NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

APRIL 2024

SPEAKER AT THE APRIL MEETING

There will be multiple speakers at the April meeting. First everyone will discuss their eclipse experiences.

Then if time permits, Vince Sempronio will give a talk called "An introduction to Stellarium"..He will explain how to use the application and point out some of its most useful features

APRIL 8 SOLAR ECLIPSE EVENTS

Weather permitting, HAC will set up telescopes at the Sierra Vista library. The eclipse begins just after 10 a.m. MST. Contact Mike Morrison or Richard Lighthill if you can help.

We are also hoping to support an eclipse watch at Kartchner Cavern's State Park. The park (Park Ranger Ritch Rummler) will be setting up three telescopes and will be distributing solar glasses. Dwight Hoxie and Art Bartlett are planning to support there. If you are remaining in town and can help at the park, please do. The eclipse watch will be set up in last (westmost) row in the main parking lot (by the Event Ramada).

KARTCHNER CAVERNS 50TH ANNIVERSARY

It will be 50 years this November since the caverns were discovered by Gary Tenen and Randy Tufts. (read the history here:

https://azstateparks.com/kartchner/explore/park-history).

As part of their celebration (and to highlight astronomy at the park) we will be holding several extra star parties this year. We are scheduling star parties for May 4, June 1, September 7, October 5 and a date in November to be announced.

Astronomy programs at Kartchner began in early 2010, when an astronomer at the Johnson Space Center in Houston, Texas asked to video-record an asteroid occultation from Kartchner Caverns. With help from park management and Ranger Ginger Nolan, a few astronomers set up telescopes at Kartchner along the SW side of the main parking area on Feb 5, 2010. This began a discussion about possible future astronomy programs at Kartchner.

The first public astronomy program at Kartchner was held on September 11, 2010. JD Maddy and Bob Gent gave talks on the night sky, and there were about a dozen telescopes set up. HAC, along with JD and Karen Maddy (then representing the Astronomers of Verde Valley) have supported star parties at the park ever since. We typically do two all day star parties each year and support other events like Cave Fest, Guano Happens and things like eclipse watches, Earth Days and Astronomy Days. Kartchner Caverns State Park became an IDA Dark Sky Park in 2017.

While there are significant bureaucratic obstacles to overcome, some within the park management are committed to establishing a public observatory at the park that would be supported by the volunteer efforts of HAC members. It's hoped that increasing the tempo of astronomy events at Kartchner will help keep this effort alive. HAC members are encouraged to attend these star parties to show our support for astronomy at the park.

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.

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, we will dive deeper into a term we use all the time but never think much about what it really means or its origin. When asked how bright the Pole Star Polaris is, a usual response is that it is magnitude 2, or put another way, it is a 2nd magnitude star. If the audience knows what the magnitude scale is, then this response is useful and immediately understandable. But what is something's magnitude, really? Without getting too technical, magnitude is a term that describes the brightness of an object using a scale that has its origins from ancient times. Some claim that the astronomer Hipparchus came up with the concept of categorizing the brightness of stars using a scale from 1 (the brightest) to 6 (the dimmest). Unfortunately, the claim has no written proof that has survived till today. Ptolemy, around AD 150 used the scale in his writings. It wasn't until the mid-19th century that the scale was given a more scientific description by basing the differences between magnitudes based on a logarithmic scale where the difference of a 1st magnitude star is 100 times brighter than a 6th magnitude star. The British astronomer, N. R. Pogson, came up with the scale and used the star Vega to calibrate the system, to which he assigned Vega the brightness (magnitude) of zero. Dimer objects have larger magnitudes while brighter ones are lower. This is why objects brighter than Vega, such as Sirius, have negative values. But once the scale became scientific rather than subjective, problems cropped up relating to the color (temperature) of stars and other objects. Recall that a star, for example, doesn't produce a pure frequency of light unlike the green laser pointers we use to point out objects in the sky. Objects put out light in many frequencies/wavelengths, and in some cases, the narrow range of light we see is but a small part of the total light the object is emitting. So, the magnitude of an object depends on what wavelength is being measured. Ranges of wavelengths are called bands and each measures the flux (intensity) of the light emitted in their specific band. The bands are given letter codes to identify them. For visual work, a band, identified by the letter "V" is used which covers the wavelengths of light the human eye can see best, the green-yellow color range. Some bands are narrower and more specific. Examples are the blue "B", red "R", ultraviolet "U", and infrared "I". Scientists use these bands separately or combine bands to compare the objects they are studying. To calibrate the bands, astronomers now carefully measure the output of specific stars as references. Since the intensity of the light through the various filters won't be the same, then the magnitude will also differ though each filter. So, when asked, what is the magnitude of Vega? Well, it depends! The magnitude of Vega is 0.03 (V). When observing visually, we should reference the "V"

