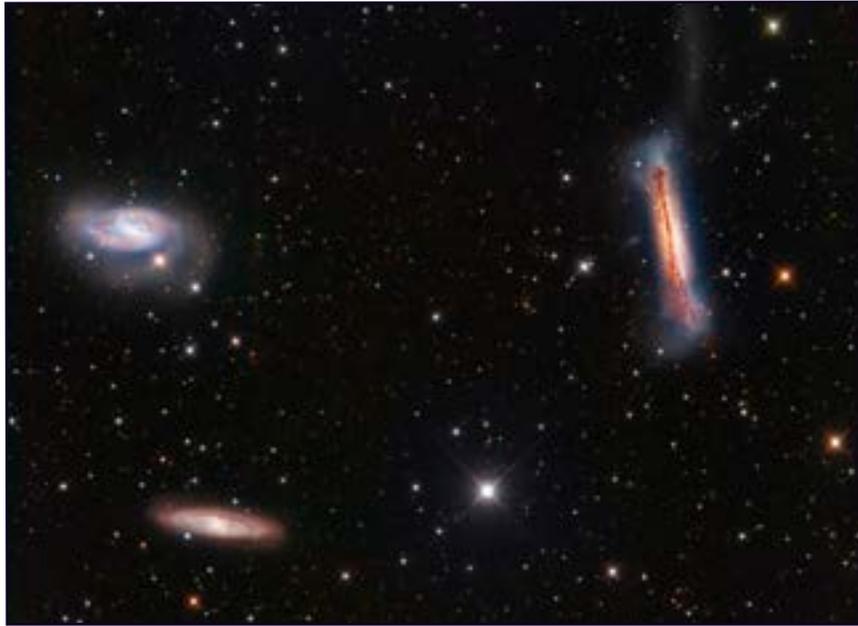


# THE OBSERVER



The Leo Trio - APOD March 20, 2021  
Image Credit & Copyright: Francis Bozon

## From the Desk of the President by Gordon Rosner

Greetings from your President.

As always, I sure hope everyone is still doing well and keeping healthy. Especially with better times beginning to come in focus.

A sign of better times coming is that in April the Southeast Regional Library in Gilbert is planning on returning to signing out the 4.5" Dobsonian Telescopes they have. These telescopes were donated to the library by our club for checking out just like a book. The Library can be reached at 602-652-3000. This is an example of how your club supports the general public in astronomy ed-

ucation. Prior to pandemic restrictions, these were very popular and I'm sure they will return to be that way. So, if anyone is interested in checking out one of these scopes, I suggest you give them a call to make sure one is still available.

With us all keeping hopes of better times ahead soon, last month another blow was struck against astronomy enthusiasts. The Picket Post Trailhead east of Phoenix, a very popular dark sky viewing and astrophotography site, is now closed between sundown and sunrise every day. Anyone there at sundown will be asked to leave and the entrance

## UPCOMING EVENTS:

All meetings will be held online.

EVAC Meeting via Zoom - April 16th

Richard Hedwick CEO of PlaneWave Instruments - "A Brief History of PlaneWave. Telescope and Mount Making and the Newest Product Member".

## INSIDE THIS ISSUE:

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# From the Desk of the President

by Gordon Rosner

*Continued from page 1*

gate will be closed and locked for the night. This is a result of a National Parks Service requirement for all national parks due to a fatal accident in Utah involving a car and a gate. Currently there is no prediction on when, or if, this requirement will be lifted. However, the full time ranger at Picket Post is scheduled to leave for the summer the first day of April. I personally discussed this change with him and it is unknown how the parking area will be controlled and by whom when he leaves.

EVAC has no official use agreement with the National Parks Service nor the Picket Post Trailhead officials. All activities there are considered as private actions of the public visitors with no connection to EVAC. Anyone can go there just as any visitor can. As such, all visitors must abide by the laws and rules of the Tonto National Forest Service. So, what does anyone do about it? Simply, everyone must abide by the service's laws and rules which now means the Picket Post Trailhead parking area where folks used to set up their equipment is closed and locked at sundown with anyone in the area being asked to leave. EVAC has club members who use the area overnight, just like any other astronomy club members and other folks not associated with any club. Picket Post is certainly considered a valuable asset to EVAC's mission statement, even though EVAC has no area responsibilities or agreements. The trailhead officials have always welcomed the astronomy visitors. The Forest Service's chain of command up to the state level has my contact information and will let me know of any official changes or possibilities for our use but this is uncertain at this time.

