NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

NOVEMBER 2022

PRESIDENT'S NOTES:

It does not seem possible that 2022 HAC year is almost over. This month you will be electing the new officers (see candidates below) to serve. This year had been filled with rocky starts and spurts and then a wild ride as we recovered from 2 years of no in-person meetings or public outreach to a full-blown program for each.

First, I want to thank the HAC board (those elected and those "dragooned") for their outstanding service to HAC in 2022. This year could not have happened without your commitment and involvement. Karen Madtes (VP/Programs), Ted Forte (Treasurer, Outreach Coordinator, NASA Ambassador, etc.), Dwight Hoxie (Past Pres.) Members at large: Gary Grue, Ken Kirchner, Howard Day, Mark Orvek, and Vince Sempronio plus Cynthia Shomenta the Nightfall Editor. Without their help and support to making this year outstanding this organization could not have functioned so well to meet the needs of its members and the community.

Second, I want to thank you, the members, for supporting our many events, our monthly meetings, our outreach. Many clubs struggled to get people to attend and to reengage when everything opened back up this spring. HAC on the other hand had great attendance and continues to grow in its membership.

Some of the highlights for 2022 were the Astronomy Swap meet that saw new homes with excited astronomers for 15 telescopes plus accessories and books. HAC earned over $5,200 from the sales. We changed our meeting location to the Cochise College Downtown Campus, 2600 E Wilcox Road which has better seating, visibility for presentations and parking. Even though the year started slow as we transitioned out of Covid restrictions HAC still participated in over 40 outreach events with about 1800 guests which included Public nights and Solar Saturdays at the Patterson, Earth Day in the Park, International Space Days, JWST Launch, Karchner Cavern events and many school groups. And we have at least 8 more scheduled through the end of the year. We have had over 50 HAC members that participated in (or at least attended) an outreach event in 2022 which was a 20% increase from last year. We also did a joint outreach event for Italian students with members of the Sierra Vista Italian Club who served as translators. In addition, HAC donated 3 Starblast telescopes to the Sierra Vista Library and did maintenance on their existing telescopes. We held a beginning astronomer class this spring and an astrophotography series of workshops. Stacy Chitwood developed braille plaques for our outreach with special needs students and Karen Madtes figured out a game to make the braille plaques work for enriching all student programs. Vince Sempronio developed a HAC card to handout at outreach events and coordinated using local business to create HAC logo merchandise, Marion Goode arranged for HAC patches which are available at all member meetings, Karen Madtes kept us informed and coordinated input for the new park in Sierra Vista. Gary Grue hosted several member star parties in his home then he and Mark Orvek planned a 2-night star party at Coronado Sky Village for members.

I hope that you will continue to support HAC in the coming year. I know the HAC slate of officers proposed for 2023 are looking forward to a great year.

NOVEMBER MEETING

For our November HAC meeting we will be hosting Grant Williams, Astronomer, Steward Observatory and Director of MMT Observatory.

Grant Williams is an astronomer on the faculty at the University of Arizona and the current Director of the MMT Observatory. He grew up in rural central NY near the Adirondack Park where the night skies are very dark. He earned a Bachelor's degree in Physics from the University at Buffalo in 1994 and a PhD from Clemson University in 2000. As the Director of the MMT Observatory, he is responsible for the safe and efficient operation of the 6.5-m MMT Telescope, a joint venture of the University of Arizona and the Smithsonian Astrophysical Observatory. His research focuses on studying the three-dimensional nature of massive stars before and after they

explode with the goal of improving our understanding of the characteristics and importance of asymmetries in supernova explosions. He searches for signatures of aspherical stars and supernovae using a technique called spectropolarimetry. He also has a strong interest in instrumentation, observatory operations, and site protection.

HAC 2023 Board candidates

The election of this slate of HAC officers for 2023 will occur at the November Meeting. The new officers, if elected, will take office Dec 1.