In the Sky

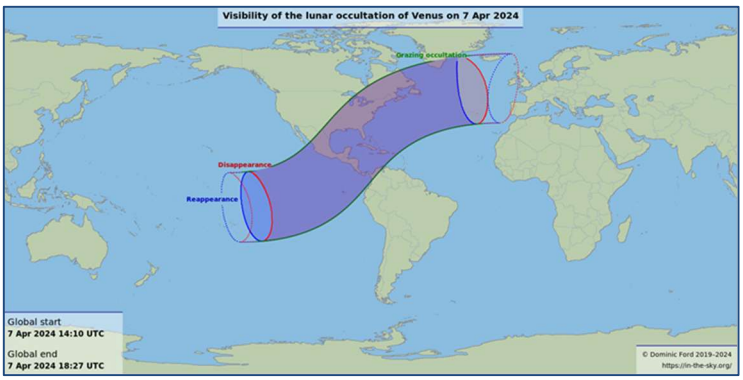
By far the biggest event of April, and probably the entire year, is the Solar Eclipse on April 8th. We need not write much else about it as there is much already written about it, but please encourage others to practice safe observing. Here are some other highlights for the month of April.

Jupiter's Last Hurrah

This is the last month this year when Jupiter is visible in the evening sky. By month's end, Jupiter is lost in the dusk twilight after Sunset.

Daytime Occultation of Venus by the Moon.

Those who are somewhere in the path of totality for the Solar Eclipse on the 8th you will have the opportunity to observe an occultation of the planet Venus by the Moon. This event is on the morning of April 7th and as shown on the map, mirrors the path of the eclipse the next day. From Eagle Pass in west Texas, Venus will skim the northern edge of the moon between 1600-1630 UT. From this location, Venus and the Moon are in the southeast sky around 50° altitude. The pair, only 15° from the Sun, makes it difficult and potentially dangerous to observe. The Moon's phase is only one day from New making it invisible, even using a telescope, but Venus, at magnitude -3.9 should be visible if conditions are ideal. A cloud-free, clean sky is desired. This event will almost certainly require a GoTo telescope. I'll describe the technique I have used to find Venus in the daytime sky, as it may work here. I suggest using an Alt-Az GoTo mount rather than an Equatorial (EQ) mount as it is easier to level an Alt-Az mount (alignment process) than it is to try to polar align an EQ mount in the daytime. If you want to use an EQ mount and can polar align it the night before, keep the mount setup till the next morning. That will greatly increase your chances of success. After leveling your Alt-Az mount, initialize it making sure you have entered the correct time/date and the longitude/latitude. I use a GPS dongle on my Celestron mounts to keep me from making entry mistakes. Now comes the tricky part whether you have an EQ or Alt-Az mount. Place a Solar filter on the scope and have the mount do an alignment on the Sun. In Celestron parlance, this is done by selecting "Solar System" as the alignment type and choosing the Sun as the alignment object. This isn't difficult and each of us have our own techniques for success, but please practice this in advance since you'll need to use the same alignment procedures for the Eclipse the next day. I suggest using a focal reducer on your scope to see as much of the sky as possible. Once you have aligned using the Sun, insert an eyepiece with the widest field of view. Refocus on the Sun and then direct the mount to move the scope to Venus. WARNING: do this step with the Solar filter still on the scope! The scope will slew towards Venus to the west. Once the slew is complete, it is now safe to remove the Solar filter. Because the angular distance to Venus from the Sun is only 15°, the slew to Venus should put the planet in the field of view. To help cut down on glare, try a dew shield. If the sky conditions are ideal, you should be able to see Venus.



