NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

MARCH 2024

RICHARD LIGHTHILL – SPEAKER AT THE MARCH HAC MEETING

Richard Lighthill will give a session on astronomy software demonstrating, for example: SIRIL - what it can do and how to do it (he will give a brief demo). He will show sample images made with SeeStar and other scopes with cameras. He will also demonstrate Astro-Hopper - how to use it with any scope for "push-to" locating astro targets.

WELCOME OUR NEW MEMBERS

Samuel Courtney of Sierra Vista is our newest student member. Riley Anderson and her mother Mary of Douglas AZ also joined the club in February. 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 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.

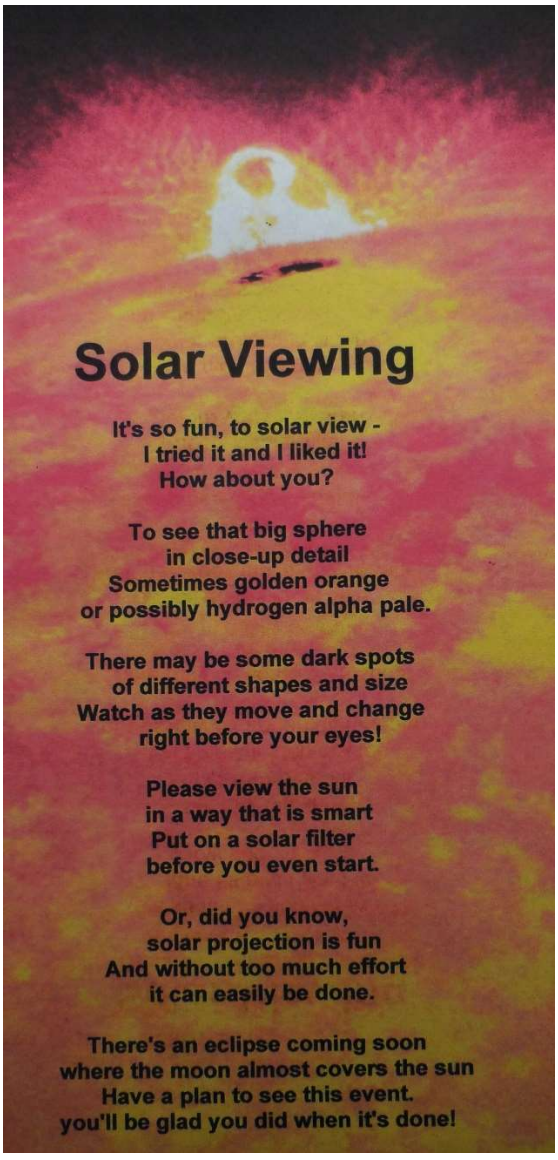
4. If you have a Pay Pal account, you can use PayPal Direct to send your payment to paypal@hacastronomy.org

5. If you have a Zelle account with your bank, you can make a dues payment by transferring funds to twforte@powerc.net

If you are unsure of your dues status, contact the treasurer, Ted Forte by email tedforte511 at gmail dot com.

SOLAR SATURDAY

In January we began a solar observing event at the Sierra Vista Library that we will conduct from 10 am to noon every second Saturday of the month. The January event was very well received. We had to cancel February's event. Weather permitting, you are invited to set up your solar telescope (or just come joins us without a scope) on March 9 at 10 a.m.



Solar Eclipse April 8

If you are traveling to the centerline – best of luck for a safe trip and good weather for the eclipse.

If you are staying in town, please mark your calendar for HAC's partial eclipse event at the Sierra Vista Library. We expect large crowds to attend, so the more volunteers that participate, the better.

Calling for NightFall Editor

Cynthia Shomenta has been the editor of the HAC Nightfall monthly newsletter for nearly 12 years. We appreciate her work over the years and the professionalism she has shown in editing our newsletter. Cindy would like to hand over the job of editor to another member to be able to support the club in other ways. Cindy will continue to edit the newsletter until June. She has offered to train whomever would like to spread their editing wings to assemble the newsletter. Contact Cindy at cindy.jean.lund@gmail.com if you are interested.

Eclipse Photos Wanted

We know that HAC members will be viewing the Solar Eclipse April 8, 2024 from both Sierra Vista (partial) and places along the totality path. We would like to include pictures of the eclipse (total and partial) as well the surrounding events experienced by members at the April General Member meeting. We will also be asking a few members to share their experience during the April General member meeting. Please send your best images along with a brief description (location, activity, etc.) to Richard Lighthill richardlighthill@gmail.com, on or before April 15, 2024.

