NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

APRIL 2023

APRIL 2023 PRESIDENT'S NOTE

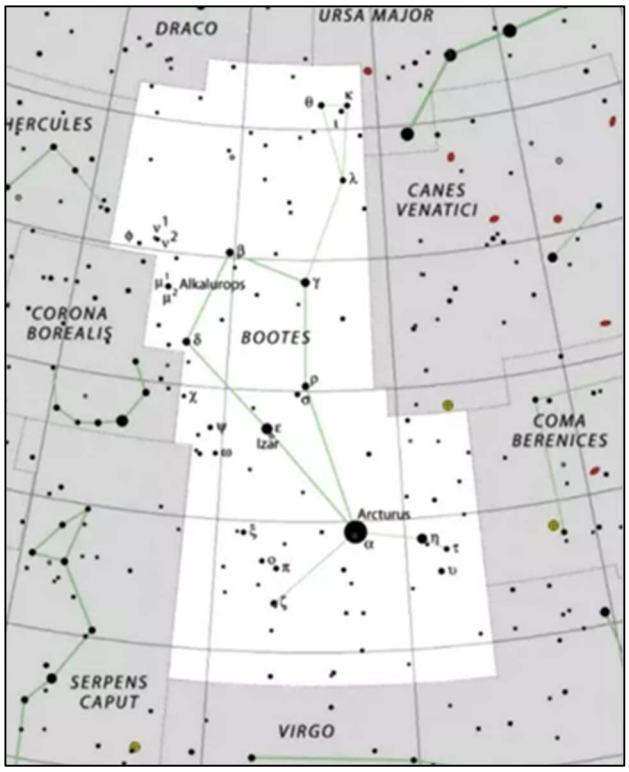
This month's president's note is on the constellation Boötes which is the 13th largest constellation covering an area of 907 square degrees in the sky. Boötes belongs to the Ursa Major family of constellations, along with Camelopardalis, Canes Venatici, Coma Berenices, Corona Borealis, Draco, Leo Minor, Lynx, Ursa Major, and Ursa Minor. The constellation is dominated by the Kite, a diamond-shaped asterism formed by its brightest stars. (In Oregon, instead of a kite we said it looked like an Ice cream cone.).

Boötes was first catalogued by the Greek astronomer Ptolemy in the 2nd century. The constellation's name comes from the Greek word *Βοώτης, Boōtēs,* which means ox driver, plowman, or herdsman. The correct pronunciation is /boʊˈoʊtiːs/, with each 'o' pronounced separately and stress on the second syllable.

Boötes is traditionally depicted as a herdsman with two hunting dogs (Canes Venatici, the Hunting Dogs) on a leash and a club in his other hand. In the sky, Boötes follows Ursa Major around the pole. In one story, the constellation represents a ploughman driving the oxen in the Ursa Major constellation, followed by his two dogs, Asterion and Chara (again represented by the constellation Canes Venatici). The ploughman's oxen are tied to the polar axis and their movement is what keeps the skies in constant rotation

Boötes contains 10 named stars with five of the stars known to have planets. The constellation is home to the contrasting double star Izar, and Arcturus, the brightest star in the northern celestial hemisphere with an apparent magnitude of -0.04. Arcturus is also the third individual brightest star in the sky, after Sirius in Canis Major and Canopus in Carina constellation. The name Arcturus means "guardian of the bear" in Ancient Greek. The star is located at the left foot of the Herdsman, the one standing next to the bear constellations, Ursa Major and Ursa Minor. Arcturus can easily be found if one follows the arc of the three bright stars that form the handle of the Big Dipper asterism in Ursa Major.

Boötes does not contain any Messier objects, however there are three meteor showers associated with the constellation: the January Bootids, the June Bootids, and the Quadrantids.



Another object of note in Boötes is the "Boötes void", also known as the Great Void, which is a sphere-shaped region of the sky, almost 250 million light years in diameter, which contains very few galaxies by comparison to other parts of the sky. The void was originally discovered by Robert P. Kirshner, Harvard College Professor of Astronomy, in 1981, as part of a survey of galactic redshifts. American astronomer Gregory Scott Alderling observed, "If the Milky Way had been in the center of the Boötes void, we wouldn't have known there were other galaxies until the 1960s."

I find learning more about the objects we view in our night sky to be fun. And I hope you enjoy discovering or rediscovering Boötes in our spring night sky (assuming we can get thru this rain/cloud cycle). Happy viewing.