I plan to record the Venus/Moon encounter as I would any other occultation. The event isn't important scientifically, but it might make for a nice YouTube video. Back in December of 2020, I successfully recorded a similar occultation. Here is a link to the video I made of that event.

https://www.youtube.com/watch?v=evzlzF61oe0

Conjunction of Mars and Saturn

On the morning of April 10th, just before sunrise, look for a very close encounter between Mars and Saturn. The pair are less than half a degree apart and are visible together in an eyepiece. The image shows the two planets through a 30mm Plossl eyepiece on a C8 SCT at 5:15am.

Lyrid Meteor Shower

The annual Lyrid Meteor Shower will peak on the evening of April 21st around midnight. This shower originates from the remnants of the comet C/1861 G1 Thatcher. Look toward the northeast around midnight. The radiant of the shower is slightly to the upper right of Vega. Under dark skies, look for up to 10 meteors an hour with the potential of an occasional bright fireball. Meteor showers, as Forrest Gump would say, are like a box of chocolates, you never know what you'll get.

President's Constellation Exploration April 2024

Since last month we covered King Cepheus of Aethiopia, it is now time to check out Cassiopeia, the queen of Aethiopia. Cassiopeia is a constellation and asterism in the northern sky named after the vain queen Cassiopeia, mother of Andromeda, in Greek mythology, who boasted about her unrivaled beauty. She was placed in the sky as a punishment after enraging Poseidon with the boast that her daughter Andromeda was more beautiful than the Nereids or, alternatively, that she herself was more beautiful than the sea nymphs. Cassiopeia was forced to wheel around the north celestial pole on her throne, spending half of her time clinging to it so she does not fall off, and Poseidon decreed that Andromeda should be bound to a rock as prey for the monster Cetus. Andromeda was then rescued by the hero Perseus, whom she later married.

Cassiopeia has been variously portrayed throughout her history as a constellation. In Persia, she was drawn by al-Sufi as a queen holding a staff with a crescent moon in her right hand, wearing a crown, as well as a two-humped camel. In France, she was portrayed as having a marble throne and a palm leaf in her left hand, holding her robe in her right hand. This depiction is from Augustin Royer's 1679 atlas.

The Chinese astronomers saw several figures in what is modern-day Cassiopeia. Kappa, Eta, and Mu Cassiopeiae formed a constellation called the Bridge of the Kings; when seen along with Alpha and Beta Cassiopeiae, they formed the great chariot Wang-Liang. The charioteer's whip was represented by Gamma Cassiopeiae, sometimes called "Tsih", the Chinese word for "whip".

In Hindu Mythology, Cassiopeia was associated with the mythological figure Sharmishtha – the daughter of the great Devil (Daitya) King Vrishparva and a friend to Devayani (Andromeda).

In Welsh Mythology Llys Dôn (literally "The Court of Dôn") is the traditional Welsh name for the constellation. At least three of Dôn's children also have astronomical associations: Caer Gwydion ("The Fortress of Gwydion") is the traditional Welsh name for the Milky Way, and Caer Arianrhod ("The Fortress of Arianrhod") being the constellation of Corona Borealis.

In the 17th century, various Biblical figures were depicted in the stars of Cassiopeia. These included Bathsheba, Solomon's mother; Deborah, an Old Testament prophet; and Mary Magdalene, a follower of Jesus.

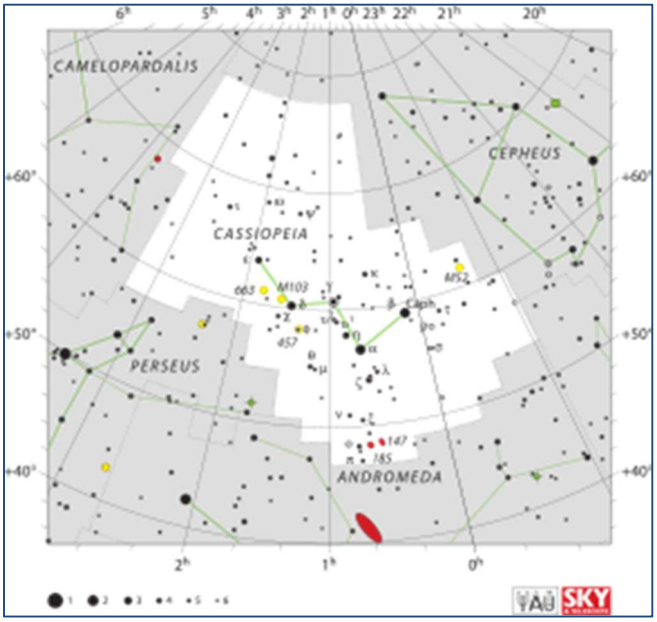
A figure called the "Tinted Hand" also appeared in the stars of Cassiopeia in some Arab atlases. This is variously said to represent a woman's hand dyed red with henna, as well as the bloodied hand of Muhammad's daughter Fatima. The hand is made up of the stars α Cas, β Cas, γ Cas, δ Cas, ε Cas, and η Cas. The arm is made up of the stars α Per, γ Per, δ Per, ε Per, η Per, and ν Per.

