



## 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

## DECEMBER 2021

### UPCOMING EVENTS

Wednesday, December 8 - Arizona Astrophotography Association @ 7:00 PM. Currently there is no new topic and speaker to hold a meeting. Jeff Stillman will inform the members if that status changes.



Saturday, December 11 - PAC Holiday Party @ 5:00 PM at Augie's Restaurant at 1721 Highway 69 in the Frontier Village Shopping Center in Prescott. Contact Susanne Vaughan [susanne.vaughan@gmail.com](mailto:susanne.vaughan@gmail.com) for additional information.

### ELECTION OF 2022 PAC OFFICERS

At the November 3 regular meeting the following individuals were elected to the six open positions on the PAC board of directors:

President: Art Arnold-Roksandich

Vice-President: Brian Blau

Secretary: Roland Albers

Treasurer: Susanne Vaughan

Directors-at-Large: EJ Van Horne and Ken Olson

Continuing Directors-at-Large: Dave Covey and Pat Bledsoe

Please extend thanks to all for contributing to the club's efforts.

### IT'S TIME TO RENEW YOUR PAC MEMBERSHIP!

A new year is about to begin, and we all share high expectations for the Prescott Astronomy Club in 2022. Please help us get off to a good start by renewing your PAC membership soon.

Dues have not changed - they are still \$25 for individuals and \$35 for a family - and are due by January 1st.

You can renew by going to [prescottastronomyclub.org](http://prescottastronomyclub.org) and clicking on the Join button. You then have the option of paying your dues online using Paypal or a credit card. Alternatively, you can print out a membership form and mail it with a check to the club treasurer at the listed address. If your contact information has not changed in the last year, simply write 'no changes' on the membership form before mailing it to the treasurer.

## **NEW MEMBER LOOKING FOR OBSERVING PARTNERS**

Fred Oswald (new PAC member) is looking for companions for informal observing at local dark-sky sites, such as Contreras Rd. near Iron Springs or Woodchute/Mingus Mtn. It is safer to go to these isolated spots with a group. If interested, contact Fred at [fredoswald@gmail.com](mailto:fredoswald@gmail.com) or phone/text 928-899-9197.

## **THE JAMES WEBB SPACE TELESCOPE: READY FOR LAUNCH**

David Prosper

NASA's James Webb Space Telescope is ready for lift-off! As of this writing (November 15), the much-anticipated next-generation space telescope is being carefully prepared for launch on December 18, 2021, and will begin its mission to investigate some of the deepest mysteries of our universe.



The development of the Webb began earlier than you might expect – the concept that would develop into Webb was proposed even before the launch of the Hubble in the late 1980s! Since then, its design underwent many refinements, and the telescope experienced a series of delays during construction and testing. While frustrating, the team needs to ensure that this extremely complex and advanced scientific instrument is successfully launched and deployed. The Webb team can't take any chances; unlike the Hubble, orbiting at an astronaut-serviceable 340 miles (347 km) above Earth, the Webb will orbit about one million miles away (or 1.6 million km), at Lagrange Point 2. Lagrange Points are special positions where the gravitational influence between two different bodies, like the Sun and Earth, "balance out," allowing objects like space telescopes to be placed into stable long-term orbits, requiring only minor adjustments - saving Webb a good deal of fuel.

