NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

JULY 2021

PRESIDENT'S NOTES

Happy July HACers

First, the club news and club events. The Huachuca Astronomy Club of Southeastern Arizona (HAC) (that's us) will try to begin holding in-person general meetings again in September. We will return to our usual haunt in the community room at Cochise Community College. As this is a while away, who knows what health and safety rules will be in place, we'll go with the flow of health guidelines, and re-plan accordingly.

My opinion (and I'm sorry to be preachy here but I'm the club President and while I don't do many things that are or should be presidential, here it is and I want you all to know where I'm coming from): public safety outweighs personal freedom, want total freedom, stay away from others, otherwise follow social constructs, period. Be polite, compassionate, and considerate of others. We are supposed to know and live by these conventions, watchwords, customs, and values anyway. Do unto others as you would have them do unto you.

I want everyone to be comfortable at our public meetings and events, so be prepared to wear a mask, wear a mask if you want to and ask for space if you feel ill at ease. As for politics, we have enough divisions in astronomy with refractor vs. reflector, fork vs. GEM, visual vs. imaging, dark matter vs. what's the matter, expanding but slowing, expanding and accelerating, expanding for now but just you wait and see, and hey I just found 50% more matter where are those dark matter guys?, without trying to push a local, national governmental, or earth-centric agenda. So, when we all come together for our meetings and events, just chill, use a clean napkin if there are cookies, and keep hydrated, please.

Second, Saturday, September 11, will also see the club resuming one of my favorite activities, HAC's (Anything but) Annual Astro Swap Meet. It has been a while so there should be a pent-up need to acquire and divest. Also, over the long pandemic there has been a lot of time for reflection, or would that be refraction? You may have changed the course of your hobby direction or focused on a specific line of investigation. You might even be new to the hobby and want to kick some tires and pick some brains. What is a club after all if not an enabling force? That is what the swap meet is for, to recalibrate, renew, replace, reconnoiter, and remember to bring your wallet!!!

Be sure to start your inventory list and pricing now! If we're not quite in a position to have an in-person sale, we may be able to take the swap meet virtual. In any case, keep an eye out for more swap meet details to come.

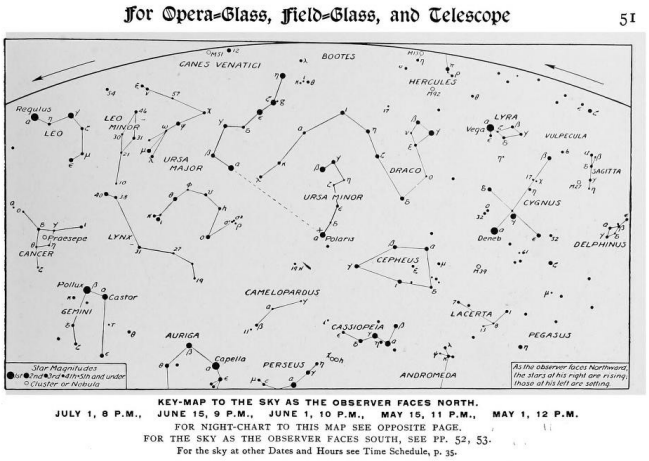
End of notices and advertisements.

Ok, it's July, so the nights are short and few between without clouds. So, let's do a little planning to be ready for the few clear nights we might get this month. We are still working from the book, A Beginner's Star-Book; An Easy Guide to the Stars and to the Astronomical Uses of the Opera-Glass, the Field-Glass and the Telescope, by Kelvin McKready. If you haven't yet started to follow along, then go grab a copy. The PDF version is available for free on the web at this address: https://archive.org/details/cu31924012302588/page/n7/mode/2up

Last month we covered the image and chart on page 52-53 (facing south in ~June/July). These are still viable in July, and you should read them over to cover what you've missed, and to remember them as you're looking for objects in clear patches between clouds.