Another Arab constellation that incorporated the stars of Cassiopeia was the Camel. Its head was composed of Lambda, Kappa, Iota, and Phi Andromedae; its hump was Beta Cassiopeiae; its body was the rest of Cassiopeia, and the legs were composed of stars in Perseus and Andromeda.

Other cultures see a hand or moose antlers in the pattern. These include the Sámi, for whom the W of Cassiopeia forms an elk antler. The Chukchi of Siberia similarly saw the five main stars as five reindeer stags.

The people of the Marshall Islands saw Cassiopeia as part of a great porpoise constellation. The main stars of Cassiopeia make its tail, Andromeda and Triangulum form its body, and Aries makes its head. In Hawaii, Alpha, Beta, and Gamma Cassiopeiae were named. Alpha Cassiopeiae was called Poloahilani, Beta Cassiopeiae was called Polula, and Gamma Cassiopeiae was called Mulehu. The people of Pukapuka saw the figure of Cassiopeia as a distinct constellation called Na Taki-tolu-a-Mataliki.

Cassiopeia is located in the northern sky and from latitudes above 34°N it is visible year-round. High in the northern sky, it is circumpolar (that is, it never sets in the night sky) to viewers in the British Isles, Canada and the northern United States



In the (sub)tropics it can be seen at its clearest from September to early November, and at low southern, tropical, latitudes of less than 25 °S it can be seen, seasonally, low in the North.

Cassiopeia was one of the 48 constellations listed by the 2nd-century Greek astronomer Ptolemy, and it remains one of the 88 modern constellations today. It is easily recognizable due to its distinctive 'W' shape, formed by five bright stars.

At magnitude 2.2, Alpha Cassiopeiae, or Schedar, is generally the brightest star in Cassiopeia, though it is occasionally outshone by the variable Gamma Cassiopeiae, which has reached magnitude 1.6. The constellation hosts some of the most luminous stars known, including the yellow hypergiants Rho Cassiopeiae and V509 Cassiopeiae and white hypergiant 6 Cassiopeiae. In 1572, Tycho Brahe's supernova flared brightly in Cassiopeia. Cassiopeia A is a supernova remnant and the brightest extrasolar radio source in the sky at frequencies above 1 GHz. Fourteen star systems have been found to have exoplanets, one of which—HD 219134—is thought to host six planets.

Within the constellation's borders, there are 157 stars brighter than or equal to apparent magnitude 6.5. The five brightest stars of Cassiopeia – Alpha, Beta, Gamma, Delta, and Epsilon Cassiopeiae – form the characteristic W-shaped asterism. All five are prominent naked eye stars, three are noticeably variable, and a fourth is a suspected low amplitude variable.

Alpha Cassiopeiae, traditionally called Schedar (from the Arabic Al Sadr, "the breast"), is a four-star system. Beta Cassiopeiae, or Caph (meaning "hand"), is a white-hued star of magnitude 2.3.Gamma Cassiopeiae is the prototype Gamma Cassiopeiae variable star, a type of variable star that has a variable disc of material flung off by the high rotation rate of the star. Gamma Cassiopeiae has a minimum magnitude of 3.0 and a maximum magnitude of 1.6, but is generally near magnitude 2.2, with unpredictable fades and brightenings. It is a spectroscopic binary, with an orbital period of 203.59 days and a companion with a calculated mass about the same as the Sun. Delta Cassiopeiae, also known as Ruchbah or Rukbat, meaning "knee," is a possible Algol-type eclipsing binary star with a maximum brightness of magnitude 2.7. Epsilon Cassiopeiae has an apparent magnitude of 3.3. It is 6.5 times as massive and 4.2 times as wide as the Sun, and belongs to a class of stars known as 'Be' stars—rapidly spinning stars that throw off a ring or shell of matter.