This month's president's note is on a nearby constellation to last month's Camelopardalis. It is much fainter and again of

a more “recent” origin and will take good eyesight and optics to see all it has to offer. Those who have done the Herschel challenge will recognize several of the objects found in the Lynx constellation.

Speaker Bio for April

I have been serious about astronomy for 32 years. I started out with 10x60 binoculars in 1991 and was also doing celestial navigation from land over the southern Chesapeake Bay. I bought my first 4.5 in telescope in 1993. In 1998, I joined the Amateur Astronomers Association of Pittsburg (PA). One of the highlights of my time with them was to help found Laurel Highlands Star Cruise Star Party in 1998. I was eventually given the opportunity to head the Mingo Creek Park Observatory building committee from 2002 until 2005, and was active in the design of the observatory. I was the director of that observatory from 2005 until 2011. I served as president of the AAAP from 2006 until 2010, and from 2016 until 2018. When I retired in 2018, I moved to Hereford, AZ and became a member of the Huachuca Astronomy Club

I did visual observing for many years, but was always interested in astrophotography. This is something you cannot do in Pennsylvania unless you have your own observatory in a dark area. I designed and built my own observatory after retiring in Arizona. I have a 12.5 in Ritchey F 6.75 astrograph, and a Stellarvue SVX130T APO triplet. As an engineer I am interested in many diverse areas of science, both theoretical and practical. I worked as an engineer in a power plant, but got tired of corporate B.S. so started my own photography business doing industrial and commercial photography. After awhile, I took advantage of an opportunity to start a plastics business working with acrylics and then ABS plastic. The company designed shelf management systems for supermarkets and display cases for various purposes. I share seven patents with my business partners in this venture.

In 2001, I saw Measuring the Universe in a bookstore and thought it would be an interesting read. I found the book to be very interesting indeed, and have given a talk on this book's first chapter many years ago back in Pittsburgh. This chapter talks about the Hellenic and Hellenistic Culture (the word "Hellenistic comes from the word Hellazein, which means "to speak Greek or identify with the Greeks") and their contributions to astronomy. I will cover many interesting details including the scientific, political and religious issues that impact the characters in this chapter.

Welcome our new members

John Cassella of Safford AZ joined at the March meeting. John is a returning member and a former officer of the club. Linda and Russell Brown of Sierra Vista joined at the March public night. Also joining in March is Michael Morrison of Hereford. Welcome, we are glad you joined.

April Outreach

April is a busy month for us with lots of opportunities for participating in outreach.

Tuesday April 4 we will host some boys, ages 11-13 from a local church group at the Patterson Observatory. On Saturday April 8 we will set up for “solar Saturday” at Patterson from 9-11 a.m. On Thursday, April 13 we will set up telescopes at the Arizona Art Academy, 9502 S Highway 92, Hereford from 7 to 10 pm. Thursday, April 20 we are at the Farmers Market at Veterans Memorial Park for Earth Day from 10 a.m to 2 p.m. Friday, April 21 we will set up a display as part pf the Cochise College Expo on the Sierra Vista campus from 5:30 to 7:30 p.m. Saturday, April 22 is the Kartchner Star Party at Kartchner Caverns State Park with solar viewing beginning about noon and star gazing after dark. Kevin Hainline of the University of Arizona’s Webb Science team is the guest speaker. Tuesday, April 25 we will do an astronomy night at Faras Elementary in Pirtleville starting at 7 p.m. Thursday, April 27 is our regular monthly public night at the Patterson Observatory. Doors open to our guests at 7:30 p.m. And finally, Saturday April 29 is Astronomy Day and we will set up outside of the Sierra Vista Library from 10 a.m. to about 4 p.m.

That’s nine events. Participate in five of them and you will qualify for the Astronomical League’s Outreach Award!

HAC members are strongly encouraged to attend these events, whether or not you set up any equipment. Outreach is one of the more important things an astronomy club can do to promote science and the preservation of our dark skies. Everyone is welcome. You don’t need to be an expert to do outreach, you simply need your enthusiasm for astronomy.

Observatory Tour

Dr. Grant Williams, the November Huachuca Astronomy Club speaker, an astronomer at Steward Observatory and the director of MMT in Tucson, has graciously offered to give us a guided tour of the observatory on Tuesday, May 9, 2023. Response to this offer was so great from the Board members that it was decided in all fairness that we should hold a random drawing to fill the 15 slots. If you would like to be entered in this drawing, please send an email to "brondum-az@cox.net" with your name and if you would like one or two

slots reserved. The deadline for entries is Thursday, April 6th, 04/06/2023. Names will be drawn at the HAC April meeting on Friday, April 7th.

