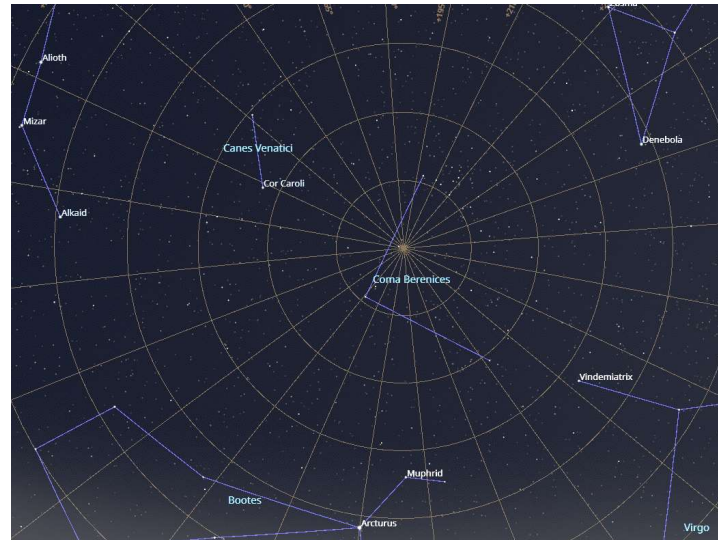


The NGP (see below) can be found at the center of the triangle formed by the stars Arcturus (in Boötes), Denebola (in Leo), and Cor Caroli (in Canes Venatici). By the way, Cor Caroli is a very nice double star visible in small scopes.

### If there are poles, then there must be an equator, right?

Yes, the portion of our Milky Way galaxy we also call the “Milky Way”. This band of densely concentration of stars lies across the equator of the galaxy, but since the plane of our solar system is tilted with respect to that of our galaxy, nothing is aligned, so the Milky Way appears angled with respect to our own tilt and the plane of the Solar System.

It is sometimes difficult to wrap our head around all the different angles, after all, we are fairly two-dimensional creatures of habit, but planetarium software, such as Stellarium can help make the concepts easier to understand.



Even though these points are 90 degrees away from the plane of the Milky Way, we can still see stars in those areas of the sky. This is because we are still inside the plane of the Milky Way which is ~1000 light years at our distance from the center, and so, we still have other stars all around us.

## IN THE SKY

By far, the most interesting event of the year occurs on December 12<sup>th</sup> at 8:26pm. This is a very rare event, and unfortunately, there is only one place in the United States where it is visible, and that is in very southern Florida. The event is the occultation of the bright star Betelgeuse by asteroid (319) Leona. This one is rare because occultations of naked-eye stars don't happen very often, and the path of this event is only 70km wide. The occultation community is buzzing with excitement, and many people will travel there to observe this event. A lot of science can be obtained from this event, mainly because Betelgeuse is a huge supergiant star which has a discernable size through the biggest scope on Earth, but alas, there aren't any of those in southern Florida. The path does pass through western Asia and southern Europe, so many more observers will have the opportunity to record the event. This event differs from garden variety asteroid occultations in that the apparent size of Betelgeuse is larger than the apparent size of the asteroid, so Betelgeuse will not blink out completely. Observations will provide the true diameter of Betelgeuse far more accurately than telescope images can. Observations will also nail down the diameter of the asteroid, which currently is estimated to be between 50-90 km. The biggest issue with this event is the weather. December on the east coast isn't always the best time to observe. At the time of this writing, over 30 observers have indicated that they might observe the event, but with the advent of EAA scopes such as the Unistellar Evscope, many more observers might participate. Personally, I believe there will be well over 50 observers.

The link below is to a website that has a simulator that shows the dynamics of the occultation.

