Volume 35 Issue 11

November 2021

The Observer

Stephan's Quintet from Hubble - June 3, 2019
Image Credit Nasa, ESA, Hubble; Processing: Daniel Nobre

Upcoming Events:

All meetings will be held online.

EVAC Meeting via Zoom - November 19th.

Jeff Kanipe - Peculiar Galaxies:Touchstones in Galaxy Classification. What Makes a Peculiar Galaxy Peculiar?

Inside this Issue:

From the Desk of the President

by Gordon Rosner

Greetings from your President.

As always, I sure hope everyone is well and keeping healthy during these changing and challenging times. Covid is still preventing us from opening our in-person events. We still don't know when we can return to those events. Keep updated via these newsletters and by visiting the club's website. However, our club's observatory, GRCO, currently remains operational to small private viewing requests Sunday through Thursday evenings. Scheduling is via the GRCO page on our website.

Those of you who have recently visited the Riparian Preserve in Gilbert during the last few Saturday evenings were probably surprised to see our GRCO observatory open to the public. The private viewings that are scheduled through the GRCO page on our website have been working so well that our club's Board of Directors voted to take a next step and open the observatory to the public for a few Saturdays. This allowed us to expand our experience with our safety protocols and provided us with more confidence for the eventual full public opening.

From the Desk of the President

by Gordon Rosner

Continued from page 1

The Board of Directors will continue to meet to determine the next steps to our goal of full pre-pandemic operations. Even though a full public opening schedule has yet to be determined, you may find the observatory open to the general public on some Friday and Saturday evenings as we get more public input supporting a full opening.

Our EVAC 2022 Officer candidate submittal period is now over. We had only one volunteer from the general membership to run for a leadership position. Our current officer positions will be past their term limits which means, per our club's policies and procedures, they cannot run for another term. However, to make sure the club continues to operate smoothly through next year's expected return to normal operations, most current officers have agreed to either stay in their positions for another year or take up other officer seats. Since this resulted in only one person running for each seat, no voting by the general membership is needed for any candidate. However, since we are non-compliant with the term limits stated in our policies and procedures, the general membership must agree to this special plan during these unique times. We will do this during the online November General Membership Meeting on 19 November.

The shuffling of officer seats has resulted in the position of Vice President being vacant. Anyone interested in this position now or in 2022 can apply by letting the club President know at any time via the 'Contact President' link on our website. Next year's officer candidates have agreed to work to make sure the duties of the Vice President are fulfilled during the interim.

The following is the list of 2022 officer candidates which will need agreement by the club general membership during the November online meeting:

- President: Claude Haynes
- Vice President: Open
- Treasurer: Alex Nachman
- Secretary: Gordon Rosner

Also, the 2022 Board Members at Large will need approval by the club general membership:

- David Coshow
- Jon Koester
- Bill Peters
- Brooks Scofield
- Derek Youngson

All the names should be familiar to everyone, even our new Board Member at Large candidate, David Coshow. David has performed various past leadership duties, and some will remember David as our previous GRCO Manager who did an excellent job there.

Again, if you are interested in the club leadership position of Vice President, please let the club President know. We will have a great group of experienced officers making sure you are successful.

As of the publishing of this newsletter, the launch of the James Webb Space Telescope is still scheduled for 18 December. Yay! After a journey by ship from California through the Panama Canal, the telescope is now at the European Space Agency's launch facility near Kourou, French Guiana, a region on the northern Atlantic coast of South America. The telescope is preparing for its integration into the Ariane 5 launch vehicle. Certainly, exciting stuff!

As I always mention every month, live member presentations are always a fun and valuable part of our monthly online Zoom meetings. These are about ten minutes or so long regarding any astronomy related subject you would like to share with the club. I encourage you to do one of these. Just let me know if you would like to do one by using the 'Contact President' link near the bottom of the main page of our EVAC website. I'll then get back with you and we can discuss. If needed, we can also do a dry run sometime before the actual meeting.