A rich section of the Milky Way runs through Cassiopeia, containing a number of open clusters, young luminous galactic disc stars, and nebulae. Two Messier objects, M52 (NGC 7654) and M103 (NGC 581), are located in Cassiopeia; both are open clusters. M52, once described as a "kidney-shaped" cluster, contains approximately 100 stars and is 4600 light-years from Earth. NGC 457 is another open cluster in Cassiopeia, also called the Dragonfly Cluster, the Owl Cluster, Caldwell 13, and more recently in America, the E.T. Cluster. The cluster was discovered in 1787 by William Herschel. It has an overall magnitude of 6.4 and is approximately 10,000 light-years from Earth, lying in the Perseus arm of the Milky Way.

There are two supernova remnants in Cassiopeia. 1) Tycho's Supernova Remnant, is the aftermath of the supernova called Tycho's Star. It was observed in 1572 by Tycho Brahe and now exists as a bright object in the radio spectrum. 2) Within the 'W' asterism formed by Cassiopeia's five major stars lies Cassiopeia A (Cas A). It is the remnant of a

supernova that took place approximately 300 years ago (as observed now from Earth; it is 10,000 light-years away), and has the distinction of being the strongest radio source observable outside the Solar System. It was perhaps observed as a faint star in 1680 by John Flamsteed. It was also the subject of the first image returned by the Chandra X-Ray Observatory in the late 1990s. The shell of matter expelled from Cas A is moving at 4,000 kilometers (2,500 mi) per second; it has a temperature of 30,000 kelvins on average.

Several members of the Local Group of galaxies are in Cassiopeia. IC 10 is an irregular galaxy that is the closest known starburst galaxy. NGC 185 is a magnitude 9.2 elliptical galaxy of type E0, 2 million light-years away. Slightly dimmer and more distant NGC 147 is a magnitude 9.3 elliptical galaxy, like NGC 185 it is an elliptical of type E0; it is 2.3 million light-years from Earth. Though they do not appear in Andromeda, both NGC 185 and NGC 147 dwarf galaxies are gravitationally bound to the far larger Andromeda Galaxy.

Cassiopeia also contains part of the closest galaxy group to our Local Group, the IC 342/Maffei Group. The galaxies Maffei 1 and Maffei 2 are located just to the south of the Heart and Soul nebulae. As a result of this location in the Zone of Avoidance (a blank spot in the Milky Way), both are surprisingly faint despite both being within 10 million light-years.

As you can see Cassiopeia has many points of exploration and the benefit for us is that we can see her all year around. So, on a clear night go out, look up and begin exploring the vain queen and all her splendors.

Science at the Patterson: An occultation of asteroid (784) Pickeringia

By Vince Sempronio

On March 19. (O'dark hundred), I used the 20" at the Patterson to record an occultation of asteroid (784) Pickeringia passing in front of the star UCAC4 290-108696 in Scorpio. Just a routine event.

The event was only 20 degrees above the southern horizon, but the sky was pretty steady.

The asteroid is magnitude 13.8 and the star is 12.9. The predicted maximum duration of the event was 4.7 seconds, and I recorded a 5.0 second event. Another observer up near Phoenix's observation was event longer. My event should have been a lot shorter because I wasn't that close to the centerline of the path, but that happens when the estimate of the size and shape of the asteroid isn't well defined. It is over 75km wide, so it could also have lumps that would cause differences in timing.

There have been 5 previous observed chords of this asteroid with the first observed in 2008 and 4 more in 2018. Our data will help refine the orbit, shape and size

For you geeks, the signal to noise ratio (SNR) of my observation was 5.49. I've had events well over 10 before, but the closeness to the horizon probably accounted for most of the noise. I recorded at 80ms / frame (12.5 frames / second).

The star is 3,600 lyrs away while the asteroid was ~295 million miles at the time of the event.

The asteroid was discovered in 1914. More info here if you are interested. https://en.wikipedia.org/wiki/784_Pickeringia

Sinus Aestuum

by Rik Hill

Nine days after new moon the great crater Copernicus (diameter 95km) and its little brother Eratosthenes (60km) are on the terminator giving one of the more spectacular views the lunar observer can see. Younger observers have related how they can see Copernicus when it is on the terminator, but I never have though I have looked many times over the years. Both craters are known as “terraced” craters for the obvious reason that the interior walls appear terraced as if it were a farming project. In the lower left corner can be seen two shadow filled craters. The largest is Reinhold (49km) and the smaller polygonal one is Reinhold B (26km).In the opposite corner are two good sized craters, Pallas (51km) and Murchison (60km) which are usually seen in images of Triesnecker (27km) that is peeking in the extreme lower right corner and its rimae system.