2023 HAC Annual Report

At the February General Member meeting Penny Brondum, HAC president, gave a brief summary of Annual HAC Metrics:

In 2023, HAC had 116 memberships (163 counting family memberships as two) up from 2022. We added 26 new memberships in 2023 and so far in 2024 we have 8 new memberships.

In 2023, HAC provided 1023 volunteer hours and interacted with 3,393 people (up nearly 900 people from the previous year). 50 individual HAC Members have attended 1 or more outreach events in the past two years (about a dozen members do most of the outreach).

HAC supported 8 Public night, 7 Solar Saturdays, 24 Student outreach and 17 Special events such as Partial eclipse, Kartchner Cavern, Earth Day, Swap meet and Dine Under the Stars scholarship fund raiser. HAC held its second beginning Astronomers class with 12 students.

HAC supported discussions on City and County Lighting regulations, SV Park Initiatives and the SV Block Grant.

HAC donated $2,600 for scholarship to the University South Foundation, owner of the Patterson Observatory. Over the years HAC has donated over 54 telescopes to local libraries and continues to support their maintenance.

HAC held an Astronomy Swap meet in November and netted over $12,350, selling approx. 50 telescopes that had been donated to them over the prior 18 months.

Overall, HAC remains an active and energetic club supporting its members with interesting programs, sharing insights for improving astronomy enjoyment for both visual and astro-photographic members. We have many ways for members to learn and share their skills and knowledge including the chapter forum, HAC website and FaceBook pages.

The Posidonius adventure

By Rik Hill

On the northeastern shore of Mare Serenitatis is found the spectacular crater Posidonius (99 km). This is what's called a fractured floor crater (FFC) meaning that it was flooded, the lava receded and the floor cracked resulting in the fissures we call Rimae Posidonius. Posidonius is thought to contain the remnants of an older crater wall seen on the east (right) side. There are two long, parallel north-south rimae immediately apparent on the floor of Posidonius. They are not at all the alike. The one in the middle of the crater is a graben-like rima that ends on the north end where it meets the interior crater wall. The rima to the west is not a linear crack but in orbiter images is seen as tightly sinuous formed by a fluid, probably lava, during some post-impact modification and flooding from Serenitatis as it takes a right angled turn to the west wall. On the other end it runs up to the northern wall and follows along the inside of that wall all the way to the crater Posidonius (14 km) B on the northeast wall. You'll need a large aperture to follow along its full extent.

South of Posidonius is the ruined crater Chacornac (53 km), as much as a billion years older than Posidonius, from the beginnings of the Moons formation. It has been overlain by ejecta from numerous nearby maria and crater impacts. Notice how the central rima in Posidonius appears to continue south across Chacornac and beyond.

Further south from Chacornac is an embayment off the mare. This is Le Monnier (63 km). The south side of this crater was the landing site for Luna (Lunik) 21. From this landing site the onboard rover, Lunokhod2, traveled 37 km across the surface to the flanks of the southeastern wall, the longest distanced traveled by any lunar roving vehicle ever. This rover had 7 cameras on board. I invite the readers to look up the pictures and exploits of this mission.

There's a nice wrinkle ridge winding its way south from the southern point Le Monnier. This is Dorsa Aldovandri that winds further south for 124 km well out of the limits of this image. To the southeast of Le Monnier is nice crater Romer

(41 km) with terraced walls. The interior of this crater is worth the time on a good steady night with highest magnifications! To the left of this crater is a graben-like rima, Rima Romer. Another such rima is to the right of Posidonius just left of the smaller crater G.Bond (19 km). This rima is, as you might expect, Rima G.Bond.

This image was made from portions of two 1800 frame AVIs stacked with AviStack2, knitted together with MS Ice and finally processed with Gimp and IrfanView.

The Bucket List March 2024

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, *lucida* [loo-si-dae], is offered by Karen Madtes who found it in a book she was reading.

The term refers to the brightest star in a constellation. For example, Sirius, is the lucida of Canes Major. The term is archaic and was used in the 1720s. It seems a lot easier to just say the "the brightest star". A more modern way to refer to the brightest star in a constellation is to use the Flamsteed designation, which identifies the brightest star in a constellation with the Greek letter alpha (α). In modern times, Lucida refers to a font style that is available in Microsoft Office.