President:	Penny Brondum
Vice President (Programs):	Karen Madtes
Secretary:	Katherine Zellerbach
Treasurer, Outreach, NASA rep.:	Ted Forte
Past President:	David Roemer

Board Members-at-Large
- Richard Lighthill
- Vince Sempronio
- Mark Orvek
- Gary Grue

Special Committees:

Nightfall Editor:	Cynthia Shomenta
Webmaster:	Ken Kirchner
Face Book Editor:	Richard Lighthill
Member Star Parties:	Gary Grue

Dues for 2023

Most HAC memberships expire in December each year. When a new member joins, they pay a full year's membership and then are asked to pay a prorated amount on their first renewal to adjust their membership expiration to December. Dues are $35 family and $25 regular ($25 and $20 for active-duty military). Full time students pay $10.

Thank you to those of you who have already paid your 2023 dues. We greatly appreciate your continued participation and support. If you are unsure of your membership status, please contact the treasurer (Ted Forte).

HAC dues payment 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. IF YOU ARE PAYING A PRORATED AMOUNT TO EXTEND YOUR MEMBERSHIP FOR A PARTIAL YEAR, YOU'LL NEED TO USE THE DONATE BUTTON – The dues "renew" option will not allow a non-standard amount.
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

Welcome our new member

Duncan Yuen, a student at UArizona, Tucson joined at the October meeting. Duncan is an IDA volunteer. Welcome Duncan, we are glad you joined!

Handbooks and Calendars

Just a reminder: HAC will not be ordering RASC handbooks this year as the volume discount is no longer offered. You can order your RASC handbook directly from the society itself, or order it from the Astronomical League, Astronomy Magazine's 'My Science Shop', or a number of other sites.

Clubs get a discount on the *Deep Space Mysteries* calendars offered by Astronomy Magazine each year. Members can just go online and get their discount by visiting MyScienceShop.com/ASYClubs and using the code CAL50 at checkout.

Total Lunar Eclipse Alert!!

Set your alarm and watch for clouds :) On Tuesday, Nov. 8th, a TOTAL lunar eclipse is forecast.

First contact should be at 2:10am with mid-eclipse being around 4am. The eclipse will be over around 5:45am. The weather has not been very cooperative for some time now so we should just about be due for a change. We can hope this will be the start of a much better season!

Outreach

We had a very active outreach schedule in October despite some less than cooperative weather. The clouds didn't dampen the enthusiasm of our volunteers who participated in Astronomy Day at the library, and several events at the Patterson including the International Observe the Moon Night and our second monthly Solar Saturday. We also hosted a couple of schools at the observatory and spent two Saturday's at Kartchner Caverns State Park. As I write this, our October Public Night looms and another school is awaiting their visit to the Patterson Observatory.

November kicks off with the **Dine Under the Stars** event on Saturday Nov 5. This important scholarship fundraiser

includes an open house at the Patterson for stargazing during the event. We'll have a moon, Saturn and Jupiter to display to the guests.

We have several events scheduled at the Patterson Observatory including a group of home school students the morning of November 11th, Solar Saturday on November 12th, a launch party for the scheduled launch of Artemis 1 on Monday Nov 14, and an evening event to host learning disabled adults on Friday the 18th. On Saturday the 19th, a few HAC members will represent the club at the Rune Winery star party.

New requests are always coming in so watch your email. Event announcements and reminders are posted on the HACAstro group on groups.io. and listed on the group calendar. If you are not signed up on HACAstro, you can join the group by sending and email to main+subscribe@HACAstro.groups.io

A Kartchner Observatory?

Kartchner Caverns State Park is exploring the idea of building an observatory at the park. The prime mover seems to be park ranger Ritch Rummler. Ritch approached us to see if we would like to be involved and got an enthusiastic response from the club leadership.

The idea is still in the preliminary concept phase and we have no real idea of how likely it is to proceed but if approval and funding goes forward, the plan is to create a moderately sized, outreach oriented facility. Mr Rummler is thinking big right now – with not just a domed observatory but additional infrastructure like a classroom and storage areas dedicated to astronomy gear. In his vision, HAC would play a major role in the planning of the facility, and in the eventual operation and maintenance of the observatory in a manner similar to what we do at Patterson.