On to the good things. Remember our newsletter's member article feature was added last month. We are accepting a one page or so article on any astronomy related topic from our membership. Tell us about your equipment, how you got started in astronomy, your road to astrophotography, outreach programs you have done, any observatories you have visited or any other astronomy related subject. Remember this is YOUR club. If it was interesting to you, it will be interesting to all of us. So, become a published astronomer and submit a member article to me via the 'Contact President' link on our website.

Everyone should remember that 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 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 Facebook page continues to be our vehicle to get together without being together. Visit it to see the latest astrophotography successes and descriptions on how they got there. It also includes general astronomy news and help with equipment. And you just might find that scope for sale there that you were thinking about.

During our past couple of online General Meetings I mentioned a five part series of online presentations available to us titled "Introduction to Amateur Astronomy" presented by the Kalamazoo Astronomical Society in Michigan. I watched all five and was very impressed by all the two-hour presentations. Very well done with excellent graphics and a very knowledgeable live presenter. The last one was on 20 March titled "The Art of Astrophotography". As I mentioned last month, I get quite a lot of questions about which telescope to buy and how to get started in astrophotography. I hope if you were one of those you watched this last presentation. If you missed it, you can view it on YouTube at <https://youtu.be/6r-2bXDA0kY>. However, there are many other excellent YouTube videos on beginning astrophotography. Before jumping in to this exciting but potentially addicting hobby, I highly suggest you research all you can.

Remember the "International Dark Sky Week" spans 5-12 April. This event is sponsored by the International Dark Sky Association. Watch out for more information on this event or by visiting the website at [idsw.darksky.org](http://idsw.darksky.org).

Our next online Monthly General Meeting will be on Friday, 16 April starting at 7:30PM. The main presentation will be by Richard Hedwick, CEO of PlaneWave Instruments titled "Brief history of PlaneWave, Telescope and Mount Making, and the Newest Product Member". PlaneWave Instruments manufactures high end astronomy equipment available to both professional and amateur astronomers.

# From the Desk of the President

by Gordon Rosner

*Continued from page 2*

As always, a reminder that there are three ways to receive a notification link via an email to register for the next on-line monthly General Meeting. 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:

1. Send a one-time email request to [vp@evaonline.org](mailto:vp@evaonline.org).
2. Sign up for the [evac-announce@freelists.org](mailto:evac-announce@freelists.org) mailing list.
3. Sign up for the [AZ-observing@groups.io](mailto:AZ-observing@groups.io) mailing list.

Another 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. These will also be announced during our monthly General Meetings.

In closing, I'm finally happy to say things are beginning to look up (pun intended). Your club Leadership Team is now actively discussing what inputs are needed to create the first steps for easing into the re-opening of the club's

## EVAC Zoom Meeting Notes for 2021 March 19th, at 07:30 P.M. AZ Time

by Wayne Thomas

### Meeting Minutes Including Details of Presentations

President Gordon Rosner welcomed those in the "audience" to the virtual meeting at 7:31 p.m. His first slide presented the meeting agenda:

- Welcome
- Introductions
- Club News
- Member presentation - Tom Polakis: "A Binary Companion to a Bright Asteroid"
- Main Presentation - Nivedita Mahesh, ASU: "A Farside Array for Radio Science Investigations of the Dark Ages & Exoplanets"

After his welcome, Gordon introduced the leadership team in charge of keeping EVAC running. EVAC's Board of Directors continue to meet and keep the club on track. Our next club meeting will be virtual on April 16 with Richard Hedrick, the CEO of PlaneWave presenting.

Under club news, he reminded us that all club sponsored events with personal contact are still cancelled. Member presentations are always welcome. Send Gordon a note if you are interested in making one. If you would like to write an article for the Observer, submit a draft to the

public events. The team has not yet finalized these steps and still can not give a predicted time of implementation during this early stage of vaccinations and government relaxing of restrictions. The safety of club members and our visitors to our events are of utmost concern which involves a step-by-step process to ensure safety requirements are understood and the methods to implement them. We are certainly getting closer but the journey is still in progress. So, remember that all EVAC in-person group activities still remain cancelled. As always, check our club website for the latest information.

I'll 'see you' at our 16 April meeting.

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

Your President,  
Gordon Rosner

president for his review. Our monthly meetings on Zoom are being recorded and each can be viewed via its link on the EVAC website, <https://www.evaonline.org/events-meetings>

The trailhead at Picket Post near Superior will be closed between sunset and sunrise each night. The gate will remain locked during the night. It is unknown if or when this will change.