In the Sky

NOTE: All times are AZ MST unless otherwise noted. The Moon may be rendered larger than its actual size in order to make it more visible in images.

March 7th, 6:15am – In the south-eastern sky, Venus and the thin crescent moon bracket the much dimmer Mars. You will need a low horizon to fully appreciate the lineup. The following morning, the Moon will be closer to Venus. Can you see the very thin crescent?

March 14th, 11:45pm – The crescent Moon, low in the western sky occults star 26 Tauri. This star is very close to the Pleiades but is closer to us at 280lys vs the 400lys for most of the members of the Pleiades. This event is also a grazing event.

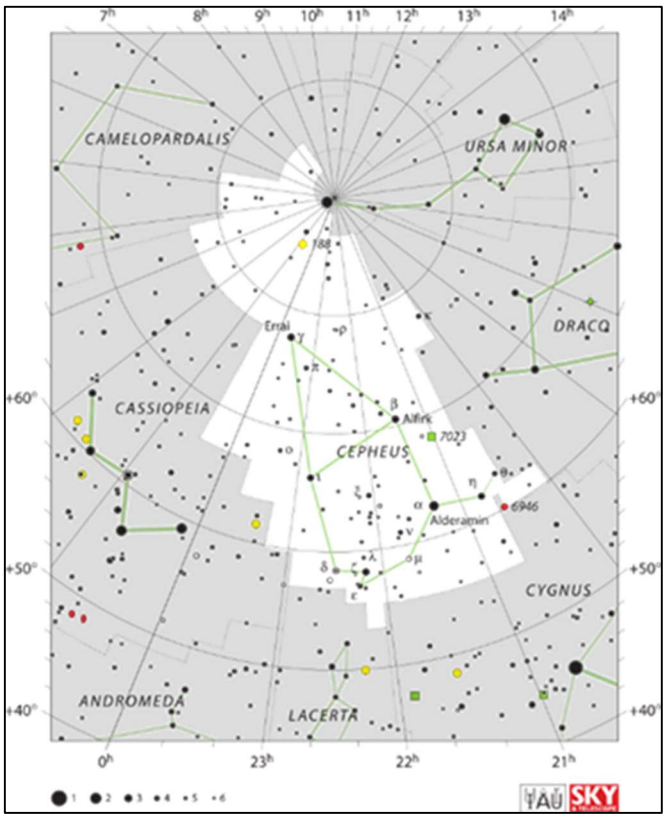
March 15th, 7:30pm – The comet 12P/Pons-Brooks is in the western sky. It is around this date that it peaks in altitude, only around 18° for the next few days. Look for it near Mirach and then in the head of Draco as it moves southward.

March 21st, 6:00am – Venus and Saturn are close enough to be seen in the eyepiece of some telescope. They are separated about the width of diameter (30') of the Moon.

March 29th, 6:00am – Venus and Mars are 17° apart with Saturn halfway between both.

President's Constellation Exploration March 2024

President's Constellation Exploration



Cepheus is a constellation in the far northern sky, named after Cepheus, a king of Aethiopia in Greek mythology. He was married to Cassiopeia and was the father of Andromeda, both of whom are immortalized as modern day constellations along with Cepheus. In Greek mythology, Cepheus was the name of two kings in Aethiopia, grandfather and grandson. The younger Cepheus was married to Cassiopeia, with whom he had a beautiful daughter, Andromeda. At some point, his wife committed hubris by boasting that she and her daughter were more beautiful than the daughters of the sea god Nereus, the Nereids. This triggered the wrath of god Poseidon, who either flooded the lands of Aethiopia or sent a terrible sea creature called Cetus to ravage the coasts of the area. Cepheus and Cassiopeia consulted an oracle on what they should do, and they were advised to sacrifice their daughter to Cetus in order to appease the god. They chained Andromeda to a rock close to the sea, but as Cetus drew close, the hero Perseus arrived in time to save her and kill the monster.

The kingdom of Cepheus was not the Ethiopia we know today, but stretched along the eastern shore of the Mediterranean southwards to the Red Sea, an area that contains parts of the modern Israel, Jordan, and Egypt.

Ptolemy described him as wearing the tiara-like head-dress of a Persian king. Cepheus is most commonly depicted as holding his arms aloft, praying for the deities to spare the life of Andromeda. He also is depicted as a more regal monarch sitting on his throne.