Our next online Zoom monthly General Membership Meeting will be on Friday, 19 November starting at the usual 7:30PM. The main presentation will be by Jeff Kanipe, Science journalist and author of many astronomy books. The title is "Peculiar Galaxies: Touchstones in galaxy classification. What makes a peculiar galaxy peculiar?"

As always, every month, a reminder that there are three ways to receive a notification link via an email to register for the next online monthly General Meeting. Membership in the club is not needed as our meetings are open to all and we encourage all club friends to join our online meetings with us. You only need to do one of the following and only once to continue to receive the email on how to register for the upcoming meetings:

From the Desk of the President
by Gordon Rosner

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1. Send a one-time email request to vp@evaconline.org.
2. Sign up for the evac-announce@freelists.org mailing list. Directions on how to do this and the link are included later in the 'Find Out What's Happening' section of this newsletter.
3. Sign up for the AZ-observing@groups.io mailing list. Also here, directions on how to do this and the link are included later in the 'Find Out What's Happening' section of this newsletter.

A way to get notifications of any special online events and how to register, is to join the EVAC Facebook page and occasionally check for special event announcements. The link to join is provided in the 'Find Out What's Happening' section of this newsletter. These events will also be announced during our monthly General Meetings.

I'll 'see you' at our 19 November meeting. Remember we are accepting a one page or so article for our newsletters on any astronomy related topic from our members. Just send yours to me via the 'Contact President' link on our website.

"Keep your feet on the ground and keep reaching for the stars."

Your President,
Gordon Rosner

EVAC Zoom Meeting Notes for 2021 October 15th, at 07:30 P.M. AZ Time
by Wayne Thomas

Here are the Meeting minutes including details of the presentation. (The recorded video of the meeting can be viewed at: EVAC Member Meeting 2021-10-15).

President Gordon Rosner welcomed those in the "audience" to the virtual meeting shortly after 7:30 p.m. His first slide displayed the meeting agenda:

- Welcome
- Introductions
- Officer Elections
- Club News
- Main Presentation: ASU doctoral candidate Tyler Richey-Yowell , speaking on "Evaluating Planets orbiting K-stars for 'Super Habitability'"

Gordon welcomed everyone in the virtual audience with his "Live Long and Prosper" slide. Next was his slide listing the club officers.

All elected officer positions are open due to term limitations for those currently serving. These positions are: President, Vice President, Treasurer, Secretary, and five Board Members at Large. Nominations were accepted at the October meeting, and elections will be held at the November meeting. The responsibilities of each position are listed on the club website.

Gordon turned the meeting over to Tom Mozdzen who introduced the speaker, Tyler Richey-Yowell.

Tyler shared the progress of her understanding of how the high energy radiation from K-stars evolves over time. Tyler began her talk by reviewing the properties of M, K, and G type stars. This included their ranges in surface temperature, mass, and size. She then asked what the audience thought would be the most likely type of stars to have a habitable planet orbiting it. The audience responded to the zoom poll and the percentages were shared after everyone eligible had voted.

She then described the process of finding a habitable planet – find a rocky planet, determine if it is in the habitable zone, and observe its atmosphere for signs of life. An additional step would be to prioritize the planets found in their habitable zones for follow-up. Tyler's focus is on the stellar side – how might the high energy radiation of K-stars affect the planet's atmosphere over time.

She explained how the apparently minuscule flux from the high energy part of the star's spectrum compared to the thermal radiation from the K-star. Although minuscule by comparison, the UV and X-ray emission still has sufficient energy to affect the planetary atmosphere. Her research uses archived data from GALAX and from ROSAT satellite observing programs. From those data she computed the UV excess by subtracting out the emission from the photosphere of the star. Her early results appeared to separate out the UV incident on a habitable zone planet by stellar classification. This included in the early evolu-

EVAC Zoom Meeting Notes for 2021 October 15th, at 07:30 P.M. AZ Time

by Wayne Thomas

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tion of the Late M, Early M, and Early K stars. The results indicated less UV arriving at the planet's atmosphere from Early K stars compared to the others.

