



# EPHEMERIS

The official newsletter of the Prescott Astronomy Club (PAC)  
*e-phem-er-is*: a time-based listing of future positions of solar system objects

## November 2022

### UPCOMING EVENTS



Wednesday, November 2 - Regular PAC meeting @ 6:00 PM at the Prescott Public Library, Founder's Suite, hosted by Art Arnold-Roksandich. This is the most important Business Meeting of the year where we approve the budget and elect officers and directors-at-large. We are still looking for a nominee for Secretary, an opportunity to take minutes, get to know other members, and keep the rest of the board on track. There are a lot of ways to participate next year and keep the momentum going in 2023: star party volunteers, event organizers (Lowell, Mt. Lemon, Mt. Wilson, etc.), and speakers for our meetings. Please volunteer for these opportunities.

After the business meeting, our vice president will talk about "Astronomy Resources on YouTube" and how to search and navigate YouTube to find information, tips and news about our hobby. Also, Adam England will present a trailer of his interview with Pat Bledsoe, a distinguished member of our club.

THERE WILL NOT BE A ZOOM OPTION FOR THIS MEETING. We encourage everyone to attend the meeting.

Tuesday, November 15 - Outreach Star Party @ Talking Rock for community members. PAC members can also attend.

Saturday, November 19 - Starry Nights public star party @ 6:30 PM at Pronghorn Park, Prescott Valley.

Wednesday, December 7 - PAC Holiday Dinner @ 6:00 PM at the Hassayampa Inn, Prescott. See details below.

### 2022 PAC HOLIDAY PARTY

Susanne Vaughan

Our annual Holiday Party is on December 7th at 6:00pm at the Hassayampa Inn, Arizona Room,

in downtown Prescott. There will be door prizes, a cash bar, and lots of cheer. It costs \$50 each and is all-inclusive with tea, coffee, salad, baguettes, your dinner choice, your dessert choice, and tips and service fees.

You can sign up on the web site: [www.prescottastronomyclub.org](http://www.prescottastronomyclub.org). Just scroll down to the green box labeled Club Holiday Party. Click the LINK to reserve and pay for your meal. This link will take you to a purple box and orange box. In the purple box, choose your dinner and dessert, hit SELECT, then "Add to Cart". Do this for your selection, your spouse or any guest, then pay and checkout using PayPal.

You can also send a check via US post, if you prefer. The orange box has details of dinner choices. Click at the bottom to open it in a new window, print it out, check your dinner and dessert choices, then mail it with a check made out to "PAC" to the Treasurer's address listed on the second page. The check should cover all persons attending.

**ALL PAYMENTS AND CHOICES MUST BE RECEIVED BY NOV 21ST.**

Join us all for a joyous party to celebrate the end of another successful year of star-gazing. Downtown has free parking (the hotel's parking is across the street from the entrance) and the Square should be decorated for the holidays. Don't miss the fun!

## **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



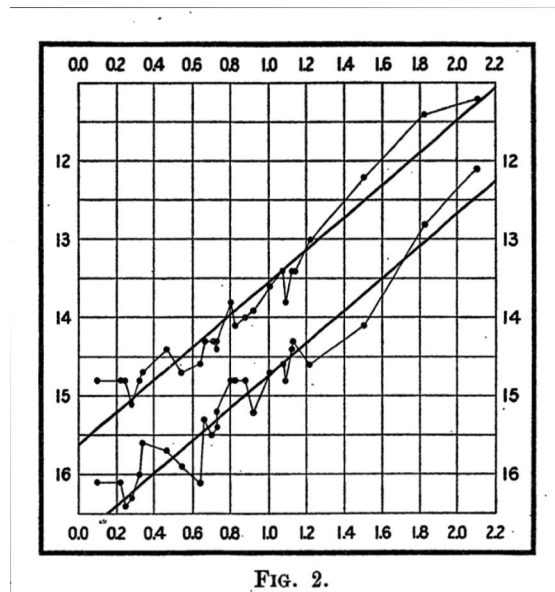
interesting objects to observe. Among them: the “Garnet Star” Mu Cephei, a supergiant star with an especially deep red hue; several binary stars; several nebulae, including the notable reflection nebula NGC 7023; and the “Fireworks Galaxy” NGC 6946, known for a surprising amount of supernovae.

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](http://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](http://stellarium.org).