Cepheus is one of the 48 constellations listed by the second century astronomer Ptolemy, and it remains one of the 88 constellations in the modern times. Cepheus ranks 27th in size covering 588 sq. deg. of the northern sky. It is best visible in November.

In Chinese astronomy, the stars of the constellation Cepheus are found in two areas: the Purple Forbidden enclosure (Zǐ Wēi Yuán) and the Black Tortoise of the North (Běi Fāng Xuán Wǔ). The name of the western constellation in modern Chinese is (xiān wáng zuò), meaning "the immortal king constellation".

The constellation's brightest star is Alpha Cephei, also known as Alderamin, with an apparent magnitude of 2.51. Delta Cephei is the prototype of an important class of stars known as a Cepheid variable, a class of pulsating variable stars. It was discovered to be variable by English amateur astronomer John Goodricke in 1784. It varies between 3.5 and 4.4 over a period of 5 days and 9 hours. Delta Cephei has a minimum size of 40 solar diameters and a maximum size of 46 solar diameters. It is also a double star; the primary star also has a wide-set blue-hued companion of magnitude 6.3.

In addition, Cepheus also has the hyper-luminous quasar S5 0014+81, which hosts an ultra-massive black hole in its core, reported at 40 billion solar masses, about 10,000 times more massive than the central black hole of the Milky Way, making this among the most massive black holes currently known.

There are three red supergiant stars in the constellation that are visible to the naked eye. Mu Cephei, also is known as Herschel's Garnet Star due to its deep red color. VV Cephei A, like Mu Cephei, is a red supergiant and a semiregular variable star, located at least 5,000 light-years from Earth. The third, Zeta Cephei, is not as large as Mu Cephei and VV Cephei with a diameter only 94 times that of the Sun (comparable to the orbit of Mercury), and has an apparent magnitude of 3.35. There are also several prominent double stars and binary stars in Cepheus.

Cephus has several deep sky objects: NGC 188 is an open cluster that has the distinction of being the closest open cluster to the north celestial pole, as well as one of the oldest-known open clusters. NGC 6946 is a spiral galaxy in which ten supernovae have been observed, more than in any other

galaxy. It is sometimes called the Fireworks Galaxy. IC 469 is another spiral galaxy, characterized by a compact nucleus, of oval shape, with perceptible side arms. The nebula NGC 7538 is home to the largest-yet-discovered protostar. NGC 7023 is a reflection nebula with an associated star cluster. S 155, also known as the Cave Nebula, is a dim and very diffuse bright nebula within a larger nebula complex containing emission, reflection, and dark nebulosity.

I know it is almost too late in the year to enjoy Cephus at its best but if you get a chance on a clear night this spring look up and check it out.

NASA Night Sky Notes March 2024

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!

Constant Companions: Circumpolar Constellations, Part 2

By Kat Troche

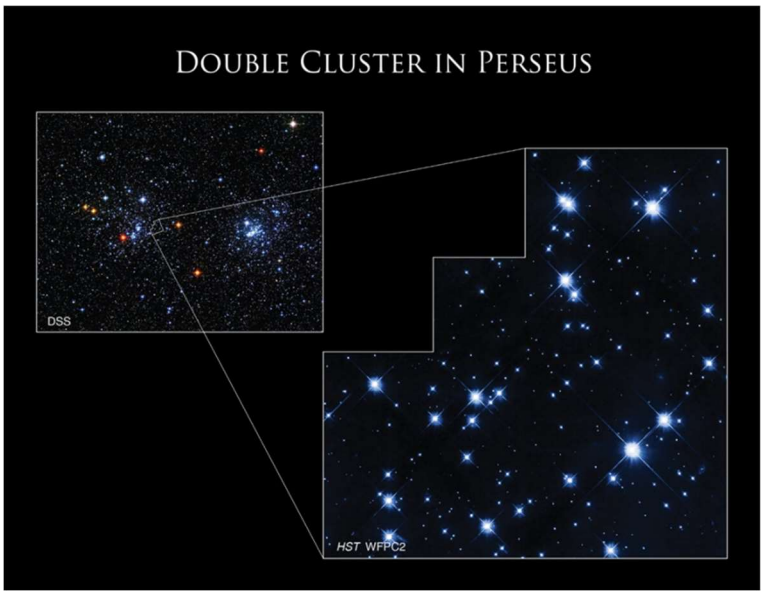
As the seasons shift from Winter to Spring, heralding in the promise of warmer weather here in the northern hemisphere, our circumpolar constellations remain the same. Depending on your latitude, you will be able to see up to nine circumpolar constellations. This month, we'll focus on: Lynx, Camelopardalis, and Perseus. The objects within these constellations can all be spotted with a pair of binoculars or a small to medium-sized telescope, depending on your Bortle scale – the darkness of your night skies.