HAC members would earn free entry to the park and access to the observatory through our sweat equity. If you think you would like to be involved in the planning of this potential observatory, please let Ted Forte know. (tedforte511@gmail.com)

Scope Orientation

by Ted Forte

Determining the orientation of your telescope's field of view can be a little confusing, so here are a few tips.

You can determine west by watching a star drift through your undriven scope. Center a star and let it drift to the edge of the field. The point where it departs is west. From there, the number of reflections determines the orientation.

An odd number of reflections, as in a refractor with a star diagonal (1 reflection) or an SCT with a star diagonal (3 reflections) mirror-reverses the view. North and South are correct but east and west are reversed. It helps to remember that your bathroom mirror is 1 reflection and it reverses your face left and right, but you are correct up and down.

With an even number of reflections, as in a Newtonian (2 reflections) the image is inverted.

To see things more clearly, draw a circle on a piece of paper and mark the cardinal directions as they would appear on a map. Rotate it 180- degrees and you will recreate the directions in your Dob (a Newtonian system with two reflections) OR turn the paper away from you and view through it from the back and you'll have the directions in a SCT (or refractor) with a star diagonal.

Notice that west is to the left in both, but in the Dob, north is CCW from west (down) and in the SCT, north is CW from west (up).

Remember that north and south being up and down (or east west being left and right) only apply when pointed at the meridian (due south) and the image will rotate if you are pointed toward the east or west. No matter where you are pointed though, west is always the direction of drift and north is always CCW from west in an inverted image and CW from west in a mirror reversed image.

Chiricahua Sky Village Star Party

By Mark Orvek

The Chiricahua Sky Village (CSV) hosted a star party on October 29th-30th. CSV is located in Pearce, AZ near the intersection of Hwy 181 and S. Clovis Road. 7 people attended: 4 HAC members (Penny & Thomas Brondum, Mitch Cherbavaz, Lori & Mark Orvek) and 2 CSV members (Alex and Carl, not double counting Lori and Mark). Saturday night was a clear sky night although the 21% waxing moon illuminated the sky until it set around 9pm.

Alex, Carl, Thomas, Penny and Mitch.

The forecast for Sunday night was cloudy so everyone (except Lori and Mark) left on Sunday morning. CSV will host another star party in the future, most likely in the spring.

What was Thomas looking at or was he just posing for a picture?

Mark's car tent and telescope

Carl checking out Alex's equipment

After the initial setup of camp and equipment, the attendees kept warm by standing around Carl's fire until the moon was low enough to start observing and imaging.

In addition to keeping warm, we enjoyed conversations about astronomy, equipment and a variety of other topics. It's great to share a dark sky site with some new and "old" friends.

NASA Night Sky Notes November 2022

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!

Cepheus: A House Fit for a King

David Prosper

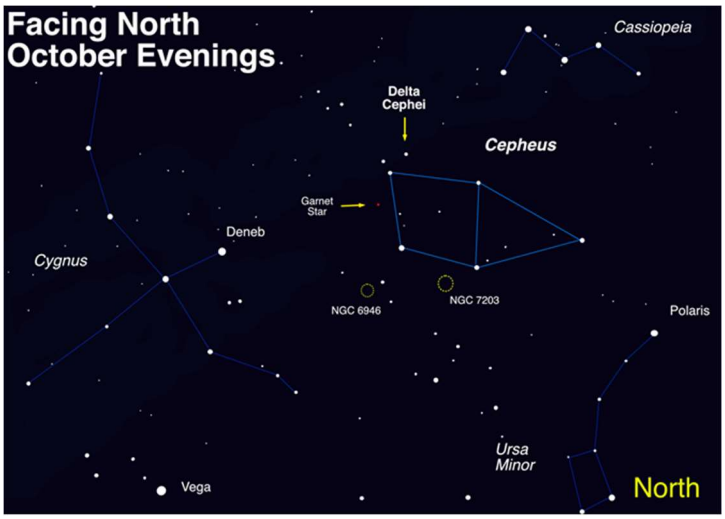
Sometimes constellations look like their namesake, and sometimes these starry patterns look like something else entirely. That's the case for many stargazers upon identifying the constellation of Cepheus for the first time. These stars represent Cepheus, the King of Ethiopia, sitting on his throne. However, many present-day observers see the outline of a simple house, complete with peaked roof, instead – quite a difference! Astronomers have another association with this northern constellation; inside its borders lies the namesake of one of the most important types of stars in modern astronomy: Delta Cephei, the original Cepheid Variable.