The Bucket List – April 2023

by Vince Sempronio

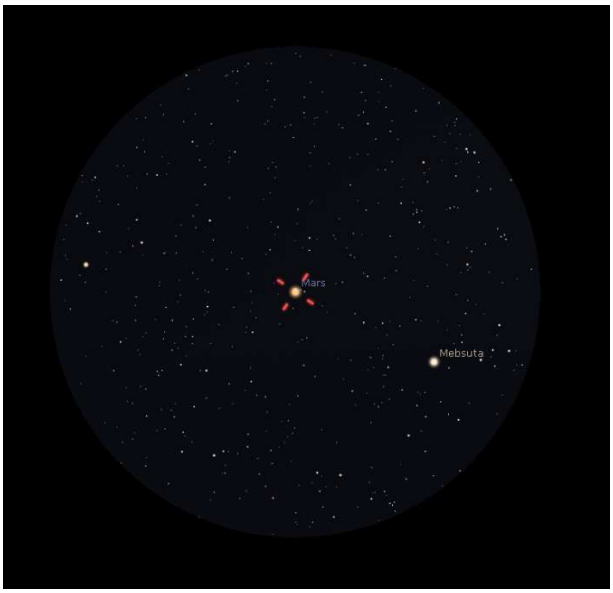
This column highlights interesting non-seasonal nighttime, and sometimes daytime sky events that the reader may not be aware of and may wish to observe. I'll cover one-off events that are special, rare, or uncommon.

TERM OF THE MONTH:

This month's terminology discussion is about nomenclature, specifically sky coordinates. When writing Right Ascension (RA) and Declination (DEC) coordinates, the guidelines are to represent the RA in the form HHh MMm SSs, where HH, MM and SS are numbers. As an example: 12h 05m 55s. 'hms' is used because RA is measure as time, not fractions of an angle. Declination, on the other hand is a measurement of angle, so the nomenclature is (+-)DD° MM' SS", where DD, MM, and SS are numbers. The "°" is the symbol for degrees, but if it is difficult to include it in your editor, use a lower case "d". Always proceed the degrees with either a "+" or "-" sign. Altitude (ALT) and Azimuth (AZ) are measured in d/m/s just like declination, so they are written the same as declination.

SKY EVENTS:

While trying to finish up your taxes, on the evening of Friday, April 14th, Mars has a close encounter with the Star Mebsuta (Epsilon Gemini). They are 14' apart at 8pm. Mars, at magnitude 1.2 outshines Mebsuta at magnitude 3.1. The pair is easily separated with binoculars, or better yet, try to see them both as a naked eye pair. At 8pm, they are 57° altitude in the west. This isn't the first time these two "M" objects have danced. On April 8th, 1976, Mars occulted this star, which allowed scientists to measure the atmosphere of Mars. The star is massive, 19 times that of the Sun. It is 140 times wider and is 8,500 more luminous. If it were our sun, its diameter would reach out to almost Venus. It is about 840 light years away. Both are visible in an 8" SCT with a 30mm Plossl eyepiece.



On April 19th at 8:00pm, the asteroid (1) Ceres passes 8' from the star SAO 99928. Both objects are 7th magnitude and form a rather odd "double star". If you missed the close encounter of Ceres with another star back in February, this time the pair are a lot closer together and nearly the same magnitude. It should be pretty apparent which is which. The pair, at the indicated time are 59° altitude in the eastern sky at RA 12h 05m 55s and DEC +16° 08' 21". The view is centered on the star and is how it might look through an 8" SCT with a 20mm Plossl eyepiece.

TRIVIA QUESTION OF THE MONTH

Earth has the highest mean density of all the planets in the solar system. Which planets are the 2nd and 3rd. Bonus points for knowing which asteroid has the highest mean density.