Time was then obtained on the Hubble Space Telescope to obtain spectroscopic, flare, and extreme UV data during 73 Hubble orbits. One result from this data is named K-dwarf stalling. There appears to be no rotational evolution of K stars between the ages 670 Myr and 1400 Myr.

Then GAIA 3-dimensional data became available. Using GAIA's distances to the stars in her earlier study, she came up with new insights into the amount of UV radiation received by planets orbiting K-stars compared to M-stars. As a result, flare activity may be the deciding factor for where life may reside outside our Solar System.

Following her talk, Tyler answered the following questions:

During the poll, Dave saw only the G option. So he voted G. The poll therefore has some bias.

Why do M and K stars emit more UV than say G stars? Compared to the photosphere, the UV comes from the chromosphere and above which is further out from the photosphere. The UV from the photosphere is much less than that from the upper atmosphere of the star.

What is the closest K-star to us? Tyler does not know off the top of her head. However, the planned space telescope Plato will launch within this decade. It will be looking specifically for planets orbiting K-stars out to about 50 parsecs and expects to find about 30.

What is the progress in studying flares from M-stars? Hubble cannot study flares for fear of damaging the imaging chip. CubeSat SPARCS is scheduled to launch next year to specifically study UV from stars.

Do planets orbiting K-stars have sufficient atmosphere? Could the fact that they are tidally locked be a saving grace for life? K-stars have a much longer life than G-stars like our Sun. Planets even closer to their star than the habitable zone may have favorable conditions on the shadow side, since the planet is tidally locked in its orbit. And the shadow side would be protected from flares.

Do planets orbiting K-stars have magnetic fields? And if so, how are these fields detected? Two techniques have been proposed. One is to observe aurora in the atmospheres of the planets. The wavelength of the radio spectrum emitted from aurora is directly related to the strength of the magnetic field. This method has yet to be successful. The second is to measure the modulation of the Calcium K-line due to the orbit of the planet about its star. This technique has produced a few detections.

Have you worked in the optical region observing flares? If so, how do the flares in the optical compare to the flares in the UV? Optical flares are important but provide an incomplete picture. A UV flare may or may not exhibit an optical flare.

Tom turned the meeting back to Gordon.

Due to the continuing threat of COVID, there will be no holiday party this year.

Our next meeting will be on Friday, November 19, at 7:30 p.m. via Zoom. We will hold election for officers, and Jeff Kanipe will speak on "Peculiar Galaxies: Touchstones in Galaxy Classification. What Makes a Peculiar Galaxy Peculiar?".

Gordon adjourned the meeting at 8:47 p.m. Attendance was at least 91.

Wayne Thomas, Secretary
EVAC

The Backyard Astronomer
by Bill Dellinges

The Fall Sky (November 2014)

Between summer and winter the night's stars are pretty tame. Like the spring, we are looking away from the plane of the Galaxy. In the spring we look north of the Milky Way band and in the fall, south of it. As a stargazer I have always had a penchant for facing initially south to get my celestial bearings. From this viewpoint the prominent fall constellation is Pegasus, the Flying Horse, nearly overhead (and upside down!). Pegasus is a large constellation but with rather dim second and third magnitude stars. Its main four stars make an asterism called the Great Square. This represents the steed's torso, though technically the northeast star of the Square, Alpheratz, is assigned to Andromeda. The northwest corner of the Square sprouts a string of third magnitude stars creating a pair of galloping legs. From the southwest corner a string of stars forms the long neck then turns northwest to the star Enif, the horse's snout - and a nice triple star.

Below the horse there is a large absence of stars all the way to the horizon because you are looking out of the plane of the Galaxy towards the South Galactic Pole (SGP). There are constellations here but they are dim ones like Capricornus, Piscis Austrinus, Aquarius, Pisces, and Cetus. These constellations are sometimes referred to as the "Watery Constellations" for obvious reasons. Though dim, two of them have lucidas worth noting. A neat coincidence is that both sides of the Great Square aim at them. A line drawn down the Square's west side points to Fomalhaut in Piscis Austrinus. A line drawn down the east side leads to Diphda in Cetus, the Whale. These two stars, magnitude 1.2 and 2.0 respectively, stand out conspicuously in this stellar void. The SGP is ten degrees due south of Diphda, very close to NGC 288.

