Nightfall

A Publication of the Huachuca Astronomy Club

October, 2025

Club Meeting Speaker

The speaker for the October 2025 HAC meeting is Vince Sempronio. The topic of his talk is "Occultations (Observations to Science). He will discuss the steps required to predict, plan, observe, process, and publish data from occultation events. He will use, as an example, a personal event that led to the discovery of a satellite of an asteroid.

Vince's interest in astronomy began in elementary school, during the height of the manned space program. In high school, he purchased his first telescope, a 60mm refractor which he used to take advantage of the dark Bortle 2.0 skies of northern California. While in college, his career path changed from astronomy to computer science, but he still retained his interest in astronomy as an amateur. While in the Air Force and stationed in the Washington DC area, he joined the local astronomy clubs and participated in their public outreach programs. It was during this time he began his interest in observing occultations, though back then the events involved the Moon. During his professional career, he taught astronomy as part of the Continuing Adult Education program at a local community college.

Vince retired from a long career as a software engineer and moved to Arizona in late 2020. Upon moving to Arizona, he joined HAC and resumed participation in public outreach. His specific interest in astronomy is citizen science, of which he is an active participant in observing stellar asteroid occultations. To his credit, using occultation observations, he has discovered a moon of an asteroid and two double stars.

Vince currently is a member at large on the HAC Board of directors and is also the HAC Nightfall newsletter's editor.

Dinner with the speaker is at 5pm on the 3rd of October at the Indochine Restaurant located at 1299 E Fry Blvd. in Sierra Vista.

The October HAC club meeting is at 7pm at the Cochise College Downtown Center at 2600 E Wilcox Drive, Sierra Vista, in Room A102.

"Two possibilities exist: either we are alone in the Universe, or we are not. Both are equally terrifying."

--- Arthur C. Clarke

2026 Dues

It's never too early to pay your dues for next year. Most HAC memberships come due in December (but there is no December meeting). The treasurer will be collecting dues at the October and November meetings. Annual dues are $25 regular and $35 family. Active duty military pay $20 and $25. Full time students :$10. Make checks payable to Huachuca Astronomy Club (not "HAC"). Correct change for those paying cash is greatly appreciated. If you are unsure of your dues status, please contact the treasurer at tedforte511@gmail.com. You can pay your dues on line at : https://www.hacastronomy.org/membership/renew/

Welcome Our New Member

Lori Baron of Huachuca City joined in September. Welcome, we are glad you joined.

2026 HAC Schedule

The HAC board of directors has approved the following meeting dates for 2026.

January 2, February 6, March 6, April 3, May 1, June 5, July 10, August 28, September 25, October 23 and November 20. We will forgo a December meeting and schedule a holiday party at a later date.

HAC meetings are held on Fridays at 7pm in Room A102 of the Cochise College Downtown Campus, 2600 E Wilcox Drive, Sierra Vista (subject to availability).

Patterson Observatory public nights will be offered (weather permitting) on January 22: 6:00pm, February 26: 6:30pm, March 26: 7:00pm, April 16: 7:30pm, May 21: 7:30pm, June 18: 8:00pm, September 17: 6:30pm, October 15: 6:00pm, November 19: 6:00pm and December 17: 6:00pm.

Public nights are generally held on Thursdays close to the first quarter moon. The public is requested to register for these events at www.usfaz.org/patterson-observtory. HAC members are always welcome and do not need to register.

We will continue our monthly "Solar Saturday" events at the Sierra Vista library on the second Saturday of each month, from 10am until noon.

Kartchner star party dates for 2026 are April 18 and October 10. The 2026 Dine Under the Stars is scheduled for October 3.

The Kartchner Star Party

The fall Kartchner Star Party will be held on Saturday, October 18th, at Kartchner Caverns State Park in Benson (2980 S Hwy 90). We set up in the bus parking lot adjacent to the Discovery Center in the park. Astronomers with telescopes coming for the party are entitled to free admission to the park.

Weather permitting, we will set up solar telescopes starting around noon. At 5:00pm. there will be a talk at the Discovery Center theater. There will be stargazing after dark, weather permitting. Volunteers wishing to bring telescopes can come anytime. You can do the daytime session and /or the evening session as you wish. I encourage all members to attend the talk which will proceed, rain or shine.