The question will also appear as a thread on the HAC user group forum and the first person to answer correctly will receive bragging rights, at least for a month! The user group is located here:

https://hacastro.groups.io/g/main

The Northern Mountains

By Rik Hill

Just south of the Montes Caucasus are the very dramatic northern peaks of the Montes Appenninus. At the top of the image is the shadow filled crater Autolycus (41km dia.) and due south of that, in the shadow of the montes is the Apollo 15, Hadley Rille base. Further south is the crater Conon (22km) with Aratus (10km) to the upper right of Conon. To the lower right from Autolycus there's the Rimae Fresnel. Just to the right of them is a shadow filled crater that appears to be sitting on top of a mountain. This is Santos-Dumont (8km) a 2km deep crater with Promontorium Fresnel just to the upper right of it casting a spectacular shadow back towards the Rimae. Below this crater is a double peaked mountain with the brighter peak on the right being Mons Hadley, a grand 4800m high mountain. The reader is encouraged to identify all the peaks and features between Santos-Dumont and Conon using something like LROC Quick Map or Virtual Moon Atlas. It is a very rich area.

The large mare to the right is Mare Serenitatus. Along the south shoreline, at the bottom of this image, you can see more rimae, the Rimae Sulpicius Gallus. Above this are three parallel vertical "wrinkle ridges" or dorsa with Dorsum Von Cotta on the right, Dorsum Owen above and a bit left of it and finally Dorsum Gast on the left near the shore. On the southern end of Dorsum Owen, the shortest of these ridges, is a very strange and unique feature called Vallis Krishna combined with Rima Sung-Mai and on the left end Yoshi. You will need a good steady sky and high magnification for this feature as it is only 3km across and 2km high. I recommend visiting Vallis Krishna on the-moon.us/wiki website first to understand this area. It is well worth the time spent.

Lastly, Dorsum Von Cotta points due north to a white spot that is an ejecta blanket for the small crater Linné in the middle of the ejecta. This is the crater that had been observed in antiquity as ranging from 8 to 10km diameter on different atlases, but was reported missing by J.F.J Schmidt in 1866 at the National Observatory of Athens using the 158mm refractor, then the largest instrument they had. After much controversy and argument (that did include some observations!) it was been proven to be a 3km diameter crater, which is difficult to see from Earth again requiring a good steady sky and high magnifications. Go and see for yourself, it's a delightful challenge!

This image was made from parts of two 1800 frame AVIs, stacked with AVIStack2 (IDL), assembled with Microsoft ICE and further processed with GIMP and IrfanView.

NASA Night Sky Notes April 2023

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!

Solar Eclipses Are Coming!

David Prosper

Have you ever witnessed a total solar eclipse? What about an annular solar eclipse? If not, then you are in luck if you live in North America: the next twelve months will see two solar eclipses darken the skies for observers in the continental United States, Mexico, and Canada!

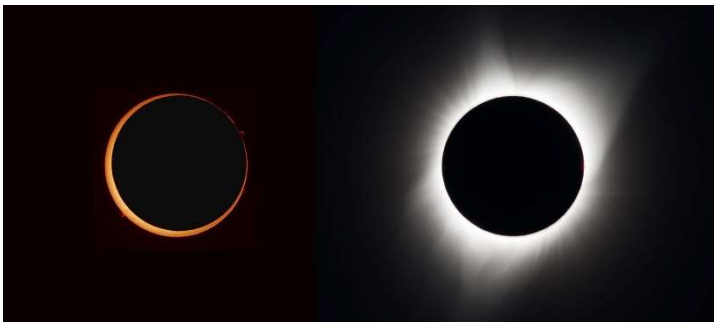
Solar eclipse fans get a chance to witness an annular eclipse this fall. On Saturday, October 14, 2023, the Moon will move exactly in front of the Sun from the point of view of observers along a narrow strip of land stretching across the United States from Oregon to Texas and continuing on to Central and South America. Since the Moon will be at its furthest point in its orbit from Earth at that time (known as apogee), it won't completely block the Sun; instead, a dramatic "ring" effect will be seen as the bright edge of the Sun will be visible around the black silhouette of the Moon. The distinct appearance of this style of eclipse is why it's called an annular eclipse, as annular means ring-like. If you are standing under a tree or behind a screen you will see thousands of ring-like shadows projected everywhere during maximum eclipse, and the light may take on a wan note, but it won't actually get dark outside; it will be similar to the brightness of a cloudy day. This eclipse must only be observed with properly certified eclipse glasses, or other safe observation methods like pinhole projection or shielded solar telescopes. Even during the peak of the eclipse, the tiny bit of the Sun seen via the "ring" can damage your retinas and even blind you.