While in the area of Pegasus, take a look at M15, one of the more impressive globular clusters in the sky. It can easily be found by following a line from Delta and Epsilon Pegasi northwestward. Higher up in the constellation is NGC 7331, a magnitude 9.5 galaxy. About half a degree southwest is a far more challenging object, Stephen's Quintet, a tight grouping of magnitude 13 galaxies 200+ light years away. I was unable to see them in an 11" telescope from my semi-rural site but have seen the grouping at a dark site with a C-14. This time of year one can also reap rewards by swinging a telescope towards the north and northeast.

Directly north of the Square in western Andromeda is a fine planetary nebula, NGC 7662. You can catch this "Blue Snowball" in just about any sized telescope. Ten degrees west in Lacerta is a marvelous multiple star. Eight Lacertae (SAO 72509) has five components and is like a small star cluster! I can see them all in my 11" at 107x. Certainly one of the finest deep sky objects in the sky is the Double Cluster in Perseus. It can be detected naked eye even in semi light polluted skies. Located between Perseus and Cassiopeia, the twin clusters are seen to best advantage in instruments yielding a field of view of at least one degree. I can get that with the 11" using a 55mm eyepiece and the view is stunning. Fortunately for field challenged scopes, the clusters have similar declinations so one can easily slew back and forth to see one, then the other in the center of the eyepiece. While each cluster is wonderful, my favorite is the western cluster NGC 869 which has a denser core with a jewel-like spattering of colorful stars. There is an interesting chain of stars running from NGC 869 northwestward to the large sparse star cluster Stock 2. That trip is best made with binoculars.

Turn southward to visit a most interesting and overlooked object in Perseus. Its brightest star is Mirphak and as you study it, you may notice there is a soft glow below it. Spy it with a binocular with a seven degree field and you will be delightfully surprised. This is the large open star cluster Melotte 20 (aka, the Perseus OB Association). To me the brighter stars form a serpentine-like "S". Seen on tripod mounted binoculars, I feel it's almost as pretty as the soon to rise Pleiades.

Another neglected object in the area is poor M34, an otherwise respectable open star cluster located midway between Almaak (Gamma Andromedae) and Algol (Beta Persei). I don't think I've ever heard anyone at a star party shout out, "Hey, I've got M34 here!" It was very nice in the 11" at 90x but the clusters stars barely fit in the scope's 0.9 degree field.

Let's end our voyage with the best galaxy in the sky – the great Andromeda Galaxy, M31. It needs no introduction. You WILL need a large field of view for this baby. It's two and half degrees long – five full moons (in a dark sky). It's huge because it's "close", only 2.5 million light years away. It's probably the most distant thing in the sky you can see

The Backyard Astronomer

by Bill Dellinges

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with the naked eye. This galaxy can easily be seen in any binocular or 8x50 finder. It's placed just above a line from Beta and Mu Andromedae. In my 11" at 90x and 0.9 degree field, I can get both M31 and its satellite galaxy M32 in the same field. M31 is elongated because we view it obliquely. Dark lanes between spiral arms can usually be seen but only at dark sites. If I slew M32 just out of the field, I can pick up M110 (NGC205) on the other side of M31. The ghostly M110 is much fainter than M32 and can be easily missed. The best views of this trio are through wide field short focus telescopes.

These objects are just a few of the treasures in the fall sky. Many more can be found in your atlases. Enjoy them as a warm up for the coming winter goodies.

Deep Sky Imaging Target Highlights for November

by James Yoder

The average low temperatures for November in the Phoenix metro area is 53° F. November 04 is a new moon with Astronomical dusk at 6:57pm and Astronomical dawn at 5:24, giving us 10 hours and 27 minutes of imaging time.

In this months list there are 141 object/configuration combinations provided of just about every class of deep sky object including 6 Globulars, 16 Open Clusters, 7 Planetary Nebulas, 35 Nebula, 21 Galaxies/Galaxy Clusters, and 3 Dark Nebula.