[https://starblink.org/occult\\_simulator\\_en](https://starblink.org/occult_simulator_en)


A PDF of a PowerPoint presentation by Dr. David Dunham is in the following link. There is much more information than I can convey here:

<https://occultations.org/publications/rasc/2023/2023Dec12Leona.pdf>

## GEMINID METEOR SHOWER

**METEOR WATCH | A sparkling show**

**Geminid meteor shower**



**A TWO-DAY-OLD MOON** at the peak of the Geminid meteor shower makes this year's event very favorable, with dark skies all night. They're active from Dec. 4 to 17, peaking late on the 14th. The zenithal hourly rate, calculated for when the radiant is at the zenith, can reach over 100 meteors per hour. Soon after local midnight, with the radiant more than 65° high across the continental U.S., this results in peak rates above 50 meteors per hour, close to one per minute. This is as good as it gets for meteor watchers and is the best shower of the year. Settle back with warm clothes and a warm drink, and enjoy.

A second shower in December, the Ursids, peaks Dec. 22 just before midnight EST, but with far lower rates. It's active from Dec. 17 to 26 and on good nights can produce a meteor every five to 10 minutes.

**GEMINID METEORS**  
**Active dates:** Dec. 4-17  
**Peak:** Dec. 14  
**Moon at peak:** Waxing crescent  
**Maximum rate at peak:** 150 meteors/hour

Dec. 16, 11am, Looking southeast.  
 Geminid is well above the horizon by 9 p.m. local time, and meteors can appear anywhere in the sky. Rates will increase through midnight.

WWW.ASTRONOMY.COM 29

## FINDING VESTA


**LOCATING ASTEROIDS | Dash out for a quick catch**

**EASY ASTEROID TRACKING** has returned with 4 Vesta hitting magnitude 6.4 on the 19th. From the suburbs with scarcely any dark adaptation, you can walk outside, point your binoculars at the feet of Gemini, shift half a field to the right, and spot the fourth- or fifth-brightest object. Even if it is cracking cold, it won't take more than five minutes!

Copy our star chart or trace out the pattern of the brighter stars in a logbook, then each night you try, place a dot where you see Vesta. On the 7th, it lies just north of a brighter field star; it is tucked close to Chi<sup>2</sup> (χ<sup>2</sup>) Orionis on the 14th and 15th. With any small scope at 80x, we can notice the space rock move over the course of three hours on the 29th as its position between two field stars shifts.

As the second-largest asteroid in the main belt, potato-shaped Vesta measures 330 miles across. Its reflectivity of 40 percent is four times that of our Moon, but half that of fresh snow.

**Easy pickings**



Bright Vesta is sliding through far northern Orion, passing south of a few easy-to-nab clusters in Gemini.