This month we turn to pages 50-51 to look northward. To orient ourselves we will again find the Big Dipper of Ursa Major and Polaris of Ursa Minor. Notice how much the stars have rotated since February and March. Back then, Ursa Minor was dropping towards the northern horizon, and we couldn't really see enough of the constellation to make out any pattern. Now Ursa Minor is nearly straight up, and Ursa Major is off to the west. We can again use the directions we used in spring to find Leo Major way off to the west.

LOOKING NORTHWARD IN JULY

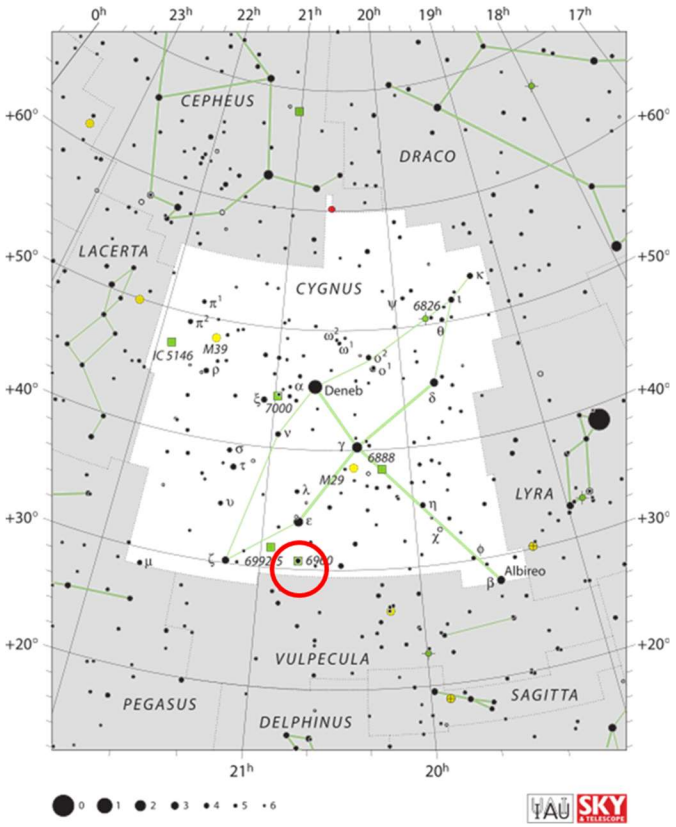


Source: A beginner's Star-Book; an easy guide to the stars and to the astronomical uses of the opera-glass, the field-glass and the telescope, Kelvin McKready, 1912-1929, p 51.

To the east of the pole and up towards the zenith, we can see a very bright star, Vega. Vega is the fourth brightest star that can be seen from the northern latitudes. To the east of Vega are the rest of the close clump of stars that make up the constellation Lyra, the harp. We visited a few of those stars last month and you should again. To the north of Lyra and due east of Polaris you see another bright star, Deneb. Deneb is the brightest star in the constellation of Cygnus, the swan, but you may also hear it called the "northern cross," or the "kite." Visually, Cygnus has something for just about everyone. As a constellation it has the Milky Way as a background, making any viewing in the area slightly hypnotic. Deneb forms the head of the kite but the tail of the swan. Follow the kite or swan south to the head of the swan. There is a dimmer star (Magnitude 3), Albireo (β-Cygni). It was given its name as a single star long ago, and we still use it today, even though with the aid of binoculars or telescopes we know it to be a double star. To me Albireo is one (are two?) of the most beautiful stars in the sky. Its component stars are nearly the same brightness but are of wonderful contrasting colors.

Cygnus is home to two Messier objects, M29 and M39, both small open star clusters with relatively few stars in their groups. The real Cygnus showpiece is a supernova remnant, the Veil Nebula (Cirrus Nebula, Filamentary Nebula) – NGC 6960, NGC 6992, NGC 6995, NGC 6974, NGC 6979, IC 1340. I hope I got all that right. The brighter parts (objects) can be glimpsed in large wide-field binoculars and small telescopes. I've seen all the major elements of the veil quite well through a 4.25" Edmond Astroscan from Glacier Point in Yosemite (a very dark, high-altitude site) without a filter, but I must confess the nebulosity looked even better, pale gray on a black velvet background, when I added a Deep Sky filter.