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>

## WHAT'S HAPPENING IN NOVEMBER 2022

This calendar from In-The-Sky.org shows the objects and events visible during November 2022.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		<b>1</b> Moon at First Quarter Conjunction of the Moon and Saturn Close approach of the Moon and Saturn Fornax is well placed	<b>2</b>	<b>3</b>	<b>4</b> Conjunction of the Moon and Jupiter Close approach of the Moon and Jupiter	<b>5</b>
<b>6</b> The Moon at aphelion	<b>7</b>	<b>8</b> Total lunar eclipse Full Moon Close approach of the Moon and Uranus Lunar occultation of Uranus Mercury at superior solar conjunction	<b>9</b> Uranus at opposition	<b>10</b>	<b>11</b> Close approach of the Moon and Mars Conjunction of the Moon and Mars	<b>12</b> Asteroid 27 Euterpe at opposition Northern Taurid meteor shower 2022
<b>13</b> The Moon at apogee	<b>14</b>	<b>15</b>	<b>16</b> Moon at Last Quarter	<b>17</b> Leonid meteor shower 2022	<b>18</b> M45 is well placed	<b>19</b> Asteroid 115 Thyra at opposition Mercury at aphelion
<b>20</b>	<b>21</b> α-Monocerotid meteor shower 2022	<b>22</b> Asteroid 324 Bamberga at opposition	<b>23</b> New Moon Jupiter ends retrograde motion	<b>24</b> 118P/Shoemaker Levy at perihelion The Moon at perihelion	<b>25</b> The Moon at perigee	<b>26</b>
<b>27</b>	<b>28</b> C/2022 P1 (NEOWISE) at perihelion November Orionid meteor shower 2022 Conjunction of the Moon and Saturn Close approach of the Moon and Saturn	<b>29</b> Asteroid 30 Urania at opposition	<b>30</b> Moon at First Quarter Mars at perigee			

For additional information and details, see: <https://in-the-sky.org/newscal.php> and [www.telescopius.com](http://www.telescopius.com) . Observing lists of monthly ‘Binocular’ and ‘Telescope’ Showpieces can be found on the club website.

## CALL FOR ASTRO-IMAGES

David Viscio, editor

I request all astrophotographer members of the club submit examples of their astro-images to share with club members by inclusion in the Ephemeris. Images can be sent to me at [pkmist@gmail.com](mailto:pkmist@gmail.com). Please include description of equipment, cameras, image capture parameters and processing.

## NEED TO KNOW - ASK A MEMBER

A 15-minute segment is being added to the regular general meetings where members can have their ‘burning’ questions answered by other knowledgeable members. If you have an astronomy related question you would like explained, submit the question to Art Arnold-Roksandich [p@prescottastronomyclub.org](mailto:p@prescottastronomyclub.org). You can also bring up the question at the meeting.

## FOR SALE

As a member of PAC, you may use the [groups.io/g/pacinfo](https://groups.io/g/pacinfo) message board to post notices of items for sale. It is easy to signup. Go to [groups.io/g/pacinfo](https://groups.io/g/pacinfo). Click on "Apply for Membership to This Group". Fill in your email address and click on "Confirm Email Address". You should get a return email by the next day. You can update your profile for a daily digest or no email notices at all. You can go anytime to [groups.io/g/pacinfo](https://groups.io/g/pacinfo) to check out what other people are doing.



New items are added now and then, so don't miss out on something that you would like to get for yourself...or a friend.

## PAC MENTORS

If you need advice on the purchase of astronomy equipment, setting up





equipment, astrophotography, etc., contact a PAC mentor.

Open - Astrophotography

David Viscio - General & Astrophotography - (928) 775-2918

Greg Lutes - Visual Observing - (928) 445-4430

Joel Cohen - Beginner's Astronomy: Selecting & Using a Telescope - (856) 889-6496

## OBSERVING LISTS

Observing lists are available in PDF format on the PAC website to provide guidance and goals for visual and astrophotography programs.



Astroleague Lunar 100

Binocular Showpieces

Bright Nebulae

Caldwell

Dunlop 100

Face-On Spiral Galaxies

Globular Clusters

Herschel 400

Herschel II

Hidden Treasures

Messier

Open Clusters

Planet Maps

Planetary Nebulae

Royal Astronomical Society of Canada Finest NGC

Saguaro Astronomy Club Best NGC

S&T Lunar 100

Telescope Showpieces

The Secret Deep

## PAC WEBSITE

Website: <http://www.prescottastronomyclub.org>

E-mail: [pacinfo@prescottastronomyclub.org](mailto:pacinfo@prescottastronomyclub.org)



## **BOARD OF DIRECTORS**

President: Art Arnold-Roksandich  
Vice President: Brian Blau  
Secretary: Roland Albers  
Treasurer: Susanne Vaughan

At Large: EJ Van Horne  
At Large: Dave Covey  
At Large: Ken Olson  
At Large: Pat Bledsoe