International Dark Sky Week, "Discover the Night," will be April 5 to April 12. Go to <https://idsw.darksky.org> for more details.

The Kalamazoo Astronomical Society class: "Introduction to Amateur Astronomy" has been excellent. The final class will have occurred by the time the April newsletter is published.

Our next regular club meeting will be at 7:30 p.m. Friday April 16 via Zoom. Richard Hedwick, CEO of PlaneWave will speak on "Brief History of PlaneWave, Telescope and Mount Making, and the Newest Product Member." Register for the meeting in the usual way by the link in the invitation email.

# EVAC Zoom Meeting Notes for 2021 March 19, at 07:30 P.M. AZ Time

by Wayne Thomas

*Continued from page 3*

Gordon introduced Tom Polakis who shared "A Binary Companion to a Bright Asteroid." He shared how he discovered a satellite orbiting the bright asteroid 1803 Zwicky. Tom regularly measures the changing brightness of many asteroids to help others develop shape models for them. This asteroid rotates once every 29.9 days and is at magnitude 14.5. For this asteroid he recorded a brief and deep dip in brightness in addition to the changes in brightness due to its rotation.

Tom Mozdzen then introduced the featured speaker, Nivedita Mahesh, a doctoral candidate at ASU.

The FARSIDE project includes two goals:

1. To study the dark ages between the epochs known as Recombination (which resulted in the emission of Cosmic Microwave Background (CMB) photons) and Cosmic Dawn (the creation of the first stars).
2. To study exoplanets for the potential of life.

Nivedita began by showing how a Coronal Mass Ejection from a star would interact with a planet containing a magnetic field. The interaction produces polarized low frequency radio waves via the synchrotron radiation process. Based on simulations, the frequencies of these waves are less than 10 MHz. This results in an antenna designed for frequencies less than 20 MHz.

For studying the universe's dark ages, Hydrogen radiation from electron spin flip will be utilized. This radiation, with a rest wavelength of 21 centimeter, will have been stretched by the expansion of the universe. By the time it reaches the Earth, the resulting frequency will be less than 40 MHz. Simulations show two troughs, one matching at shorter wavelengths, and another with widely varying depths at longer wavelengths. FARSIDE will provide ground truth to constrain the models.

The requirement for no radio interference results in the far side of the Moon as an ideal location. Modeling suggests that the area around the exact opposite to the Earth is best with lunar latitude and longitude constraints. The need to detect many faint signals simultaneously results in a very large array.

Polarization of the incoming radio waves is critical to determining the properties of the source. To measure po-

larization requires pairs of dipole antennas oriented perpendicular to each other.

Nivedita discussed her analysis of various antenna designs based on the EDGES design. The result is a larger antenna but with no ground plane. Further investigations will include better modeling of the lunar regolith and simulations involving offsetting the perpendicular dipoles from each other.

The resulting array will be in a spiral configuration with both a low band antenna array and a high band array. The low band array will cover 100 kilohertz to 2 megahertz, while the high band array will cover 1 to 40 megahertz. There will be 128 units, each consisting of two antennas.

Because the perpendicular dipoles are offset one from another, additional mixing is introduced into the polarization data. Further modeling will be done to better understand and to maximize the quality of the data produced by FARSIDE.

The Lunar Gateway, a satellite orbiting the Moon, will relay data from the FARSIDE array to Earth. FARSIDE will generate 65 gigabytes of data each day.

Following her talk, Nivedita fielded the following questions:

How does the practical limit on mission deployment impact the spatial optimal size?

The lengths of the antenna are limited to 100 meters, otherwise they would need to be deployed in a zigzag fashion. The spirals will each be 5 kilometers long for a total array diameter of 10 kilometers.

How do you handle noise from the Sun?  
We will only observe during lunar night.

How long will Farside be in operation?  
Farside will operate for 60 months. This is the useful lifetime of the power source.

Where will Farside be located?  
There are many potential sites, however the specific site has not been chosen. The site must have no undulations greater than 1 meter.

# EVAC Zoom Meeting Notes for 2021 March 19, at 07:30 P.M. AZ Time

by Wayne Thomas

*Continued from page 4*

Red dwarfs produce strong signals. How will you be able to distinguish the signal from the exoplanet from that of the star? The polarization of the signal from the planet will be different compared to that from the star.

Which radioisotope will be used in the power source? The isotope is not specified at this time.