CIRCLE SHOWS VAIL NEBULA'S LOCATION)



Source: IAU and Sky & Telescope magazine (Roger Sinnott & Rick Fienberg) - [1], CC BY 4.0, https://commons.wikimedia.org/w/index.php?curid=15406373

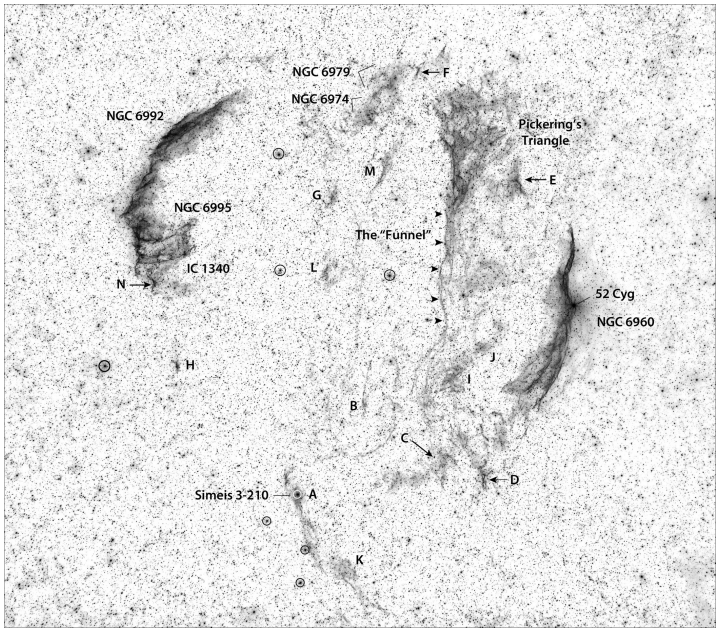
That said, a telescope of 8" or larger allows you to follow portions of the nebulosity nearly all around the perimeter of the exploded star's fragments and view the varying textures of the gas and dust in much less remote and darkened locations within the object. But please do not expect to see color in the fragments. Although you may have hints of color in larger scope in the 16" or larger range. Having said that, you will not be prepared when wandering this area with large (16"-30") telescopes. It is breathtaking and mesmerizing

The brighter sections of the nebula bear unique catalog numbers and/or nicknames:

- **Western Veil, or NGC 6960** ("Finger of God" or "Witch's Broom"). This section is centered on the bright star 52 Cyg. The northern half looks like a sharp fang with a darker center. The southern half divides into parallel ribbons reminiscent of the summertime Milky Way.
- **Eastern Veil, or NGC 6992,** is the brightest part and composed of multiple, interwoven strands of nebulosity. **NGC 6995** is a bright arc of material at the south end of 6992 that unfurls to the west; together they're known as the "Network Nebula." **IC 1340** is a bright condensation in the arc parallel to and immediately south of NGC 6995.

CHART FOR CYGNUS SHOWING DEEP SKY OBJECTS (RED

- **NGC 6979 and NGC 6974** are two fainter hunks of diffuse nebula between the two main arcs and a short distance east of the magnificent Pickering's Triangle, a prominent bright section shaped like a goatee and trailing a long, winding strand of nebulosity. The Triangle is also cataloged as **Simeis 3-188**.
- **Simeis 3-210** is a brighter patch of nebulosity at the remnant's southern border.