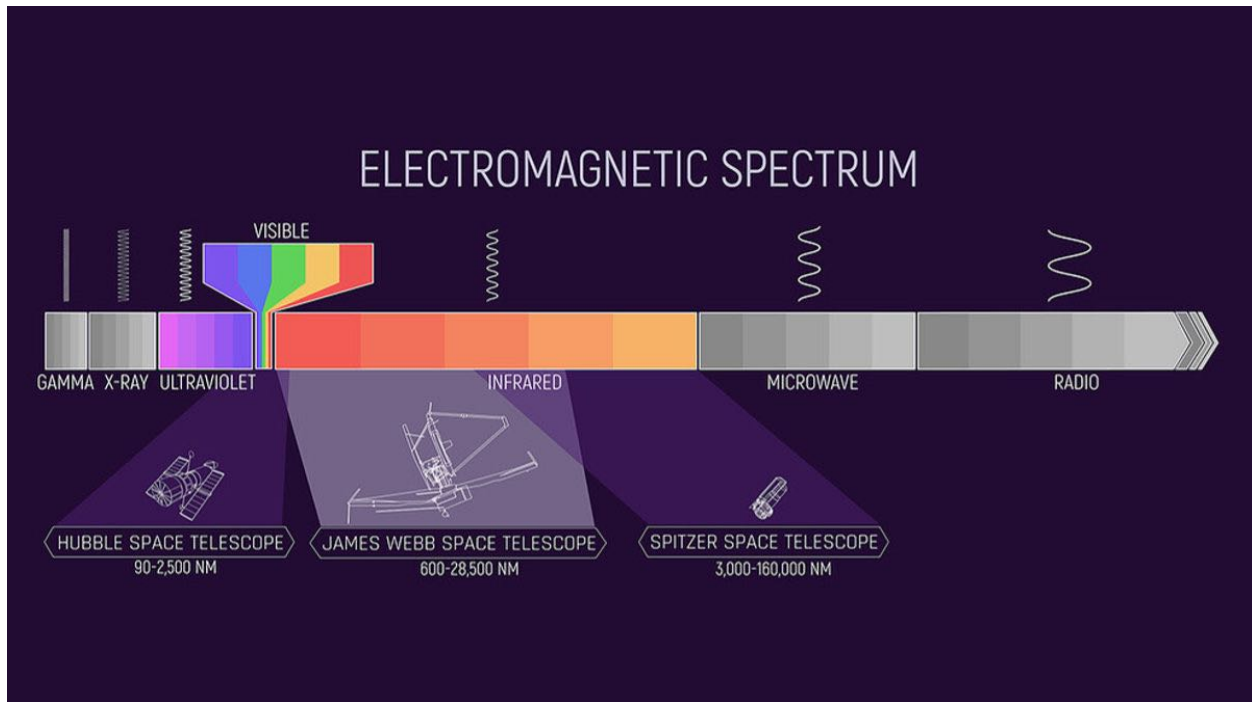
Since this position is also several times further than the Moon, Webb's sunshield will safely cover the Moon, Earth, and Sun and block any potential interference from their own infrared

radiation. Even the seemingly small amount of heat from the surfaces of the Earth and Moon would interfere with Webb's extraordinarily sensitive infrared observations of our universe if left unblocked. More detailed information about Webb's orbit can be found at [bit.ly/webborbitinfo](http://bit.ly/webborbitinfo), and a video showing its movement at [bit.ly/webborbitvideo](http://bit.ly/webborbitvideo).

Once in its final position, its sunshield and mirror fully deployed and instruments checked out,

Webb will begin observing! Webb's 21-foot segmented mirror will be trained on targets as fine and varied as planets, moons, and distant objects in our outer Solar System, active centers of galaxies, and some of the most distant stars and galaxies in our universe: objects that may be some of the first luminous objects formed after the Big Bang! Webb will join with other observatories to study black holes - including the one lurking in the center of our galaxy, and will study solar systems around other stars, including planetary atmospheres, to investigate their potential for hosting life.

Wondering how Webb's infrared observations can reveal what visible light cannot? The "Universe in a Different Light" Night Sky Network activity can help - find it at [bit.ly/different-light-nsn](http://bit.ly/different-light-nsn). Find the latest news from NASA and Webb team as it begins its mission by following #UnfoldTheUniverse on social media, and on the web at [nasa.gov/webb](http://nasa.gov/webb).



*Webb will observe a wide band of the infrared spectrum, including parts observed by the Hubble - which also observes in a bit of ultraviolet light as well as visible - and the recently retired Spitzer Space Telescope. Webb will even observe parts of the infrared spectrum not seen by either of these missions!  
Credits: NASA and J. Olmstead (STScI)*