Cepheus is a circumpolar constellation for most observers located in mid-northern latitudes and above, meaning it does not set, or dip below the horizon. This means Cepheus is visible all night long and can be observed to swing around the northern celestial pole, anchored by Polaris, the current North Star. Other circumpolar constellations include Cassiopeia, Ursa Major, Ursa Minor, Draco, and Camelopardalis. Its all-night position for many stargazers brings with it some interesting objects to observe. Among them: the "Garnet Star" Mu Cephei, a supergiant star with an especially deep red hue; several binary stars; several nebulae, including the notable reflection nebula NGC 7023; and the "Fireworks Galaxy" NGC 6946, known for a surprising amount of supernovae.

Perhaps the most famous, and certainly the most notable object in Cepheus, is the star Delta Cephei. Its variable nature was first discovered by John Goodricke, whose observations of the star began in October 1784. Slightly more than a century later, Henrietta Leavitt studied the variable stars found in the Magellanic Clouds in 1908 and discovered that the type of variable stars represented by Delta Cephei possessed very consistent relationships between their luminosity (total amount of light emitted), and their pulsation period (generally, the length of time in which the star goes through a cycle of where it dims and then brightens). Once

the period for a Cepheid Variable (or Cepheid) is known, its luminosity can be calculated by using the scale originally developed by Henrietta Leavitt, now called “Leavitt’s Law.”. So, if a star is found to be a Cepheid, its actual brightness can be calculated versus its observed brightness. From that difference, the Cepheid’s distance can then be estimated with a great deal of precision. This revolutionary discovery unlocked a key to measuring vast distances across the cosmos, and in 1924 observations of Cepheids by Edwin Hubble in what was then called the Andromeda Nebula proved that this “nebula” was actually another galaxy outside of our own Milky Way! You may now know this object as the “Andromeda Galaxy” or M31. Further observations of Cepheids in other galaxies gave rise to another astounding discovery: that our universe is not static, but expanding!

Because of their importance as a “standard candle” in measuring cosmic distances, astronomers continue to study the nature of Cepheids. Their studies revealed that there are two distinct types of Cepheids: Classical and Type II. Delta Cephei is the second closest Cepheid to Earth after Polaris, and was even studied in detail by Edwin Hubble’s namesake telescope, NASA’s Hubble Space Telescope, in 2008. These studies, along with others performed by the ESA’s Hipparcos mission and other observatories, help to further refine the accuracy of distance measurements derived from observations of Cepheids. What will further observations of Delta Cephei and other Cepheids reveal about our universe? Follow NASA’s latest observations of stars and galaxies across our universe at nasa.gov.



The stars of Cepheus are visible all year round for many in the Northern Hemisphere, but fall months offer some of the best views of this circumpolar constellation to warmly-dressed observers. Just look northwards! Image created with assistance from Stellarium: stellarium.org.