This black-on-white version of Scott Rosen's photo is labeled to help you identify the many pieces of the Veil Nebula. Besides the named sections, I've labeled other distinct patches and spots alphabetically from A through N. Several helpful field stars to help you find your way around are circled. North is up. Click for a higher resolution image you can download and use at the telescope. I would also suggest you download this unlabeled version in case you feel like roaming first and identifying features later.
Scott Rosen
Source: https://skyandtelescope.org/astronomy-blogs/explore-night-bob-king/explore-veil-nebula/

A Final Note and What's Next

If you've ever wanted to be a deep-sky astro-imager you really don't need to go anywhere in the sky but Cygnus to collect experience. Cygnus flies along the Milky Way so there is a high density of stars for your dynamic image backgrounds. There are bright clouds of gases and darker masses of dust showing textures and wave fronts that hint at their origins. There are reflection nebulae illuminated by stunningly colored stars. Also, it is once again time to put in your high-power eyepieces and slew over to Jupiter. When the sky is steady there are few objects as complex and rewarding to view. Even for small scopes Jupiter is a standout. And do not forget to watch the moons. Those moons that Galileo di Vincenzo Bonaiuti de' Galilei on 7 January 1610, observed with his telescope and described at the time as "three fixed stars, totally invisible by their smallness", all close to Jupiter. On 10 January he again looked at Jupiter and noted one of the small stars had disappeared, probably behind Jupiter, but then he was curious. After a few more nights of observing around Jupiter he realized those stars were in fact moon orbiting Jupiter. The lesson of the story get out there and stare it could change everything.

Welcome our new members

We would like to welcome our newest military member, Hershel Smith of Sierra Vista who joined the club in June. Welcome, we are glad you joined!

Mark Your Calendars

The July 23 and Aug 20 HAC meetings will be held via Zoom. Watch your email for details.

September 11: Telescope Swap Meet at the Patterson Observatory. Break out all your unused telescopes, cameras, and accessories and get them ready to sell at our "not quite annual telescope swap meet". Then save up your nickels and dimes to purchase replacements. Watch the HACAstro group for further announcements and information.

September 17: Return to In-Person Meetings. The September meeting will be held live and in-person in the Community Room, Student Union Building at Cochise College. Program to be announced.

October 2: Dine Under the Stars. The 19th annual Dine Under the Stars fundraiser will be held on the UA Sierra Vista campus adjacent to the Patterson Observatory. The observatory will be open for public viewing during the event. Tickets are $50 adult, $15 children. Proceeds go to fund scholarships for students attending classes at UA Sierra Vista and Douglas campuses. Dine Under the Stars is the major fundraiser for the University South Foundation, owner of the Patterson Observatory. Please support the event if you can.

October 9 Kartchner Star Party. The fall star party at Kartchner Caverns State Park is planned for Saturday, October 9. We will set up for solar observing around noon, enjoy a talk in the Discovery Center at 5:30 pm followed by an evening of telescope observing. Watch HACAstro for more details.

JWST Community Event

A consortium consisting of the Patterson Observatory, Huachuca Astronomy Club, Henry F. Hauser Museum, and Sierra Vista Library have been selected by NASA to host a NASA supported Community Event in celebration of the launch of the James Webb Space Telescope. Planning for our event will take place this month.

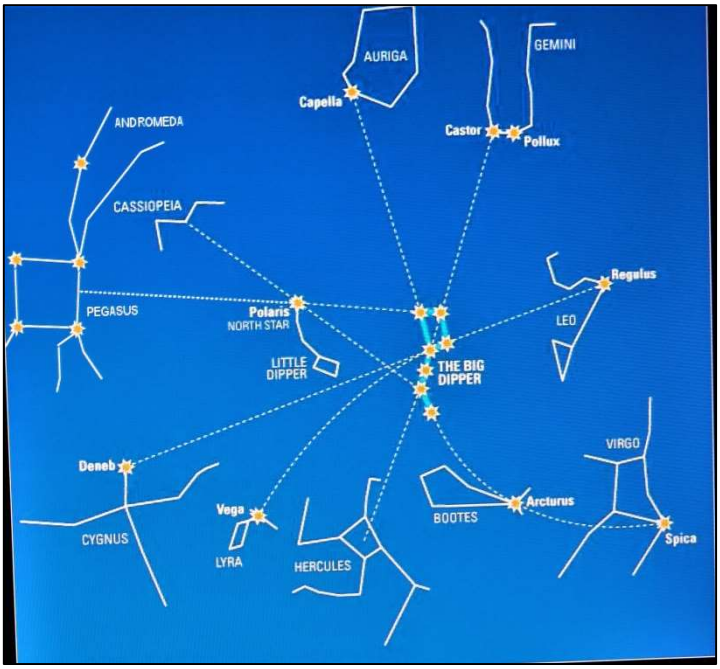
HAC members wishing to be involved in the planning, or that have suggestions about what sort of activities to schedule should contact Ted Forte.