Heading to the northeast (upper right) from Eratosthenes is the southern end of the Montes Apenninus including Mons Wolf (3500m high). Between Copernicus and Eratosthenes you can see a clustering of craters all roughly the same size. Notice they are laid out rather concentric to the walls of Copernicus and not all are round. These are “secondary” craters formed in low velocity impacts of the ejecta thrown out during the Copernicus impact that occurred in the last billion years, rather recent on the moon. In fact, this is the basis for the Copernican Period in the lunar geologic timescale while Eratosthenes defines the Eratosthenean Period that goes from 1.1 to 3.2 billion years ago. This is why

you don't see any ejecta blanket features on the side of that crater facing Copernicus. Secondary craters can be seen all over Sinus Aestuum, the plain below Eratosthenes to the east of Copernicus. Also on this plain you can see the rays from Copernicus as delicate shadings on the surface. During high sun, like full moon, these become overwhelmingly bright and dominant.

Lost in the secondary craters between the two great craters you can see an outline of a circle. This is Stadius (71km) a once great crater every bit as glorious as Eratosthenes when it was formed over 3.85-3.8 billion years ago (the Imbrium Period) but now buried in the flooding that created Sinus Aestuum and then overlain by ejecta from both the more recent craters. Oddly enough, all these secondary crater created from Copernicus ejecta are named as satellite craters of Stadius!

NASA Night Sky Notes April 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!

Participate in Eclipse Science

By Kat Troche

April is NASA's Citizen Science Month, and there is no shortage of projects available. Here are some citizen science projects that you can participate in on April 8th, on and off the path of totality right from your smartphone!

Eclipse Soundscapes, ARISA Lab / NASA

Eclipse Soundscapes

Eclipse Soundscapes will compare data from a 1932 study on how eclipses affect wildlife – in this case, crickets. There are a number of ways you can participate, both on and off the path. NOTE: you must be 13 and older to submit data. Participants 18+ can apply to receive the free Data Collector kit. Learn more at: eclipsesoundscapes.org/

GLOBE Eclipse

Folks that participated in the GLOBE Eclipse 2017 will be glad to see that their eclipse data portal is now open! With the GLOBE Observer smartphone app, you can measure air temperature and clouds during the eclipse, contributing data to the GLOBE program from anywhere you are. Learn more at: observer.globe.gov/

HamSCI, The University of Scranton / NASA

HamSCI

HamSCI stands for Ham Radio Science Citizen Investigation. HamSCI has been actively engaged in scientific data collection for both the October 14, 2023, annular solar eclipse and the upcoming April 8, 2024, total eclipse. Two major activities that HamSCI will be involved in around the solar events will be the Solar Eclipse QSO Party (SEQP) and the Gladstone Signal Spotting Challenge (GSSC) which are part of the HamSCI Festivals of Eclipse Ionospheric Science. Learn more about these experiments and others at: hamsci.org/eclipse

SunSketcher, Western Kentucky University / NASA

SunSketcher

If you're traveling to totality, help the SunSketcher team measure the oblateness, or shape, of the Sun during the eclipse by timing the flashes of Baily's Beads. You will need

a smartphone with a working camera for this, along with something to hold the phone in place - don't forget a spare battery! NOTE: The app will need to run from five minutes before the eclipse starts until the end of the eclipse. Any additional phone use will result in Sun Sketcher data loss. Learn more at: sunsketcher.org/

Don't stop at the eclipse - NASA has citizen science projects you can do all year long – from cloud spotting on Mars to hunting for distant planets! By contributing to these research efforts, you can help NASA make new discoveries and scientific breakthroughs, resulting in a better understanding of the world around us, from the critters on the ground, to the stars in our sky.