Just six months later, a dramatic total solar eclipse will darken the skies from Mexico to northeast Canada, casting its shadow across the USA in a strip approximately 124 miles (200 km) wide, on Monday, April 8, 2024. While protection must be worn to safely observe most of this eclipse, it's not

needed to witness totality itself, the brief amount of time when the Moon blocks the entire surface of the Sun from view. And if you try to view totality through your eclipse viewer, you won't actually be able to see anything! The Moon's shadow will dramatically darken the skies into something resembling early evening, confusing animals and delighting human observers. You will even be able to see bright stars and planets - provided you are able to take your eyes off the majesty of the total eclipse! While the darkness and accompanying chilly breeze will be a thrill, the most spectacular observation of all will be the Sun's magnificent corona! Totality is the only time you can observe the corona, which is actually the beautiful outer fringes of the Sun's atmosphere. For observers in the middle of the path, they will get to experience the deepest portion of the eclipse, which will last over four minutes - twice as long as 2017's total solar eclipse over North America.

While some folks may be lucky enough to witness both eclipses in full – especially the residents of San Antonio, Texas, whose city lies at the crossroads of both paths – everyone off the paths of maximum eclipse can still catch sight of beautiful partial eclipses if the skies are clear. The Eclipse Ambassadors program is recruiting volunteers across the USA to prepare communities off the central paths in advance of this amazing cosmic ballet. Find more information and apply to share the excitement at eclipseambassadors.org. NASA has published a fantastic Solar Eclipse Safety Guide which can help you plan your viewing at bit.ly/nasaeclipsesafety. And you can find a large collection of solar eclipse resources, activities, visualizations, photos, and more from NASA at solarsystem.nasa.gov/eclipses

This detailed solar eclipse map shows the paths of where and when the Moon's shadow will cross the USA for the upcoming 2023 annular solar eclipse and 2024 total solar eclipse, made using data compiled from multiple NASA missions. Where will you be? This map is very detailed, so if you would like to download a larger copy of the image, you can do so and find out more about its features at: https://svs.gsfc.nasa.gov/5073 Credits: NASA/Scientific Visualization Studio/Michala Garrison; eclipse calculations by Ernie Wright, NASA Goddard Space Flight Center



Photos of an annular total solar eclipse (left) and a total solar eclipse (right). Note that the annular eclipse is shown with a dark background, as it is only safe to view with protection – you can see how a small portion of the Sun is still visible as the ring around the Moon. On the right, you can see the Sun's wispy corona, visible only during totality itself, when the Moon completely – or totally - hides the Sun from view. A total solar eclipse is only safe to view without protection during totality itself; it is absolutely necessary to protect your eyes throughout the rest of the eclipse! Credits: Left, Annular Eclipse: Stefan Seip (Oct 3, 2005). Right, Total Eclipse, NASA/Aubrey Gemignani (August 21, 2017)

It Would Seem It Should Be The Same

By Karen Madtes

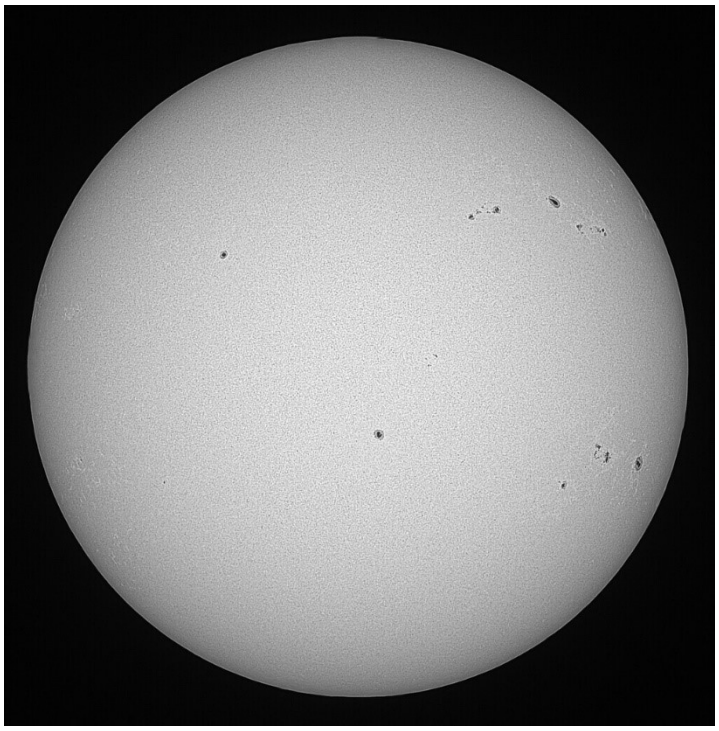
It Would Seem It Should Be The Same

Night and day, day and night,
Right to left and left to right.
I name the groups, one by one
Confident and having fun
But wait.....