In the appearance of left to right: constellations Perseus, Camelopardalis, and Lynx in the night sky. Also featured: Cassiopeia as a guide constellation, and various guide stars. Credit: Stellarium Web

Double Stars: The area that comprises the constellation Lynx is famous for its multiple star systems, all of which can be separated with a telescope under dark skies. Some of the notable stars in Lynx are the following:

- 12 Lyncis – a triple star that can be resolved with a medium-sized telescope.
- 10 Ursae Majoris – a double star that was once a part of Ursa Major.
- 38 Lyncis – a double star that is described as blue-white and lilac.

Kemble's Cascade: This asterism located in Camelopardalis, has over 20 stars, ranging in visible magnitude (brightness) and temperature. The stars give the appearance of flowing in a straight line leading to the Jolly Roger Cluster (NGC 1502). On the opposite side of this constellation, you find the asterism Kemble's Kite. All three objects can be spotted with a pair of binoculars or a telescope and require moderate dark skies.



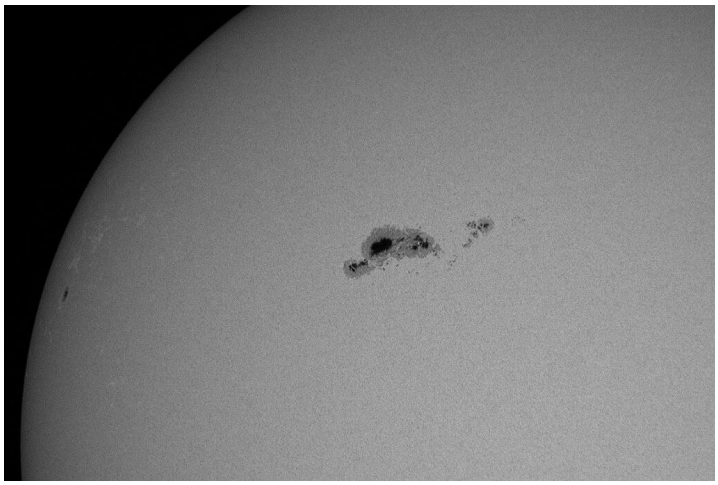
A ground-based image from the Digitized Sky Survey (DSS) in the upper left shows Caldwell 14, the Double Cluster in Perseus, with an outline of the region imaged by Hubble's Wide Field and Planetary Camera 2 (WFPC2).

Ground-based image: Digitized Sky Survey (DSS); Hubble image: NASA, ESA, and S. Casertano (Space Telescope Science Institute); Processing: Gladys Kober (NASA/Catholic University of America)

Double Cluster: The constellation Perseus contains the beautiful Double Cluster, two open star clusters (NGC 869 and 884) approximately 7,500 light-years from Earth. This object can be spotted with a small telescope or binoculars and is photographed by amateur and professional photographers alike. It can even be seen with the naked eye in very dark skies. Also in Perseus lies Algol, the Demon Star. Algol is a triple-star system that contains an eclipsing binary, meaning two of its three stars constantly orbit each other. Because of this orbit, you can watch the brightness dim every two days, 20 hours, 49 minutes – for 10-hour periods at a

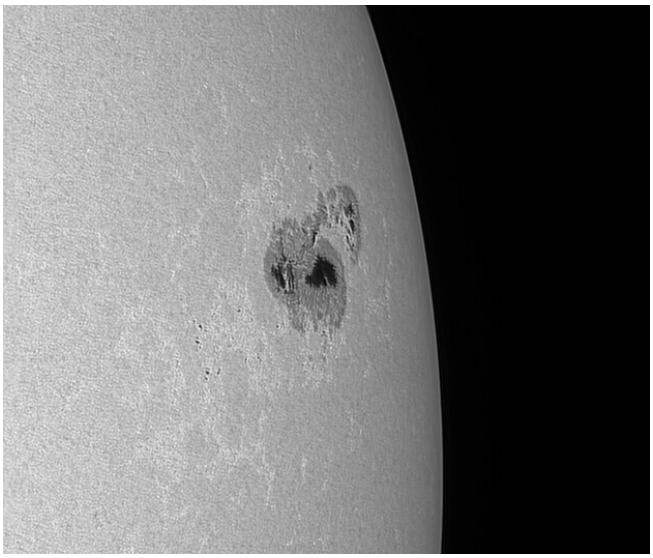
time. For a visual representation of this, revisit NASA's What's Up: November 2019.