The Prospective Imaging Objects guide (PDF download) covers objects that reach their highest point in the sky and crosses the meridian (aka Transit) sometime between Astronomical Dusk to Dawn. We will be focusing on object that transit roughly between 10pm and 2am. This ensures maximum imaging time over the month.

Happy Hunting!

Some Highlighted Targets for November

Configuration	Page	Object	Type	Image Link
Hyperstar	20	IC-1848 (Soul Nebula)	Dark Nebula	130 min
Hyperstar	24	IC-2118 (Witch Head Nebula)	Dark Nebula	81 min
Reducer(0.7)	12	NGC-281 (Pacman Nebula)	Diffuse Nebula	78 min (C-8)
Reducer(0.7)	19	M-77, NGC-1055	Galaxy Pair	205 min
Primary Focus	16	M76 (Little Dumbbell Nebula)	Planetary Nebula	240 min
Primary Focus	15	M-33 (Triangulum Galaxy)	Face-on Galaxy	Imaging Time Unknown (C-8)

Resources:

- ArtCentrics.com – November Potential Targets Guide (PDF download)
- Telescopius – Lookup objects, plan imaging session.
- Field of View Calculator – Test Different Telescope, camera & eyepiece combinations.
- Astrometry.net – Solve images captured by your system. Get image RA/DEC, pixel scale, image size, orientation of the image you have taken.

EVAC Outreach Events

by Gordon Rosner

Again, unfortunately another very short column this month. All outreach events remain cancelled due to supporting the public health concerns. For more information, see the President's column at the beginning of this newsletter or at the top of the EVAC website.

As always, still looking very forward to our outreach program getting back and to hearing all those "OH WOW's" we so love to hear.

Gordon Rosner
EVAC Outreach Events Coordinator

Find Out What's Happening – Join EVAC-Announce List

If you would like to receive email announcements about EVAC meetings and activities, please join the EVAC–Announce mailing list. Click on the link below to subscribe. Enter your full email address in the box titled User Options and press OK. You will receive a confirmation email. Your privacy is respected by EVAC and we will never sell your email address, or use it for non-club relevant solicitations. This mailing list is designed for communication from EVAC, and does not enable users to respond to the message. If you wish to contact club officers, please use the list in the Contact-Us area on the Home page of our EVAC website. To subscribe to the EVAC–Announce mail group click: http://www.freelists.org/list/evac-announce. To unsubscribe use the same link, enter your email address and select Unsubscribe from the "Choose An Action" list. Another list to consder is AZ-Observing@groups.io, simply click on this link https://groups.io/g/AZ-Observing and follow the instructions on the page. EVAC also has a Facebook Group where members may share ideas, photos, and Astronomy related information. To join: EVAC Facebook Group.

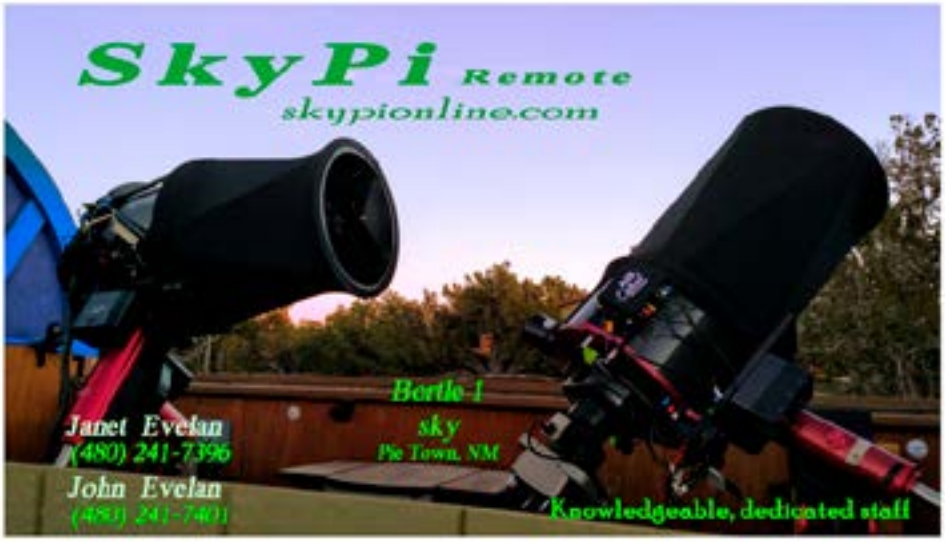
The Gilbert Rotary Centennial Observatory (GRCO) also has a Facebook Group where members may share ideas, photos, and Astronomy related information. To visit, please click on Gilbert Rotary Centennial Observatory - GRCO.