Our speaker is Dr. Vinicius (Vini) Placco. Associate Astronomer NSF NOIRLab. Vini earned his BSc in Physics, MSc and PhD in Astrohysics from Universidade de São Paulo (Brazil). He was a Postdoctoral Fellow at Universidade de São Paulo (Brazil) and NOAO (Arizona, USA) and a Science Fellow at the Gemini Observatory (Hawaii, USA) and then a Research Assistant Professor at the University of Notre Dame (Indiana, USA). He is currently Associate Astronomer and Head of the US National Gemini Office at NSF NOIRLab (Arizona, USA).

His talk is titled: A tale of two stars: Revealing the Chemical Evolution and Age of the Universe

Abstract: The chemical elements we see today in the Sun, the Earth, and our bodies are the result of the complex evolution of many generations of stars across the universe, starting with the very first stars that formed over 13 billion years ago. By comparing the chemical fingerprints found in old stars in the Milky Way with theoretical predictions, we can construct a compelling narrative about how the Universe evolved from having only hydrogen and helium to the chemical diversity we observe today. In this presentation, I will introduce two stars, BD+44 493 and RAVE J203843.2-002333, and show how these unique objects provide us with two pieces in this intricate puzzle that is the evolution of our Galaxy and the universe.

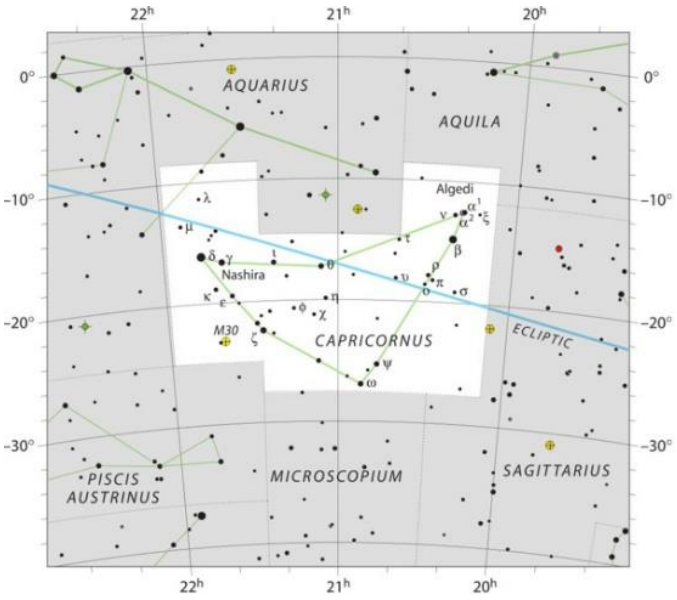
The daytime activity at the Kartchner Star party is usually pretty sparce with only a trickle of guests finding their way to our scopes. But as you probably will agree, this smaller interaction allows for a greater ability to connect with viewers and is usually quite fun and rewarding.

The evening event is often quite well attended with up to a hundred or more guests waiting in line at the scopes as the twilight fades. The event officially is over at 9pm and most of the guests will have departed by then. It's new moon. Moon set is at 4pm. Sunset is at 5:51pm, and twilight ends 7:06pm. Just after sunset, Mars and Mercury will be visible together in the southwest sky. Saturn is prominent in the southeast sky along with Neptune.

President's Constellation Exploration – Capricornus

by Penny Brondum

Capricornus is one of the constellations of the zodiac. Its name is Latin for "horned goat" or "goat horn" or "having horns like a goat's", and it is commonly represented in the form of a sea goat: a mythical creature that is half goat, half fish.



Capricornus is one of the 88 modern constellations and was also one of the 48 constellations listed by the 2nd century astronomer Claudius Ptolemy. It is bordered by Aquila, Sagittarius, Microscopium, Piscis Austrinus, and Aquarius. The constellation is in an area of sky called the Sea or the Water, consisting of many water-related constellations such as Aquarius, Piscis Austrinus, Eridanus, Cetus, Delphinus, and Hydra.