The joint NASA/ ESA mission plans on launching October 31, 2021, from Europe's Spaceport in French Guiana atop an Arianne 5 rocket. It's a four-week journey to the second Lagrange point where it will be stationed. The second Lagrange point is located 932,056 miles away from Earth.

Our event needs to be held within a month of the launch. The date will be announced soon.

Helpful Star Pointer Chart

From Karen Madtes



Binary Star Eclipse Light Curve Observed at Patterson

By Tom Kaye

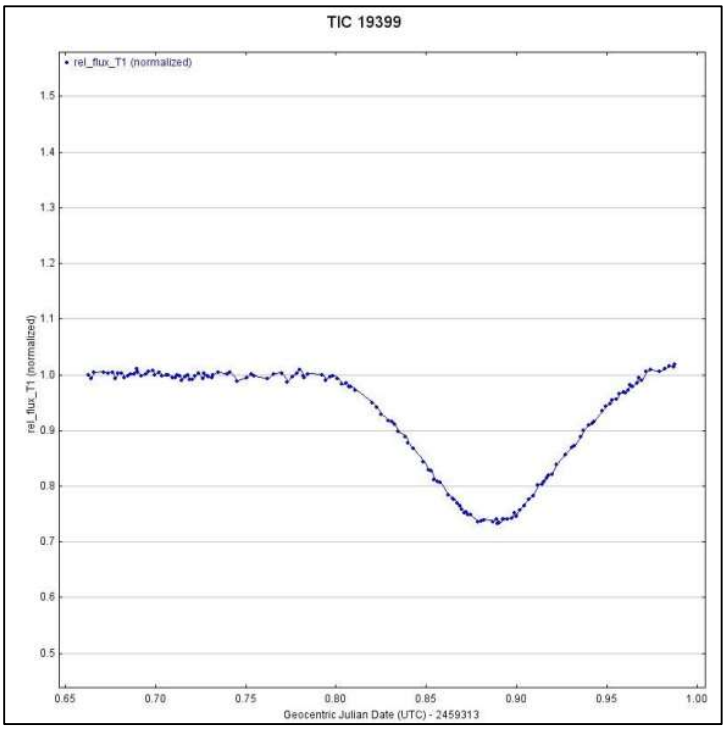
In an ongoing effort to keep people up to date on the science at Patterson, here is a light curve from last night. Patterson took 250 images back-to-back in order to capture this data. This star was found by the TESS space telescope and we are doing follow-up research to understand what is going on with the system.

The dip shows one binary star going in front of another and eclipsing it. This event took several hours to finish. The dip in the light intensity was about 25% so it was very easy to measure and happens every few days. These two stars have a third star orbiting much farther out around the close binary pair in the middle that takes weeks to come back around and eclipse the inner pair.

Now the interesting thing is that these inner eclipses are changing their timing slightly week to week. That fact hints at a possible 4th star in the system farther out than the 3rd one. These are called Transit Timing Variations or TTV's. So with enough observations of the inner eclipses, we can (hopefully) prove there is a 4th star in the system even though we can't see it cross in front of the others.

Last Tuesday there was an eclipse of the third star but we clouded out and didn't get it. Hope to get another shot soon

That's what is happening at Patterson



Light curve of Binary Star Eclipse

Solar viewing (advice and information for newbies)

By Ted Forte

Observing the sun is perhaps the only inherently dangerous activity we engage in as amateur astronomers. With our impending return to daytime outreach events, it's probably worth the time to cover some basic stuff about safely observing the sun.