New Moon on November 4 at 14:14

First Quarter Moon on November 11 at 05:45

Full Moon on November 19 at 01:57

Last Quarter Moon on November 27 at 05:27



SkyPi Remote Observatory

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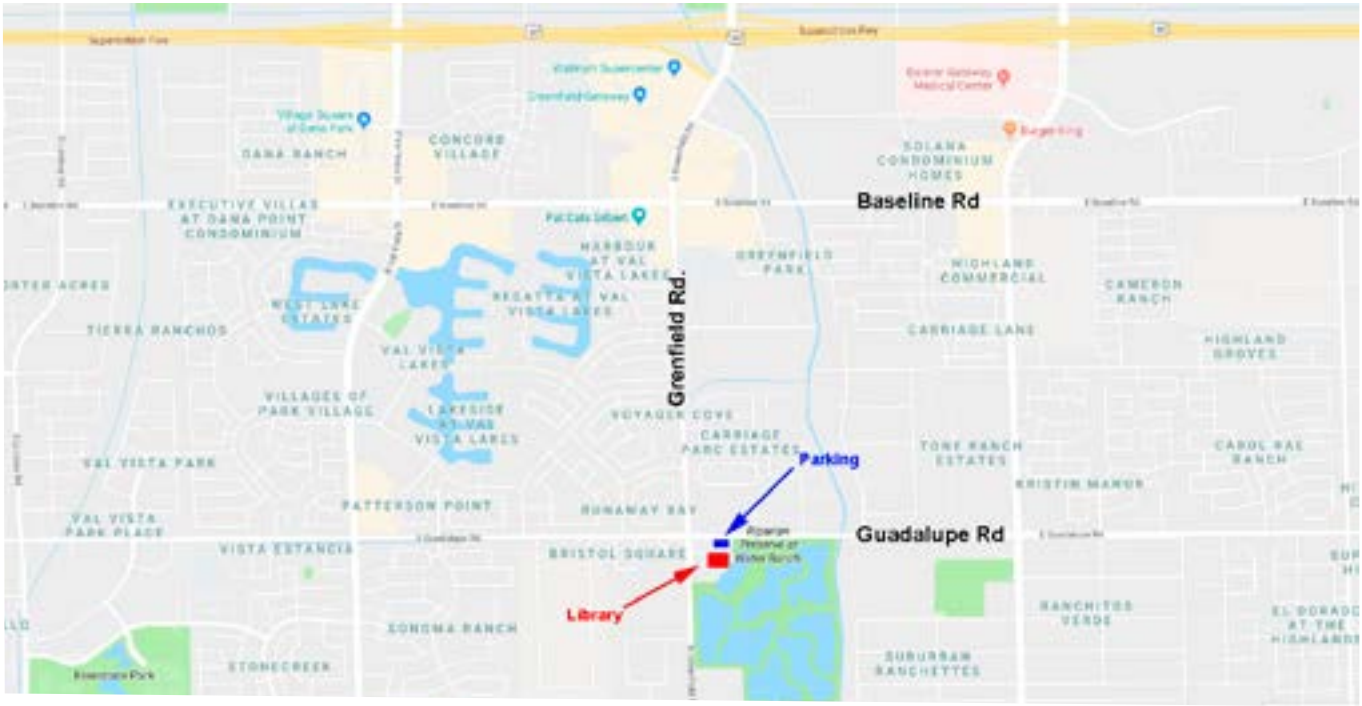
Monthly Meetings will be presented live online using Zoom. See the EVAC Website for updates. All other events are on hold until health concerns are resolved.