## **PAC COORDINATORS**

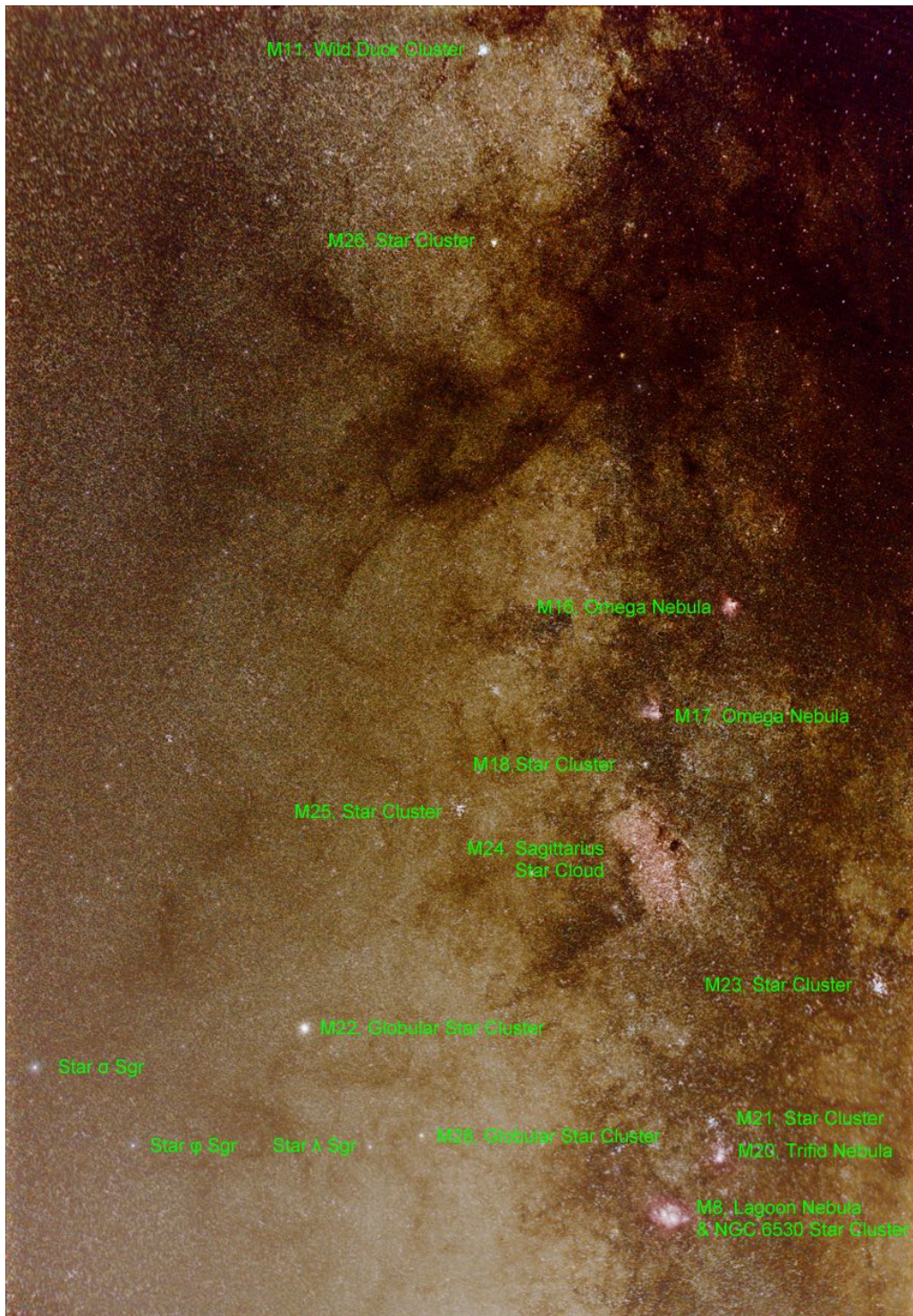
Astronomical League Coordinator: Ken Olson  
Events: Susanne Vaughan  
Facebook: Open  
Membership: Susanne Vaughan  
METASIG: John Dwan  
Newsletter: David Viscio  
Night Sky Network: Open  
PAC Affiliate Partner w/ NAU Space Grant Program – Cory Shaw  
PAC Store Sales - Open  
Property Records: Open  
Public Relations: Open  
Refreshments: Open  
Schools & Camps Outreach: Joel Cohen & Brian Blau  
Starry Nights Coordinator: David Viscio  
Webmaster: EJ Van Horne





# SAGITTARIUS REGION

*Image Credit: Fred Oswald*



*Canon T3i DSLR, 50mm, f/2.8, ISO 3200, 755 2.5-second exposures  
Stacked in Deep Sky Stacker, processed in Adobe Photoshop*