Capricornus is the 40th biggest constellation in the sky, occupying an area of 414 square degrees. It lies in the fourth quadrant of the southern hemisphere (SQ4) and can be seen at latitudes between +60° and -90°. Look for the constellation Capricornus in the early evening in August, September and October. If you are familiar with the Summer Triangle, a large and prominent asterism, draw an imaginary line from the star Vega and through

Altair to find this arrowhead-shaped constellation low in the southern sky

Capricornus is the smallest constellation in the zodiac. It contains only one Messier object, M30. Like other zodiac constellations, Capricornus was first catalogued by the Greek astronomer Claudius Ptolemy in his Almagest in the 2nd century CE. In Greek mythology, the constellation is associated with Pan, the god of the wild, and with the goat Amalthea, who suckled Zeus when he was very young.

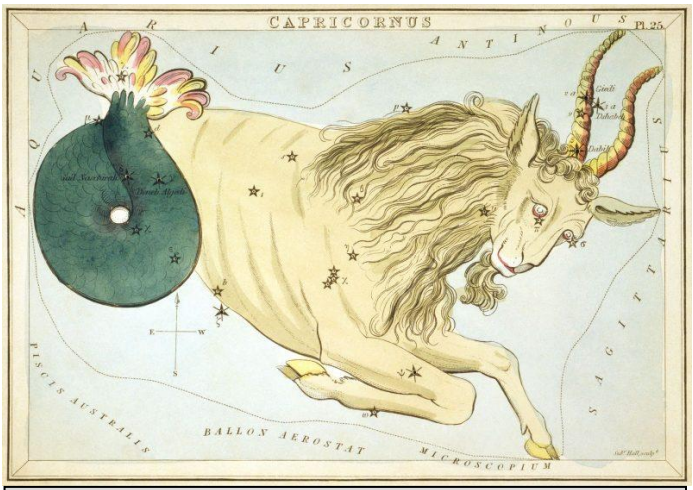
The Capricornus constellation was first attested in depictions on a cylinder-seal from around the 21st century BCE, it was explicitly recorded in the Babylonian star catalogues before 1000 BCE. In the Early Bronze Age the winter solstice occurred in the constellation, but due to the precession of the equinoxes, the December solstice now takes place in the constellation Sagittarius. The Sun is in the constellation Capricornus (as distinct from the astrological sign) from late January through mid-February.

Although the solstice during the northern hemisphere's winter no longer takes place while the sun is in the constellation Capricornus, as it did until 130 BCE, the astrological sign called Capricornus is used when referring to the constellation, while Capricorn is used in conjunction with the sign of the Zodiac. Capricorn is still used to denote the position of the solstice, and the latitude of the sun's most southerly position continues to be called the Tropic of Capricorn, a term which also applies to the line on the Earth at which the sun is directly overhead at local noon on the day of the December solstice.

There are five meteor showers associated with Capricornus: the Alpha Capricornids (mid-July to mid-Sept), the Chi Capricornids (late Jan to late Feb) , the Sigma Capricornids (mid-Jun to late July), the Tau Capricornids (mid Jun to Late July), and the Capricorniden-Sagittarids (beg. Feb but is but is a daytime shower, so unless you own a radar set you won't be watching this one).

Despite its faintness, the constellation Capricornus has one of the oldest mythological associations, having been consistently represented as a hybrid of a goat and a fish since the Middle Bronze Age, when the Babylonians used SUḪUR.MAŠ "The Goat-Fish" as a symbol of their god Ea.

In Greek mythology, the constellation is sometimes identified as Amalthea, the goat that suckled the infant Zeus after his mother, Rhea, saved him from being devoured by his father, Cronos. Amalthea's broken horn was transformed into the cornucopia or "horn of plenty". Capricornus is also sometimes identified as Pan, the god with a goat's horns and legs. Pan was placed in the sky by Zeus in gratitude for his coming to the other gods' rescue on several occasions. In the myth, Pan eludes the monster Typhon by jumping into the river Nile and intending to turn his body into that of a fish. However, Pan was so scared that he goofed up, changing himself into a half-goat, half-fish hodgepodge instead of a fish. In other words, Pan pan-icked. Thus, by one interpretation, the word panic originated from the god Pan's misadventure with Typhon. Zeus eventually struck down Typhon with his thunderbolts. In reference to the myth, Capricornus is still often depicted as a goat with the tail of a fish.