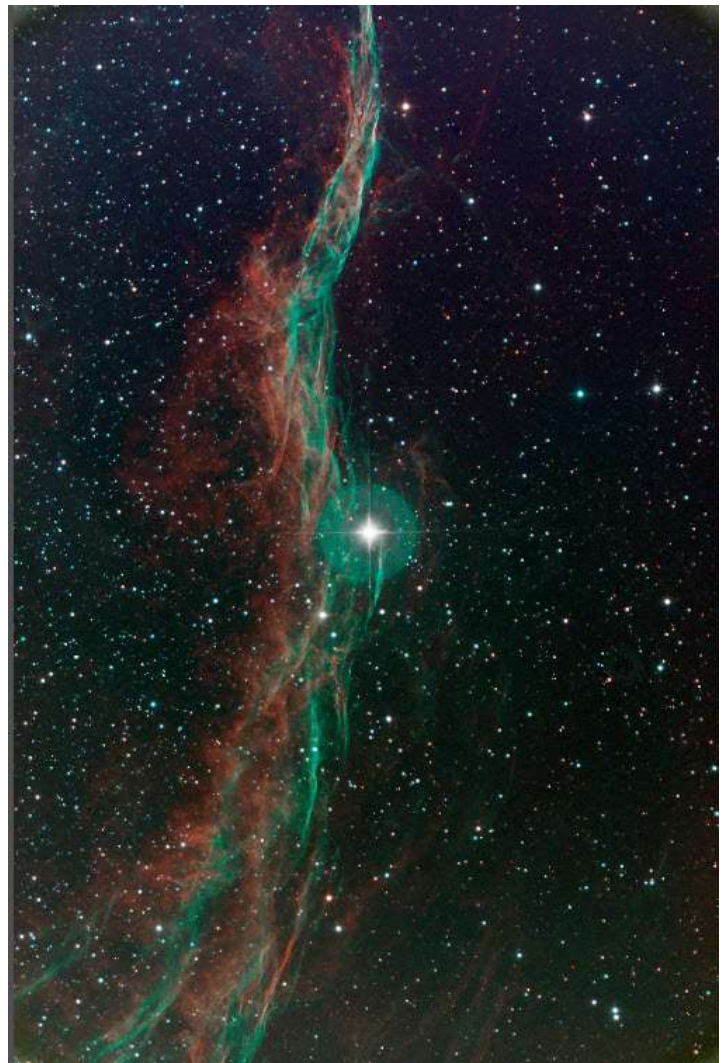
M42 ORION NEBULA BY DAVID ROEMER



NGC 2359 THOR'S HELMET BY LEONARD AMBURGEY



ROSETTE NEBULA BY LEONARD AMBURGEY



WESTERN VEIL NEBULA BY LEONARD AMBURGEY



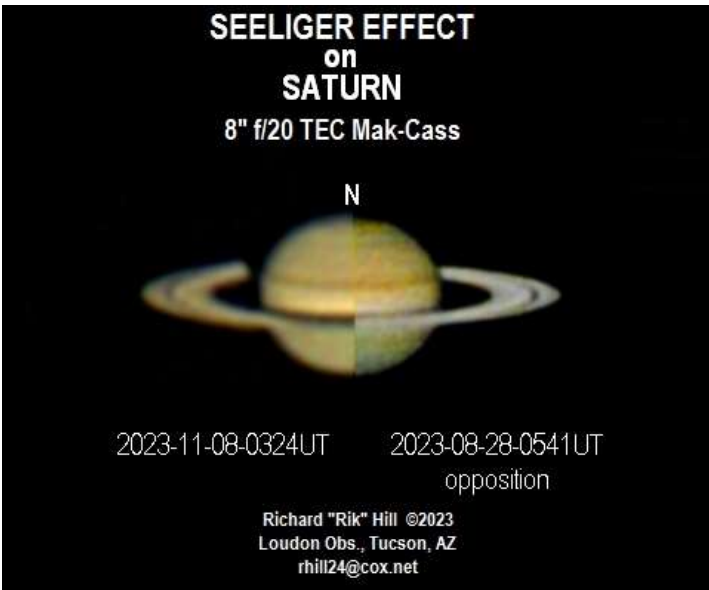
NGC 7635 BUBBLE NEBULA BY RICHARD LIGHTHILL