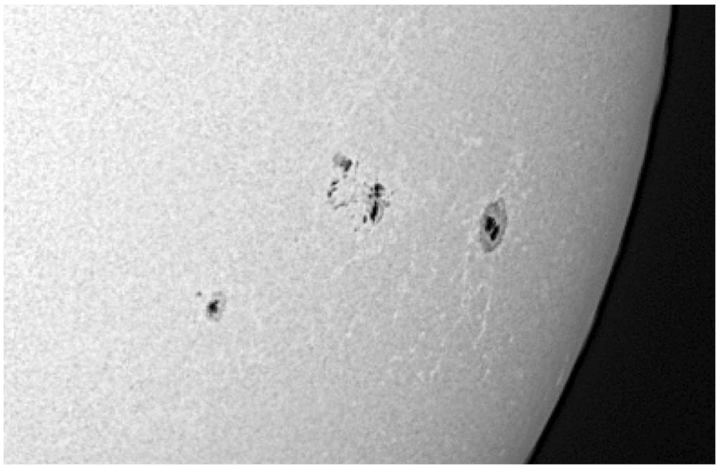
When I reverse, there seems one more
How can it be that I didn't see it before?
It had to be there, left to right
Surely it was in plain sight

But going in reverse to verify,
I spy with my little eye
Some "extra" stars that I can't name
I guess they really AREN'T the same!!