Antique drawing of Capricornus. Image via Urania's Mirror
Adam Cuerden/ Wikipedia (public domain)

In another story, Capricornus is identified as Amalthea, the goat that suckled Zeus when he was an infant, hiding from his father Cronos. Cronos had devoured his other children, all future gods and goddesses, because of a prophecy that said that he would be overthrown by one of them.

Capricornus is a faint constellation, with only one star above magnitude 3; its alpha star has a magnitude of only 3.6. The brightest star in Capricornus is Deneb Algedi, with a magnitude of 2.9, located 39 light-years from Earth. Like several other stars such as Denebola and Deneb, it is named for the Arabic word for "tail or end" (deneb) and "young goat / kid" (al-gedi); its traditional name means "tail to head" or "back to the beginning", which could be related to the Ouroboros or Janus since the zodiac relates to January. Deneb Algedi is a four-star system with an eclipse that can be seen with the naked eye.

"The star is a fascinating, confusing wonder, and astronomers seem unsure of just how to classify it," said retired astronomer Jim Kaler on his website. "Its greatest claim to distinction is that it is among the brightest of the "metallic A stars," those hotter stars that seem to be highly enriched in most metals yet have deficiencies in others like calcium."

Capricornus has five stars with known planets. The constellation is home to three stars located within 10 parsecs (32.62 light years) of the Sun. It also contains several galaxies, star clusters, and Messier 30 a globular cluster located 1 degree south of the galaxy group that contains NGC 7103. Another interesting target is the wide spiral galaxy NGC 6907.

Messier 30 (NGC7099) imaged by the Hubble Space Telescope

Messier 30 (NGC 7099) is a centrally-condensed globular cluster at a distance of 30,000 light-years, it has chains of stars extending to the north that are resolvable in small telescopes. The cluster is approaching us at the speed of 181.9 km/s. It was one of the first deep sky objects discovered by Charles Messier, who described it as a circular nebula without a star in 1764. Its estimated age is 12.93 billion years. Like many other globular clusters in the Milky Way Galaxy, M30 has undergone a core collapse. Its core is now only 0.12 arc minutes in size, and half of the cluster's mass is contained in a spherical radius that is 17.4 light years across.

One galaxy group located in Capricornus is HCG 87, a group of at least three galaxies located 400 million light-years from Earth. It contains a large elliptical galaxy, a face-on spiral galaxy, and an edge-on spiral galaxy. The face-on spiral galaxy is experiencing abnormally high rates of star formation, indicating that it is interacting with one or both other members of the group. Furthermore, the large elliptical galaxy and the edge-on spiral galaxy, both of which have active nuclei, are connected by a stream of stars and dust, indicating that they too are interacting. Astronomers predict that the three galaxies will merge millions of years in the future to form one giant elliptical galaxy.

The fun thing about writing these Constellation explorations is being reminded of the stories portrayed in our skies and the interest they still maintain in our lives. So don't get "panicked" if the clouds get in the way during the tail ends of the post monsoon clouds, because Capricornus will be around for several months to make your own discoveries of this ancient constellation.

October Birthdays

Neil deGrasse Tyson, October 5th, 1958
Riccardo Giacconi, October 6th, 1931
Donald Machholz, October 7th, 1952
Thomas Bopp, October 15th, 1949
Subrahmanyan Chandrasekhar, October 19th, 1910
Karl Guthe Jansky, October 22nd, 1905

NASA Night Sky Notes

This article is distributed by NASA's Night Sky Network (NSN)

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!

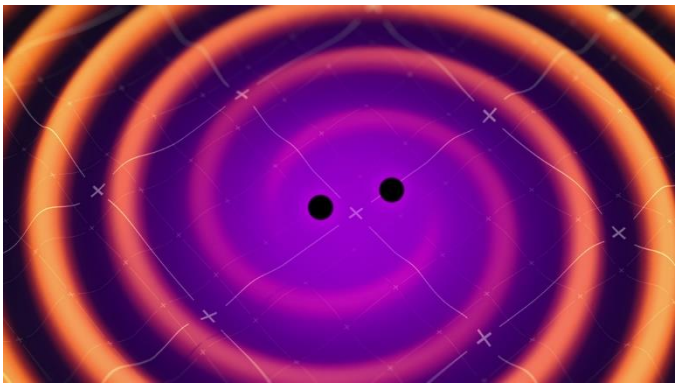
Let's Go, LIGO

By Kat Troche

September 2025 marks ten years since the first direct detection of gravitational waves as predicted by Albert Einstein's 1916 theory of General Relativity. The Laser Interferometer Gravitational-Wave Observatory (LIGO) first directly detected these invisible ripples in space. Traveling at the speed of light (~186,000 miles per second), these waves stretch and squeeze the fabric of space itself, changing the distance between objects as they pass.