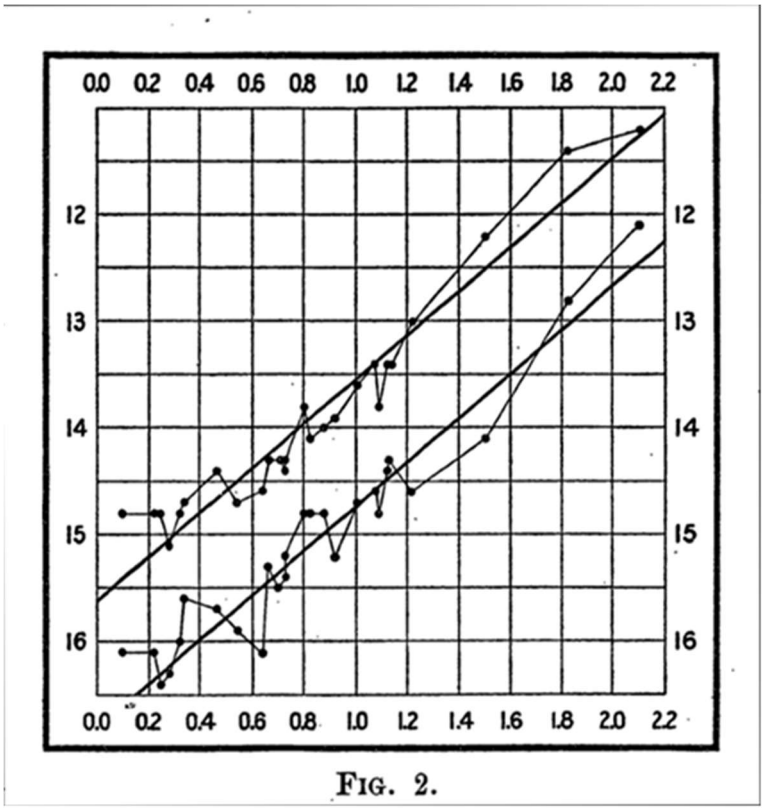


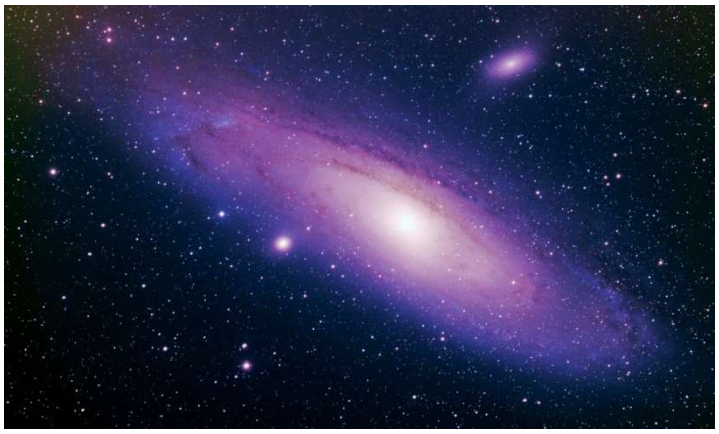
FIG. 2.

This historical diagram from Henrietta Leavitt’s revolutionary publication shows the luminosity of a selection of Cepheid Variables on the vertical axis, and the log of their periods on the horizontal axis. The line drawn through these points shows how tight that relationship is between all the stars in the series. From Henrietta Leavitt and Edward Pickering’s 1912 paper, “Periods of 25 Variable Stars in the Small Magellanic Cloud,” a copy of which can be found at: https://ui.adsabs.harvard.edu/abs/1912HarCi.173....1L/abstract