# WHAT'S HAPPENING IN DECEMBER 2021

This calendar from In-The-Sky.org shows the objects and events visible during December 2021.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			<b>1</b> Neptune ends retrograde motion	<b>2</b> Pheonid meteor shower 2021 Mercury at aphelion Conjunction of the Moon and Mars	<b>3</b>	<b>4</b> Total solar eclipse New Moon The Moon at perigee
<b>5</b> The Moon at perihelion	<b>6</b> December $\phi$ -Cassiopeid meteor shower 2021 Conjunction of the Moon and Venus Close approach of the Moon and Venus	<b>7</b> Puppid-Velid meteor shower 2021 Venus at greatest brightness Conjunction of the Moon and Saturn Close approach of the Moon and Saturn	<b>8</b> Conjunction of the Moon and Jupiter	<b>9</b> Monocerotid meteor shower 2021 Close approach of the Moon and Jupiter Venus at highest altitude in evening sky	<b>10</b> Asteroid 44 Nysa at opposition Moon at First Quarter	<b>11</b>
<b>12</b> $\alpha$ -Hydrid meteor shower 2021 C/2021 A1 (Leonard) at perigee LMC is well placed Conjunction of Venus and Pluto	<b>13</b>	<b>14</b> Geminid meteor shower 2021	<b>15</b> NGC 1981 is well placed	<b>16</b> Comae Berenicid meteor shower 2021	<b>17</b> The Moon at apogee The Moon at aphelion	<b>18</b> Full Moon
<b>19</b> December Leonis Minorid meteor shower 2021	<b>20</b>	<b>21</b> December solstice Conjunction of Venus and Pluto	<b>22</b> Ursid meteor shower 2021	<b>23</b>	<b>24</b>	<b>25</b>
<b>26</b> Moon at Last Quarter	<b>27</b>	<b>28</b> NGC 2232 is well placed Conjunction of Venus and Mercury	<b>29</b> NGC 2244 is well placed	<b>30</b> Conjunction of Mercury and Pluto	<b>31</b> Close approach of the Moon and Mars Lunar occultation of Mars Conjunction of the Moon and Mars	

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.

## **ASTRONOMY PHOTOGRAPHER OF THE YEAR CONTEST WINNERS**

My Modern Met announces Astronomy Photographer of the Year winners. Use the following link to see some spectacular astro-images and more.

<https://mymodernmet.com/astronomy-photographer-of-the-year-2021/>

## **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 new 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 John Carter ([jrcpvaz@icloud.com](mailto:jrcpvaz@icloud.com)). You can also bring up the question at the meeting.

## **FOR SALE**

Please visit the Classified Ads section of the club website to view the items posted there for sale:

<http://prescottastronomyclub.org/classified-ads/>

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.



Jeff Stillman - Astrophotography - (928) 379-7088

David Viscio - General - (928) 775-2918

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

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

John Carter - Video Observing - (928) 458-0570

## 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 & YAHOO GROUPS

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

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

Arizona Astrophotography Association:

<https://www.facebook.com/groups/azastro>



## BOARD OF DIRECTORS

President: Jeff Stillman

Vice President: Open

Acting Secretary: Roland Albers

Treasurer: Art Arnold-Roksandich

At Large: Jason Hoover

At Large: Dave Covey

At Large: Doug Tilley

At Large: Pat Bledsoe



## PAC COORDINATORS

Astronomical League Coordinator: John Carter

Facebook: Open

Membership: Susanne Vaughn

METASIG: Open

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

Starry Nights Coordinator: David Viscio

Third Thursday Coordinator: Dave Covey

Webmaster: Russell Chappel & EJ Van Horne



## APOD NOVEMBER 17, 2021: NGC 3314: WHEN GALAXIES OVERLAP

Image Credit: NASA, ESA, Hubble; Processing & Copyright: William Ostling (The Astronomy Enthusiast)



*Why doesn't the nearby galaxy create a gravitational lensing effect on the background galaxy? It does, but since both galaxies are so nearby, the angular shift is much smaller than the angular sizes of the galaxies themselves. The featured Hubble image of NGC 3314 shows two large spiral galaxies which happen to line up exactly. The foreground spiral NGC 3314a appears nearly face-on with its pinwheel shape defined by young bright star clusters. Against the glow of the background galaxy NGC 3314b, though, dark swirling lanes of interstellar dust can also be seen tracing the nearer spiral's structure. Both galaxies appear on the edge of the Hydra Cluster of Galaxies, a cluster that is about 200 million light years away. Gravitational lens distortions are much easier to see when the lensing galaxy is smaller and further away. Then, the background galaxy may even be distorted into a ring around the nearer. Fast gravitational lens flashes due to stars in the foreground galaxy momentarily magnifying the light from stars in the background galaxy might one day be visible in future observing campaigns with high resolution telescopes.*