Waves In Space

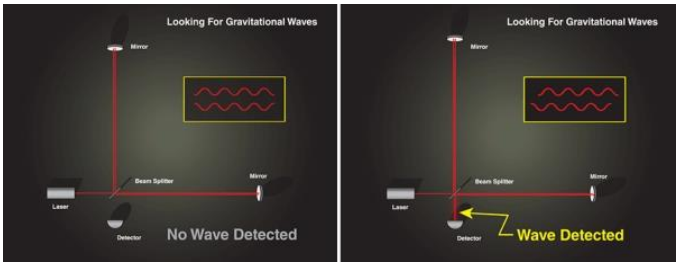
Gravitational waves are created when massive objects accelerate in space, especially in violent events. LIGO detected the first gravitational waves when two black holes, orbiting one another, finally merged, creating ripples in space-time. But these waves are not exclusive to black holes. If a star were to go supernova, it could produce the same effect. Neutron stars can also create these waves for various reasons. While these waves are invisible to the human eye, this animation from NASA's Science Visualization Studio shows the merger of two black holes and the waves they create in the process.



How It Works

A gravitational wave observatory, like LIGO, is built with two tunnels, each approximately 2.5 miles long, arranged in an "L" shape. At the end of each tunnel, a highly polished 40 kg mirror (about 16 inches across) is mounted; this will reflect the laser beam that is sent from the observatory. A laser beam is sent from the observatory room and split into two, with equal parts traveling down each tunnel, bouncing off the mirrors at the end. When the

beams return, they are recombined. If the arm lengths are perfectly equal, the light waves cancel out in just the right way, producing darkness at the detector. But if a gravitational wave passes, it slightly stretches one arm while squeezing the other, so the returning beams no longer cancel perfectly, creating a flicker of light that reveals the wave's presence.



The actual detection happens at the point of recombination, when even a minuscule stretching of one arm and squeezing of the other changes how long it takes the laser beams to return. This difference produces a measurable shift in the interference pattern. To be certain that the signal is real and not local noise, both LIGO observatories — one in Washington State (LIGO Hanford) and the other in Louisiana (LIGO Livingston) — must record the same pattern within milliseconds. When they do, it's confirmation of a gravitational wave rippling through Earth. We don't feel these waves as they pass through our planet, but we now have a method of detecting them!

Get Involved

With the help of two additional gravitational-wave observatories, VIRGO and KAGRA, there have been 300 black hole mergers detected in the past decade; some of which are confirmed, while others await further study.

While the average person may not have a laser interferometer lying around in the backyard, you can help with two projects geared toward detecting gravitational waves and the black holes that contribute to them:

- **Black Hole Hunters:** Using data from the TESS satellite, you would study graphs of how the brightness of stars changes over time, looking for an effect called gravitational microlensing. This lensing effect can indicate that a massive object has passed in front of a star, such as a black hole.
- **Gravity Spy:** You can help LIGO scientists with their gravitational wave research by looking for glitches that may mimic gravitational waves. By sorting out the mimics, we can train algorithms on how to detect the real thing.

You can also use gelatin, magnetic marbles, and a small mirror for a more hands-on demonstration on how gravitational waves move through space-time with JPL's Dropping In With Gravitational Waves activity!

For Sale

Eric Allen, a former member of HAC, currently living in Benson has two large Dobsonian telescopes for sale. For further information, He can be reached at 520-720-6177 (land line). Photos of the scopes can be seen here. The price of each scope has been recently reduced.