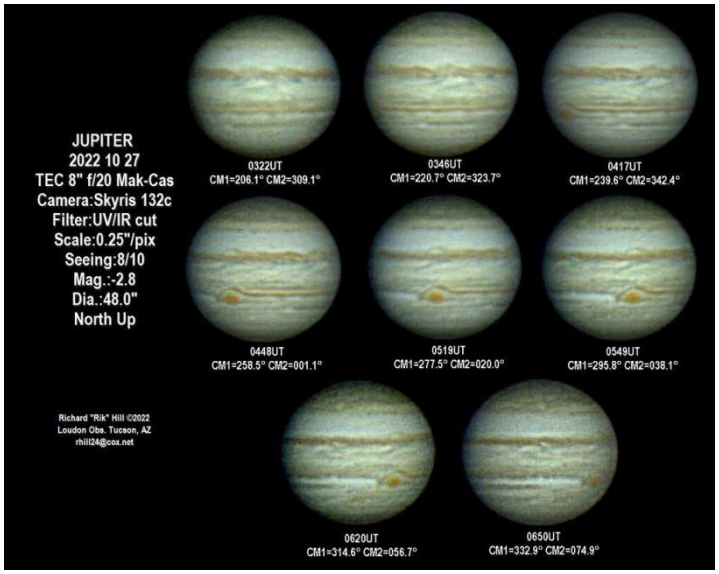
Pictures from HAC Astro

Rosette Nebula by JD Maddy

Andromeda Galaxy by JD Maddy



Jupiter by Rik Hill



Space X Falcon 9 at Patterson by Ted Forte

Star Link Launch by JD Maddy

Club Officers and Contacts

President: *Penny Brondum* ***Vice President:*** *Karen Madtes*

Secretary: *Marion Goode* ***Treasurer:*** *Ted Forte*

Past President: *Dwight Hoxie*

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Facebook Editors: *Bert Kelher*

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

Email: info@hacastronomy.org

Please Support Our Sponsors

Our sponsors have been keeping us supplied in door prizes for some years. If you have not contacted them lately, please consider this. They have a lot of great astronomical products that we all need.

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

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

Starizona http://starizona.com/

Instead of our monthly meeting we want to invite everyone to a ***HAC Holiday party*** *on* ***Dec 9th from 5:30 – 9 p.m.***

This year's event will be graciously hosted by Penny and Thomas Brondum at their home at 4071 S. Huron Pl. in Sierra Vista and will include their newly completed observatory and 2nd phase of remodeling.

The event will be catered by Olive Garden. we will have a great variety of Italian food to choose from in a buffet style that includes salad, a main course, tea and dessert! If you are not a fan of tea, water and some assorted beverages will be available, but feel free to bring your own favorite beverage. The cost is 20 dollars per adult and 10 dollars for children 12 and under. (Plus, attendees are asked to bring their own folding chair.)

We will begin collecting for the party at the next HAC meeting on November 4. *Make checks payable to Huachuca Astronomy Club. You may also pay using your credit card or PayPal account by using the "Donate" button on the HAC website www.hacastronomy.org. Please notify Ted Forte tedforte511@gmail.com that your donation is for party attendance.*

Members and guests wishing to attend must make payment payable Huachuca Astronomy Club no later than December 1.

If you have any questions, please feel free to call or email me anytime.

We hope to see everyone at the event this year.

Gary Grue

Cell 559-760-3827

HAC Nov-Dec 2022 Calendar of Events

SU	MO	TU	WE	TH	FR	SA
30	**31** **11:37PM**	**1 Nov**	**2**	**3**	**4** **HAC Meeting 7PM Room A102**	**5** **Dine Under the Stars 6-9PM**
6 Daylight Savings Time Ends	**7**	**8** **4:02AM** Total Lunar Eclipse Election Day	**9**	**10**	**11** Home Schoolers at Patterson 9am **Veterans Day**	**12** Solar Saturday at Patterson 9-11 AM
13	**14** Artemis Launch Party Patterson 9am (tentative)	**15**	**16** **6:27 AM**	**17** Leonid Meteors	**18** Adaptive Adult Rec at Patterson 6pm Leonid Meteors	**19** Rune Winery Stargazing
20	**21**	**22**	**23** **3:57PM**	**24** 	**25**	**26**
27	**28**	**29**	**30** **7:36 AM**	**1 DEC** Patterson Public Night 6PM Jupiter 3 d N of Moon	**2**	**3**
4	**5**	**6**	**7** **9:08 PM** Mars at Opposition	**8**	**9** **HAC Holiday Party @ Patterson**	**10** Solar Saturday at Patterson 9-11 AM
11	**12**	**13** Geminid meteors	**14** Geminid meteors	**15**	**16** **1:56 AM**	**17**
18	**19**	**20**	**21** Winer Solstice 2:48PM	**22**	**23** **3:17 AM**	**24**
25 	**26**	**27**	**28**	**29** **6:20 PM** Patterson Public Night 6PM	**30** 	

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