Pictures from HAC Astro

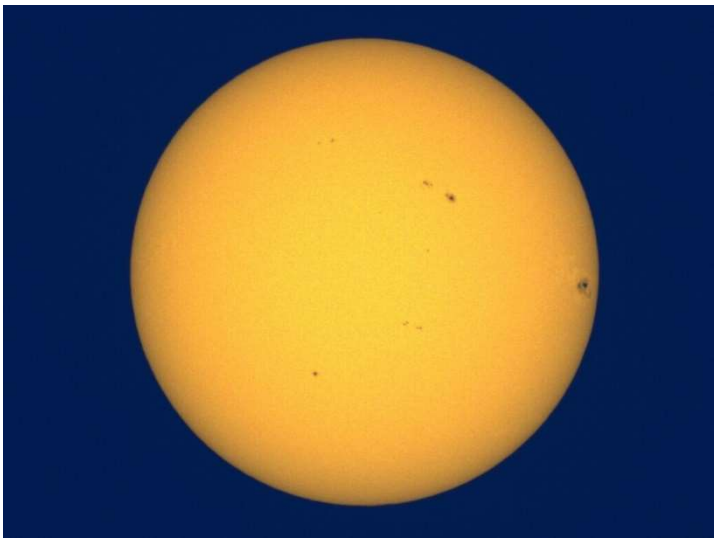


Sunspot AR 3590 by David Roemer

Sunspot AR 3590 by Rik Hill



Sunspot AR 3590 by Richard Lighthill



Full Sun with Sunspot AR 3590 by Vince Sempronio

Seagull Nebula (Sh2-292, IC217) in HaOIII by Mark Orvek

NGC 123 by Glen Sanner

Jellyfish Nebula (IC 443) by Michael Borland
Hubble-like Palette (Top)
Forrax palette (Bottom)

California Nebula NGC 4199 by Richard Lighthill

Monkey Head Nebula (NGC 2174) by Michael Morrison

Witch Head Nebula (IC 2118) by Michael Morrison

Club Officers and Contacts

President: *Penny Brondum* ***Vice President:*** *Jim Reese*

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Facebook: *http://www.facebook.com/HuachucaAstronomyClub*

Email: *info@hacastronomy.org*

HAC Mar/Apr Calendar of Events

SU	MO	TU	WE	TH	FR	SA
Mar 3 8:23 AM Juno Opposition	**4**	**5**	**6**	**7**	**8**	**9** Solar SaturdayS.V. Library 10 AM
10 3:00 AM	**11**	**12**	**13**	**14** Public Night at Patterson 7:00 PM	**15**	**16** 10:11PM
17	**18** Outreach at Leman Academy 6PM	**19** Hiking club at Patterson 7:30PM Vernal Equinox	**20**	**21** Venus/Saturn 0.3°	**22** **HAC Meeting Room A102 Downtown**	**23**
24 Mercury Greatest Eastern Elongation	**25** 1:00AM Penumbral Lunar Eclipse	**26**	**27**	**28**	**29**	**30**
31	**Apr 1** 9:15 PM	**2**	**3**	**4**	**5** Mars/Moon 2°	**6** Saturn/moon1.5°
7 Venus/Moon .4°	**8** 12:22 PM **Total Solar Eclipse**	**9**	**10** Jupiter/Moon 4°. Mars/Saturn .5°	**11** Public Night at Patterson 7:30 PM	**12**	**13** Solar SaturdayS.V. Library 10 AM
14	**15** 1:13 PM Music Group at Patterson 6:30PM	**16**	**17**	**18** **Earth Day at Vet park 10a - 2pm**	**19** **HAC Meeting Room A102 Downtown**	**20**
21 Lyrid Meteors	**22** Lyrid Meteors	**23** 5:49 PM Lyrid Meteors	**24**	**25** **STEAM Night at Col Smith 5-6:30 PM**	**26**	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