- 17.5" f/4.5 big box Dob for sale. Has 1/13 wave PVW custom refigured Coulter primary with 9-pt. aluminum flotation designed with PLOP software. Tube assy. breaks down into 3 sections. Tube assy. can be locked to rocker so scope can be rolled as a unit on wheels attached to rocker. Has 3.75" f/6.5 reflector finder. Has custom made cover. Not used recently but in good shape. Undriven. Can be Ronchi tested with tester or on a star, weather permitting. In Benson. Asking $4000.
- 24" f/4 homemade big box/Truss Dob for sale. 24" f/4. Custom primary 1/20 wave PVW. Aluminum18-point flotation designed with PLOP software. Undriven. Custom made scissor-jack style focuser. Tube assy. breaks down into four sections. The tube assy. can be locked to rocker so scope can be moved as a unit on wheels attached to the rocker. Will fit (barely) in my Toyota Tacoma with camper shell. Comes with loading ramps. Not used for several years and mount has suffered some water damage to ¼" oak plywood. Optics are in good shape. Can be Ronchi tested with Ronchi tester or on star, weather permitting. Asking $6000

About the Cover

This month's cover image is provided by Zane Landers.

Image Details

IC 342 - Sensor is an IMX585 I believe. 50mm f/5 scope (Vespera II). 20s subs with broadband filter from my house, total exposure time 19h 45min. You just tell Vespera what you want to image (in my case I had to create a "custom" target to change exposure from the default 10 to 20 seconds) and it stacks a TIF for you that you can export. I stacked several TIFs over a few nights to do this. All processing done in Siril with Graxpert.

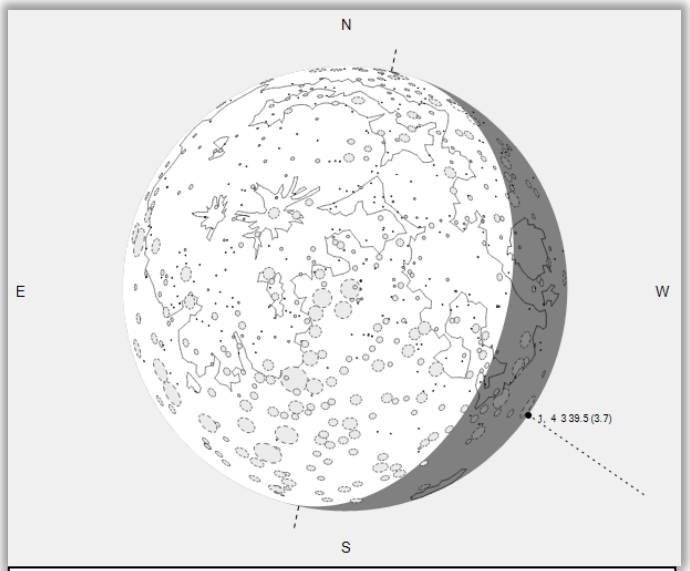
AI Summary

IC 342, also known as Caldwell 5, is an intermediate spiral galaxy located in the constellation Camelopardalis, situated relatively close to the Milky Way. Despite its significant size and intrinsic brightness, its visibility is hindered by dense interstellar dust and gas along the galactic equator, earning it the nickname "The Hidden Galaxy". If not obscured, it would be visible to the naked eye. The galaxy was discovered by William Frederick Denning in 1892, although Edward Emerson Barnard had noted it earlier in 1890 without publishing his discovery.

IC 342 is classified as a starburst galaxy with a morphological type of SAB(rs)cd or SA(s)cd, indicating a spiral galaxy with a weak bar structure, an incomplete ring, and moderately wound spiral arms. It has an H II nucleus and is part of the IC 342/Maffei Group, one of the closest galaxy groups to the Local Group. The group is located approximately 10.7 million light-years (3.3 million parsecs) from Earth, with estimates ranging from about 7 to 11 million light-years. The galaxy is estimated to contain around 100 billion stars and spans roughly 150,000 light-years in diameter.

The Bucket List
by Vince Sempronio

On the evening of October 9th, the moon, the waning gibbous Moon passes through the Pleiades (M45) cluster in Taurus. Some of the Seven Sisters will disappear behind the bright eastern limb of the Moon, making the events difficult to observe. One sister, Electra though, will reappear on the western dark limb at 7:03pm (local time). The map shows the position of the reappearance.