You should never look directly at the sun, as it is always injurious to your eyes. Looking at a magnified, unfiltered sun can cause instant, permanent damage that can lead to blindness. You owe it to yourself to protect your own eyesight, of course, but it is especially important to protect those that you might encounter at outreach events as well.

Projection is the safest method available to view the sun. You might just use pin hole projection. Put a pinhole in an index card and have it project the sun's image onto another card or other flat surface. You can improve the performance by enclosing things in a box. You can also use a small telescope or one side of a binocular to project the sun's image.

I use what is called a "sun funnel" on a small department store telescope. (One design can be found here: https://eclipse2017.nasa.gov/make-sun-funnel)

Don't use any scope larger than 4 inches for projection unless it is stopped down to 4 inches or less. The amount of heat that builds up in larger scopes is enough to damage your optics.

It is also essential to be vigilant and attentive when using telescope projection in a public venue – be sure that your scope is never left unattended while pointed at the sun, lest some child try and look through it.

You can safely view the sun (unmagnified) through solar glasses (usually called eclipse glasses). Just be sure they are from a reputable source and are undamaged – no cracks or pinholes. Look for the ISO certification stamp that will appear on glasses that meet the international quality standard for safety. The club has a supply of them – you can pick one up at Patterson for free. (We often bring a supply of them to events and meetings as well).

A welding glass that is #14 or darker can also be safely used. However, stacked sunglasses, polarizers, smoked glass, CDs etc. are NOT safe.

To safely view the sun through a telescope, you must use a solar filter. There are commercially available full aperture solar filters made of treated glass, optical grade mylar or solar grade polymers. You can also purchase the film itself and make your own filter cell. Be sure your filter covers the entire aperture and is in good repair. Also be sure it is securely attached to the scope – you don't want a gust of wind to dislodge your filter. And be on guard for little hands that might want to poke or prod them if there are children in your audience.

Do not use solar filters that screw into an eyepiece. Many older department store style scopes came with such things. They can shatter from the heat and are quite dangerous. If you have one of these, I suggest you smash it with a hammer and throw it away.

Another method that is safe for a small telescope is a "Herschel Wedge". These devices attach at the eyepiece end of a refractor (like a star diagonal) and shunt most of the sun's light away, they should be used in conjunction with a neutral density filter. Some models, especially older ones, direct the light out the bottom of the device in a collimated beam and can get hot enough to burn you, so be cautious. They can only be safely used with refractors – do not use one on a reflector (this is because reflecting telescopes usually have a secondary mirror close to focus which may be damaged by the heat caused by IR light.)

The methods described above provide views of the solar photosphere. We call them "white light filters" because they pass all of the visible wavelengths (albeit in very tiny quantities). They will enable you to see sunspots and watch the progress of an eclipse, but nothing else.

Telescope specially designed as solar scopes allow you to view the sun in h-alpha. These scopes can only be used on the sun. They use something called an etalon filter which is a type of interference filter. They not only shunt away most of the light, but also pass just a very narrow band (essentially a single wavelength) through to the eyepiece. H-alpha scopes let you view the sun's chromosphere and will show prominences, filaments, granulation and active areas. They can be adjusted to enhance surface detail or highlight solar prominences. Popular brands are Lunt and Coronado. Models vary in the way they are "tuned" (adjusted).

There are other scopes that pass the calcium K line at 393.4 nm. They are less popular, generally more expensive, and somewhat more difficult to use. Many people have considerable difficulty seeing in calcium K.

When done safely, solar observing can extend your enjoyment of our hobby greatly and is an excellent way to interact with the public at outreach events. I highly recommend it but can't stress enough that you must take care to observe the proper precautions.

I also suggest that you do a bit of research on our sun before interacting with the public. At a minimum you should be able to define and explain (in simple terms) "sunspot", prominence," "filament" and "flare".

NASA Night Sky Notes JULY 2021

This article is distributed by NASA Night Sky Network

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

Observe the Milky Way and Great Rift

By David Prosper

Summer skies bring glorious views of our own Milky Way galaxy to observers blessed with dark skies. For many city dwellers, their first sight of the Milky Way comes during trips to rural areas - so if you are traveling away from city lights, do yourself a favor and look up!