Pictures from HAC Astro

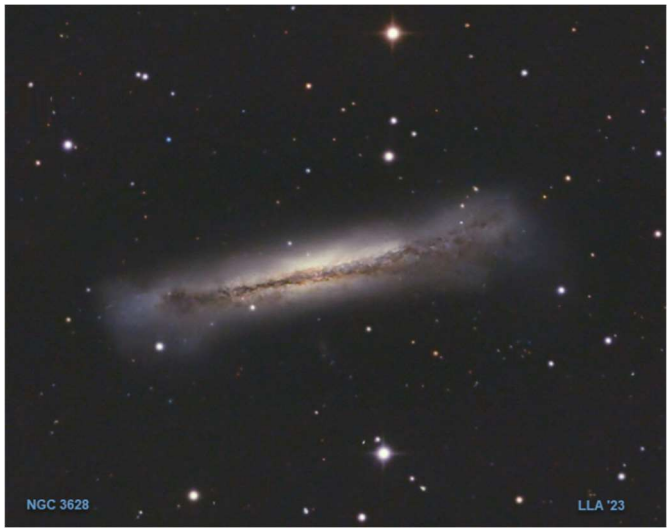


Sunspots by Richard Lighthill



Sunspots Detail by Richard Lighthill

M96 by Leonard Amburgey



NGC 3328 by Leonard Amburgey

M51 by Leonard Amburgey

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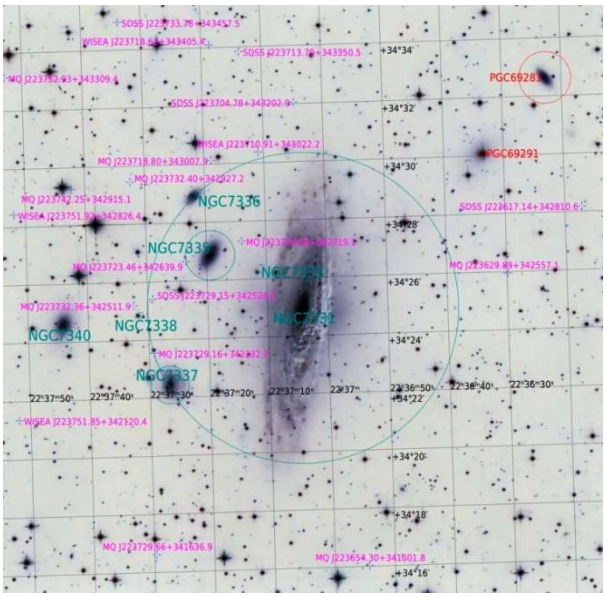
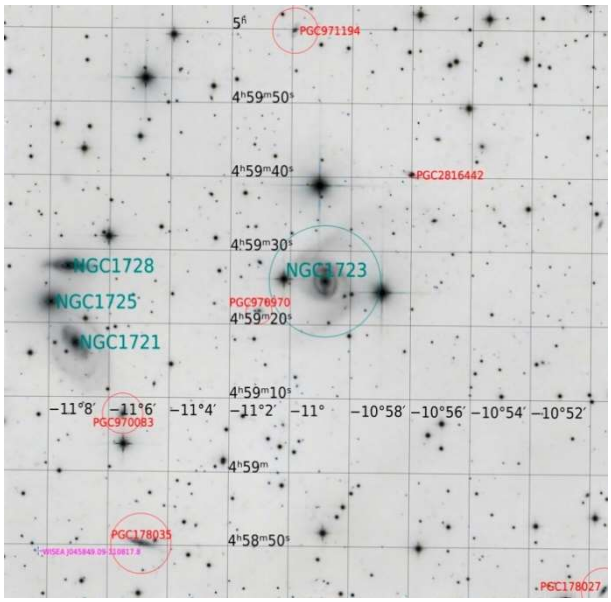
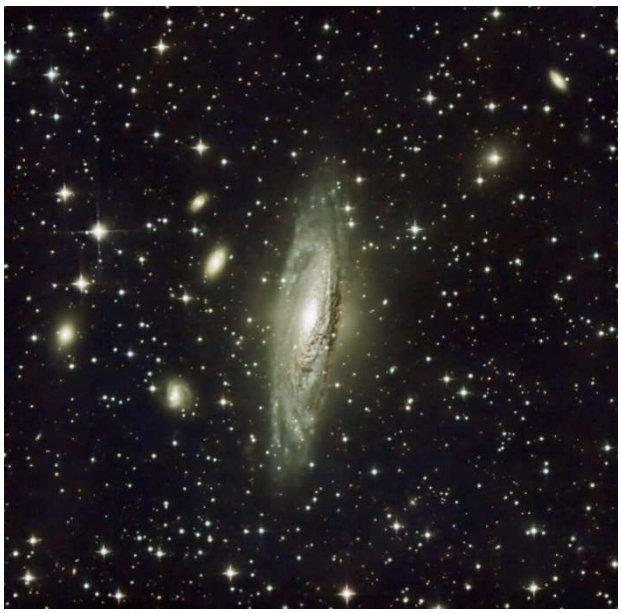


NGC 7331 and Friends Annotated by Glen Sanner



Galaxy group in Eridanus incl. NCG 1721, 1725, 1728 and 1723 Annotated by Glen Sanner



NGC 7331 and Friends by Glen Sanner

Galaxy group in Eridanus incl. NCG 1721, 1725, 1728 and 1723 by Glen Sanner

HAC Apr-May 2023 Calendar of Events

SU	MO	TU	WE	TH	FR	SA
2 Apr	**3**	**4** Youth Grp at patterson 7:30pm	**5** 10:35PM	**6**	**7** **HAC Meeting Room A102 7PM**	**8** Solar Saturday 9-11AM Patterson
9	**10**	**11**	**12**	**13** 3:11AM AZ Art Academy Hereford 7-10p	**14**	**15** Member Star party at Grue's Blue Marvel Obs
16	**17**	**18**	**19** 10:13PM	**20** Earth Day Vet Park 10a-2p	**21** Cochise College Expo 5:30-7:30p	**22** Kartchner Star Party noon-9p Lyrid meteors
23 Lyrid meteors	**24**	**25** Faras Elementary Pirtleville 7PM	**26**	**27** 3:20PM Patterson Public Night 7:30 PM	**28**	**29** Astronomy Day Sierra Vista Library 10a -4p
30	**1 May**	**2**	**3**	**4**	**5** 10:34AM **HAC Meeting Room A102 7PM** Eta Aquarids	**6** Eta Aquarid meteors
7 Eta Aquarid meteors	**8**	**9** MMT Tour Mt Hopkins	**10**	**11**	**12** 7:28 AM	**13** Solar Saturday
14 	**15**	**16**	**17** Jupiter/Moon 0.8° Merc/Moon 4°	**18**	**19** 8:53 AM	**20**
21	**22**	**23** Venus/Moon 2°	**24** Mars/Moon 4°	**25** Patterson Public Night 8:00 PM	**26**	**27**
28	**29** 	**30**	**31**	**1 June**	**2**	

All times local MST
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