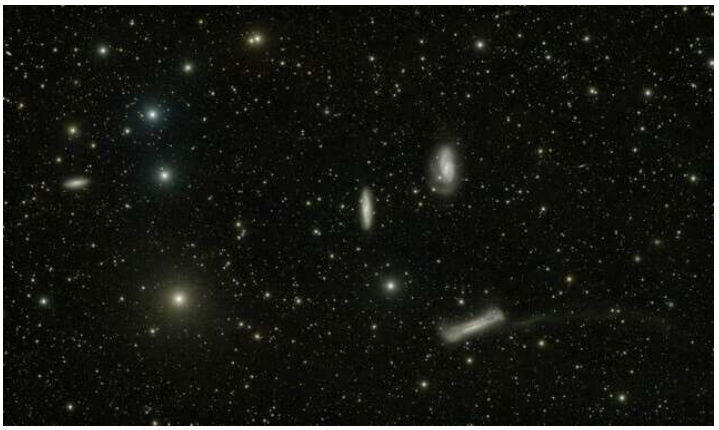
We'll be highlighting other citizen science projects with our mid-month article on the Night Sky Network page, but we want to wish all you eclipse chasers out there a very happy, and safe solar eclipse! For last minute activities, check out Night Sky Network's Solar Eclipse Resources section!

Pictures from HAC Astro

Auroras by David Roemer

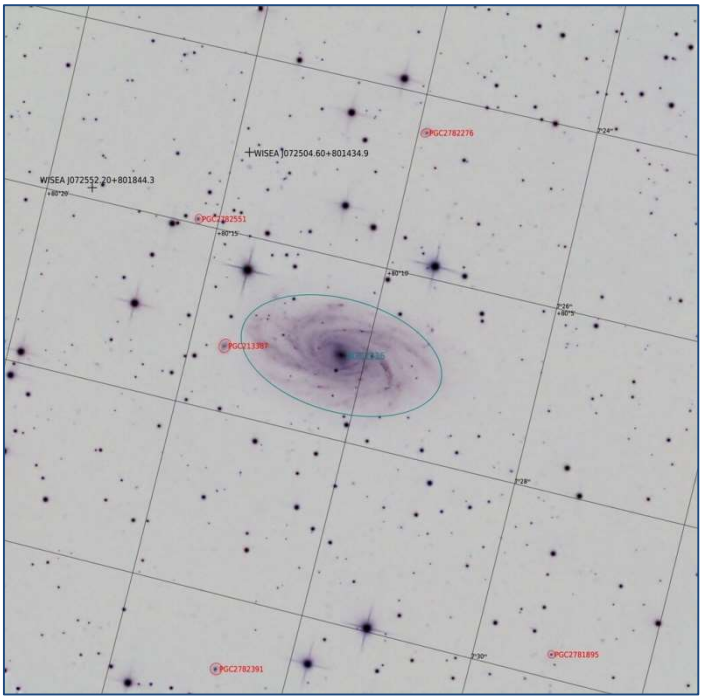
Supernova 2023ixf in M101 by Rik Hil

NGC 2071 and 2112 by Michael Borland



Leo Triplet Wide Field by Michel Borland

NGC 2336 by Glen Sanner



NGC 2336 with Annotation by Glen Sanner

Dolphins Head Nebula (Sh2-308) with narrowband normalization (top) and without (bottom)

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Website: http://www.hacastronomy.org

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

Email: info@hacastronomy.org

HAC Apr/May Calendar of Events

SU	MO	TU	WE	TH	FR	SA
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 7PM	20
21 Lyrid Meteors	22 Lyrid Meteors	23 5:49 PM School Field Trip Pat Obs 9a Lyrid Meteors	24	25 STEAM Night at Col Smith 5-6:30 PM	26	27
28	29	30	May 1 5:27 AM	2 School Field Trip Pat Obs 9 am	3 Saturn/Moon 0.8 °	4 Kartchner Star Party noon to 9 PM Eta Aquariid Meteors
5 Eta Aquariid Meteors	6 Mercury/moon 4° Eta Aquariid Meteors	7 9:22 PM	8	9 School Field Trip Pat Obs 9 am Mercury greatest W Elong	10	11 Solar SaturdayS.V. Library 10 AM
12 	13	14	15 5:48 AM	16 Public Night at Patterson 7:30 PM	17	18
19 Pallas Opposition	20	21	22	23 7:53AM	24 HAC Meeting Room A102 Downtown 7PM	25
26	27 	28	29	30 11:13 AM	31 Saturn/Moon 0.4 °	

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