To observe the Milky Way, you need clear, dark skies, and enough time to adapt your eyes to the dark. Photos of the Milky Way are breathtaking, but they usually show far more detail and color than the human eye can see – that's the beauty and quietly deceptive nature of long exposure photography. For Northern Hemisphere observers, the most prominent portion of the Milky Way rises in the southeast as marked by the constellations Scorpius and Sagittarius. Take note that, even in dark skies, the Milky Way isn't easily visible until it rises a bit above the horizon and the thick,

turbulent air which obscures the view. The Milky Way is huge, but is also rather faint, and our eyes need time to truly adjust to the dark and see it in any detail. Try not to check your phone while you wait, as its light will reset your night vision. It's best to attempt to view the Milky Way when the Moon is at a new or crescent phase; you don't want the Moon's brilliant light washing out any potential views, especially since a full Moon is up all night.

Keeping your eyes dark adapted is especially important if you want to not only see the haze of the Milky Way, but also the dark lane cutting into that haze, stretching from the Summer Triangle to Sagittarius. This dark detail is known as the Great Rift, and is seen more readily in very dark skies, especially dark, dry skies found in high desert regions. What exactly is the Great Rift? You are looking at massive clouds of galactic dust lying between Earth and the interior of the Milky Way. Other "dark nebulae" of cosmic clouds pepper the Milky Way, including the famed Coalsack, found in the Southern Hemisphere constellation of Crux. Many cultures celebrate these dark clouds in their traditional stories along with the constellations and Milky Way.

Where exactly is our solar system within the Milky Way? Is there a way to get a sense of scale? The "Our Place in Our Galaxy" activity can help you do just that, with only birdseed, a coin, and your imagination: bit.ly/galaxyplace. You can also discover the amazing science NASA is doing to understand our galaxy – and our place in it - at nasa.gov.

The Great Rift is shown in more detail in this photo of a portion of the Milky Way along with the bright stars of the Summer Triangle. You can see why it is also called the "Dark Rift." Credit: NASA / A.Fujii

If the Milky Way was shrunk down to the size of North America, our entire Solar System would be about the size of a quarter. At that scale, the North Star, Polaris - which is about 433 light years distant from us - would be 11 miles away! Find more ways to visualize these immense sizes with the Our Place in Our Galaxy activity: bit.ly/galaxyplace