The Moon as shown at 7:03pm on the evening of October 9, 2025. The dot shows the location of where the star Electra (mag 3.7) will reappear from behind the moon. Credit: Occult software

Trivia Question

As the Sun travels along the ecliptic, it passes through many (13) constellations, but unlike astrology would have you believe, the Sun does not spend equal time in each constellation. The Sun spends the most time (45 days) in Virgo. In which constellation does the Sun spend only 7 days, the least amount of time? The cryptic answer appears at the end of the newsletter.

Editor's Corner
Regarding the Calendar and Times

Our Newsletter contains a calendar of events found on the last page of each issue. Although there is not a byline, our club Treasurer, Ted Forte, maintains it. Your editor may add additional content and formats it for space and style. The calendar contains the club schedule along with astronomical events. Hint: Print a copy and put it on your refrigerator so you will not miss an event.

Formating Time

I received feedback regarding the "correct" use of abbreviations for representing time in the morning and afternoon. While researching the matter, I discovered there are four acceptable styles. They are (for morning), 'AM', 'A.M.', 'am', and 'a.m.' with the same format applying to afternoon times. The most used styles are 'AM' or 'a.m.'. The newsletter does not adhere to a specific style guide, but as the editor, I strive to be consistent. The editorial choices are to be terse (favors AM or am) and readability. The dotted form; 'a.m'. wastes space (the periods) and looks confusing. Capitalized letters appear too much like acronyms, which are abundant in scientific circles, so therefore, the newsletter standard will be to show a time as a numeric time (7 or 7:00, for example) followed by 'am' or 'pm' without a space character between the two. Examples are 7pm or 9:30am. I hope this makes the decision clear.

Club Officers & Contacts

President: *Penny Brondum* ***Vice President:*** *Mark Orvek*
Secretary: *Del Gordon* ***Treasurer:*** *Ted Forte*
Past President: *David Roemer*

Board Members-at-Large
Gary Grue, Richard Lighthill, Mike Morrison, Vince Sempronio

Nightfall Editor: *Vince Sempronio* *nightfall@hacastronomy.org*
Webmaster: *Ken Kirchner*
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Facebook: *http://www.facebook.com/HuachucaAstronomyClub*
Email: *info@hacastronomy.org*

Club Meetings: Monthly at 7pm at the Cochise College Downtown Center at 2600 E Wilcox Drive, Sierra Vista, AZ in Room A102. Refer to the calendar for specific dates.

HAC Calendar of Events (October & November 2025)

SU	MO	TU	WE	TH	FR	SA
Sep 28	**29** **4:54pm**	**30**	**Oct 1**	**2**	**3** HAC Meeting (1) 7pm	4
5	**6** **8:48pm**	**7** Draconids Meteor Shower	**8**	**9**	**10**	**11** Solar Saturday SV Library 10am to 12pm
12	**13** **11:13am** **Columbus Day**	**14**	**15**	**16**	**17**	**18** Kartchner Star Party Kartchner State Park Noon to 9pm
19	**20**	**21** **5:25am** Orionids Meteor Shower	**22** Orionids Meteor Shower	**23**	**24** Conscious Child Family at Patterson 6pm	**25**
26	**27**	**28**	**29** **9:21am** Mercury at Greatest Eastern Elongation	**30** Patterson Obs. Public Night 6pm	**31**	**Nov 1**
2 **Daylight Savings Time Ends**	**3**	**4** Taurids Meteor Shower	**5** **6:19am** Taurids Meteor Shower	**6**	**7** HAC Meeting (1) 7pm	**8** Solar Saturday SV Library 10am to 12pm
9	**10**	**11** **10:28am** **Veteran's Day**	**12**	**13** Patterson Obs. Public Night 6pm	**14**	15
16 Leonid Meteors	**17** Leonid Meteors	**18** Leonid Meteors	**19** **11:47pm**	**20**	**21** Uranus at Opposition	

All dates and times are local MST
Astronomy events listed are those visible in the Southwestern, USA

(1) HAC meeting location: Cochise College Downtown Center at 2600 E Wilcox Drive, Sierra Vista, AZ in Room A102

Trivia question answer:19-3-15-18-9-16-21-19

Join the HAC Astro forum to keep up to date with all the Huachuca Astronomy Club events
To join, send an email to: HACAstro+subscribe@groups.io