The monthly general meeting is your chance to find out what other club members are up to, learn about upcoming club events and listen to presentations by professional and well-known amateur astronomers.

Our normal in-person monthly meetings have temporarily been cancelled. and are replaced with an online Zoom meeting.

Our meetings are held on the third Friday of each month at the Southeast Regional Library in Gilbert. The library is located at 775 N. Greenfield Road; on the southeast corner of Greenfield and Guadalupe Roads. Meetings begin at 7:30 pm.

Visitors are always welcome!



Southeast Regional Library
775 N. Greenfield Road
Gilbert, Az. 85234

November 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	**19**	20
21	22	23	24	25	26	27
28	29	30				

November 19 - EVAC Monthly Meeting Live Online via Zoom.

The EVAC Monthly Meeting will be held live online via Zoom. All other meetings and events have been cancelled until further notice.

December 2021

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	**17**	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

December 17 - EVAC Monthly Meeting Live Online via Zoom.

The EVAC Monthly Meeting will be held live online via Zoom. All other meetings and events have been cancelled until further notice.

East Valley Astronomy Club -- 2021 Membership Form.

IMPORTANT: All memberships expire on December 31 of each year

New Member Dues (select according to the month you are joining the club)

	Individual	Family	
January, Feburary & March	**$30.00**	**$35.00**	
April, May & June	**$22.50**	**$26.25**	
July, August & September	**$15.00**	**$17.50**	
October, November & December	**$37.50**	**$43.75**	(*Includes following year)*

Renewal (current members only):

☐ **$30.00 Individual** ☐ **$35.00 Family**

☐ **Astronomical League:** $7.50 Annually (per person)

Name Badges: Quantity: _____

☐ **$10.00** Each

Name to imprint: _____

Total amount enclosed:

Please make check or money order payable to EVAC

Payment will be made using PayPal ☐

Name: | Phone:

Address: | Email:

City
State
Zip | URL
For website

Would you be interested in our outreach program? ☐ Yes ☐ No

How did you discover East Valley Astronomy Club?

Liability Release Form

In consideration of attending any publicized Star Party hosted by the East Valley Astronomy Club (hereinafter referred to as "EVAC"), the receipt and sufficiency of which is hereby acknowledged, I hereby affirm that I and any related entities, predecessors, successors, affiliates, attorneys, guarantors, insurers, transferees, assigns, parents, spouses, children, subsidiaries, accountants, officers, directors, employees, agents, shareholders, members, and trustees, past and present, hereby forever release, acquit and discharge to hold EVAC and its related entities, predecessors, successors, affiliates, attorneys, guarantors, insurers, transferees, assigns, parents, spouses, subsidiaries, accountants, officers, directors, employees, agents, shareholders, members, and trustees, past and present, from any and all causes of action, claims, losses, damages, liabilities, expenses (including attorneys' fees) and demands of any nature whatsoever, known or unknown, that in any way relate to, arise out of, or concern EVAC and/or my presence on the premises of any EVAC Star Party and related areas, whether or not those causes of action, claims, damages, liabilities, and demands are part of the specific subject matter of EVAC or any EVAC Star Party. This release is intended to and does cover all injuries and damages, and the consequences thereof, whether known or unknown at the time of the execution of this release, which have occurred or may hereafter occur or which may hereafter be discovered, and which may have been caused or may be claimed to have been caused by the said incident, and specifically includes, but is not limited to, bodily injuries, mental and emotional injury, pain and suffering, medical treatments, and loss of earnings or income.

My signature upon this form also indicates agreement and acceptance on behalf of all minor children (under 18 years of age) under my care in attendance. EVAC only recognizes those who are members or invitees and who also have a signed Liability Release Form on file as participants at an EVAC Star Party.

Signature _____ Date _____

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The East Valley Astronomy Club is a 501(c)(3) nonprofit charitable organization.

www.evaconline.org

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