Pictures by HAC Members

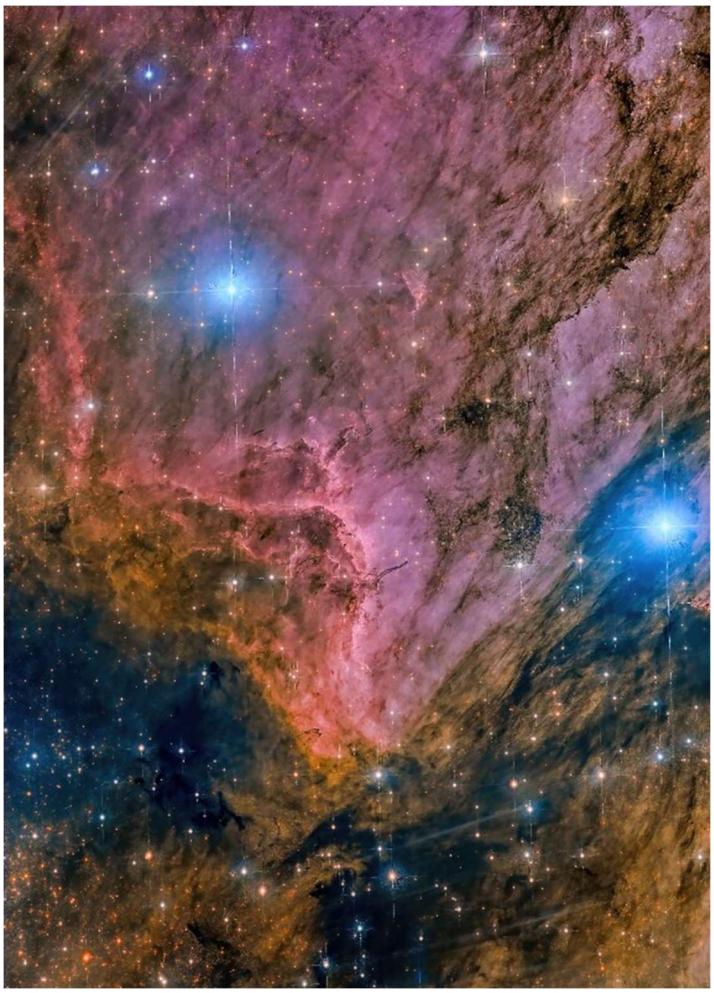
Rainbow by Karen Madtes

Planetary Nebula Jones 1 by David Roemer

NGC 6804 By David Roemer

A 3-scope synthesis focused on IC 5070:

Pelican Nebula By Alex Woronow



Gold at the End of Rainbow by Ted Forte

FOR SALE

Takahashi Mewlon 250 (10") About 9 yrs old. Seldom used. Dealer (Anacortes) installed field-flattener and upgraded manual focuser with an electric (computer-controllable) focuser. Asking just $4,700. (new price ~$ 8,000). Contact Alex Woronow at Alex@FaintLightPhotography.com (Alex lives in Silver City NM (SW Corner) but would meet a buyer halfway to deliver the scope).

FREE to good home! Anyone want a permanent pier. I used it with a 5-inch refractor and it is nice and solid. Its designed to fit on a concrete slab or floor. You can anchor it with expansion bolts by drilling holes with an impact drill. To pick up contact Bob Kepple at: astrocards@aol.com or 520-732-4841

Patricia Houser has two telescopes to sell. Her husband was the astronomer, and can no longer pursue the hobby. She did not mention what the scopes are but would be open to potential buyers coming out to see them (Whetstone). That's all the information we have, so if you have questions please contact Ms. Houser directly at iamtennis@peoplepc.com

Celestron 6SE. (Schmidt Cassegrain) Includes two scope buggies for it. Also includes an equatorial tripod for the 2nd buggy. See pictures below
Contact JD Maddy at 602-672-2032 Will deliver

Club Officers and Contacts

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***Nightfall* Editor:** Cindy Lund cindy.jean.lund@gmail.com

Webmaster: Ken Kirchner

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Website: http://www.hacastronomy.org

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For more information on products and contact information, their websites are:

Farpoint Astronomy http://www.farpointastro.com/

Starizona http://starizona.com/

HAC July-August 2021 Calendar of Events

SU	MO	TU	WE	TH	FR	SA
4 July 	**5**	**6**	**7** Mercury/Moon 4 degrees	**8**	**9** 6:17PM	**10**
11	**12** Venus/Moon 3 degrees	**13** Mars/Venus 0.5 degrees	**14**	**15**	**16**	**17** 3:11 AM
18 Pluto Opposition	**19**	**20**	**21**	**22**	**23** 7:37 PM HAC Meeting ZOOM	**24** Saturn/Moon 4 degrees
25 Jupiter/ Moon 4 degrees	**26**	**27**	**28**	**29** Mars/Regulus Conjunction .6 degrees Delta Aquariid Meteors	**30** Delta Aquariid Meteors	**31** 6:18AM
1 Aug	**2** Saturn at Opposition	**3**	**4**	**5**	**6**	**7**
8 6:50AM	**9**	**10**	**11** Perseid Meteors	**12** Perseid Meteors	**13**	**14**
15 8:21 AM	**16**	**17**	**18** Mars/Mercury 0.1 degrees	**19** Jupiter at opposition	**20** HAC Meeting ZOOM	**21**
22 5:02 AM	**23**	**24**	**25**	**26**	**27**	**28**
29	**30** 0:15 AM	**31**	**1Sep**	**2**	**3**	Huachuca Astronomy Club of Southeastern Arizona

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

In person events and meetings will resume in September