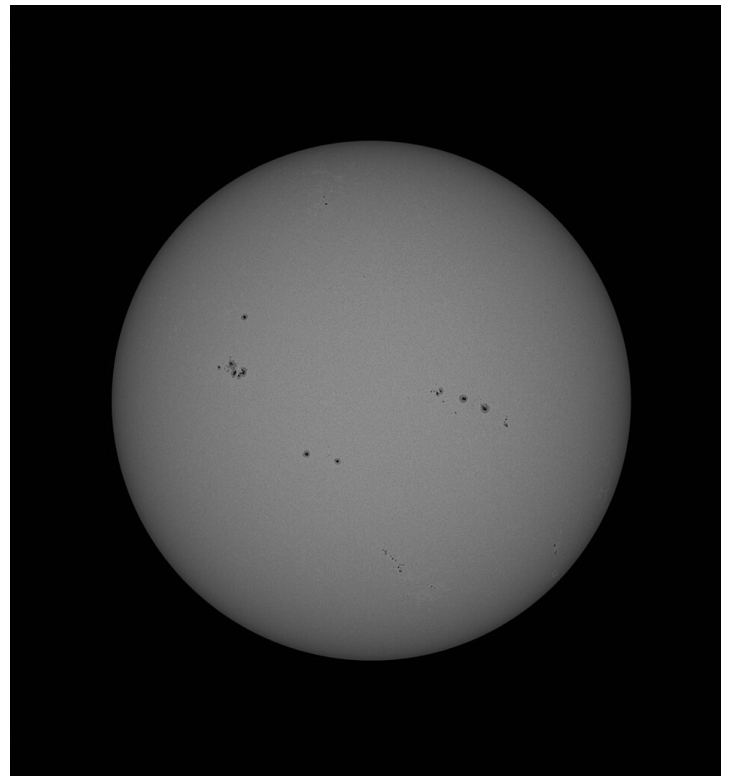
M33 TRIANGULUM GALAXY BY RICHARD LIGHTHILL



SH2-115 BY GLEN SANNER



SATURN WITH SEELIGER EFFECT BY GLEN SANNER



SUNSPOTS BY DAVID ROEMER

<b>CLUB OFFICERS AND CONTACTS</b>	
<b>President:</b> Penny Brondum	<b>Vice President:</b> Jim Reese
<b>Secretary:</b> Katherine Zellerbach	<b>Treasurer:</b> Ted Forte
<b>Past President:</b> David Roemer	
<b>Board Members-at-Large</b>	
Vince Sempronio	Mike Morrison      Gary Grue      Richard Lighthill
<b>Nightfall Editor:</b>	Cynthia Shomenta      cindy.jean.lund@gmail.com
<b>Webmaster:</b>	Ken Kirchner
<b>Facebook Editor:</b>	Richard Lighthill
<b>Website:</b>	<a href="http://www.hacastronomy.org">http://www.hacastronomy.org</a>
<b>Facebook:</b>	<a href="http://www.facebook.com/HuachucaAstronomyClub">http://www.facebook.com/HuachucaAstronomyClub</a>
<b>Email:</b>	<a href="mailto:info@hacastronomy.org">info@hacastronomy.org</a>

## HAC Dec 2023- Jan 2024 Calendar of Events

SU	MO	TU	WE	TH	FR	SA
26 Uranus/Moon 3 degrees	27  2:16 AM	28 Venus/Spica 4 degrees	29	30 Carmichael School Field Trip 9-11 AM	1 Dec Holiday party at the Brondums	2
3	4  10:49PM Mercury eastern elongation	5	6	7  Cocoa W. Santa 5:30 Patterson	8	9
10	11	12  4:32 PM	13 Geminid Meteors	14 Public Night at Patterson 6 PM Geminid Meteors	15 Geminid Meteors	16
17 Saturn/Moon 2 degrees	18	19  11:39 AM Neptune/Moon 1.3 degrees	20	21 Winter Solstice 8:27 PM Vesta Opposition	22 Jupiter /Moon 3 degrees	23 Uanus/Moon 3 degrees
24	25 	26  5:33 PM	27	28	29	30
31  Happy New Year!		Jan 2	3  8:30 PM Quadrantid Meteors	4 Quadrantid Meteors	5	6
7	8 Antares/Moon 0.8°	9	10	11  4:57AM	12	13 Solar Saturday
14 Saturn/Moon 2°	15	16	17  8:53 PM	18 Public Night at Patterson 6 PM Jup/Moon 3°	19	20
21	22	23	24	25  10:54AM	26 HAC Meeting Room Art 411	

All times local MST

Join HacAstro to keep up to date with all of the Huachuca Astronomy Club events

Send an email to: [HACAstro+subscribe@groups.io](mailto:HACAstro+subscribe@groups.io)