## The Backyard Astronomer

by Bill Dellinges

### Terminator: Following the Moon's Black Curtain

Most stargazers are familiar with the Moon's various phases. Simply put, as the Moon revolves around Earth at an average velocity of 2,288 miles per hour completing one revolution in 27.3 days relative to the stars (Sidereal month) or 29.5 days (Synodic month) if timing it from one particular phase cycle such New Moon to New Moon. Note we get the word month from the root "Moon". The first half of the journey, from New Moon to Full Moon is pretty easy to comprehend because it occurs during evenings when most people are likely to observe the process.

We usually recognize the start of lunar phases with the New Moon, when the Moon is between Earth and the Sun and we can't see it except during solar eclipses. A day or two later we begin to notice a thin sliver of Moon after sunset. It grows after about seven days to the Half Moon (or first quarter) as the terminator, the line dividing day and night on the Moon, moves to your left or eastwards (at 9.6 miles per hour at its equator). During this period, it's interesting to note that a keen eye, perhaps aided by binoculars, can detect detail in the dark areas of the Moon. This is caused by "earthshine", reflected light from Earth illuminating those areas. Meanwhile, the terminator continues leftwards during the next seven days to the Full Moon phase.

Now things get tricky, as we are not paying much attention to how the terminator behaves past the full moon phase because we are usually asleep or abstaining from stargazing until that annoying light polluting satellite of ours nears its next new moon phase. To assist in conceptualizing the movement of the terminator post full moon, let's treat the dark of the moon as a black curtain.

Quick review: Day one (New Moon): A black curtain covers the Moon completely. The next couple of days reveal

What is the resonate frequency of the array? For an antenna 100 meters long, the frequency is 1.5 MHz.

Our next meeting will be on Friday, March 19th, at 7:30 p.m. via Zoom. Gordon adjourned the meeting at 9:26 p.m. Attendance maximum was 83.

Wayne Thomas Secretary EVAC

a thin crescent phase of the Moon as the "Curtain" opens near the Moon's right side. The terminator is curved (convex) because the Moon is a sphere. The bright light is reflected Sunlight. During several more days the curtain moves to your left eastwards until reaching the first quarter phase where the terminator is now a straight vertical line because the Moon is now at a right angle to us relative to the Sun. During the next seven days the curtain's retreating edge turns concave forming a gibbous (Latin for "hump") phase – halfway from first quarter to Full Moon. The curtain moving left (east) gets thinner until it disappears presenting us with a Full Moon. The Full Moon is a moment when the Moon is 180 degrees from the direction of the Sun. It's a moment because the Moon is moving, it can't be full very long as seen from Earth. But it can appear full to the naked eye for a day or two. Nevertheless, a telescope aimed at the right side of the Full Moon's rim will soon detect detail, craters and mountains, are beginning to show – indicating the Moon is no longer completely full.

Now for what we don't usually see: On the right side of the Moon our black curtain appears and will grow moving to your left (but now westwards) eventually making a last quarter phase with a straight terminator and continuing on to extinguish sunlight as the Evil Black Curtain marches down to a New Moon ending the show.

To sum up: the first half of our "Moon show" sees a black curtain that previously covered the Moon, move from right to left (New Moon to Full Moon) revealing more Moon. The second act sees a black curtain move also from the right to the left but decreasing or covering more sunlit Moon. In both cases, the terminator always marches from your right to your left.

Some may find this Black Curtain analogy a little loony, but it works for me.

## 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 consider is [AZ-Observing@groups.io](mailto: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](#).

## 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

**LAST QUARTER MOON ON APRIL 4 AT 03:02**

**NEW MOON ON APRIL 11 AT 19:30**

**FIRST QUARTER MOON ON APRIL 19 AT 23:58**

**FULL MOON ON APRIL 26 AT 20:31**



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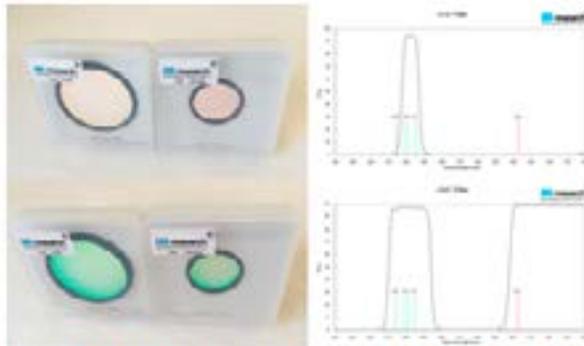
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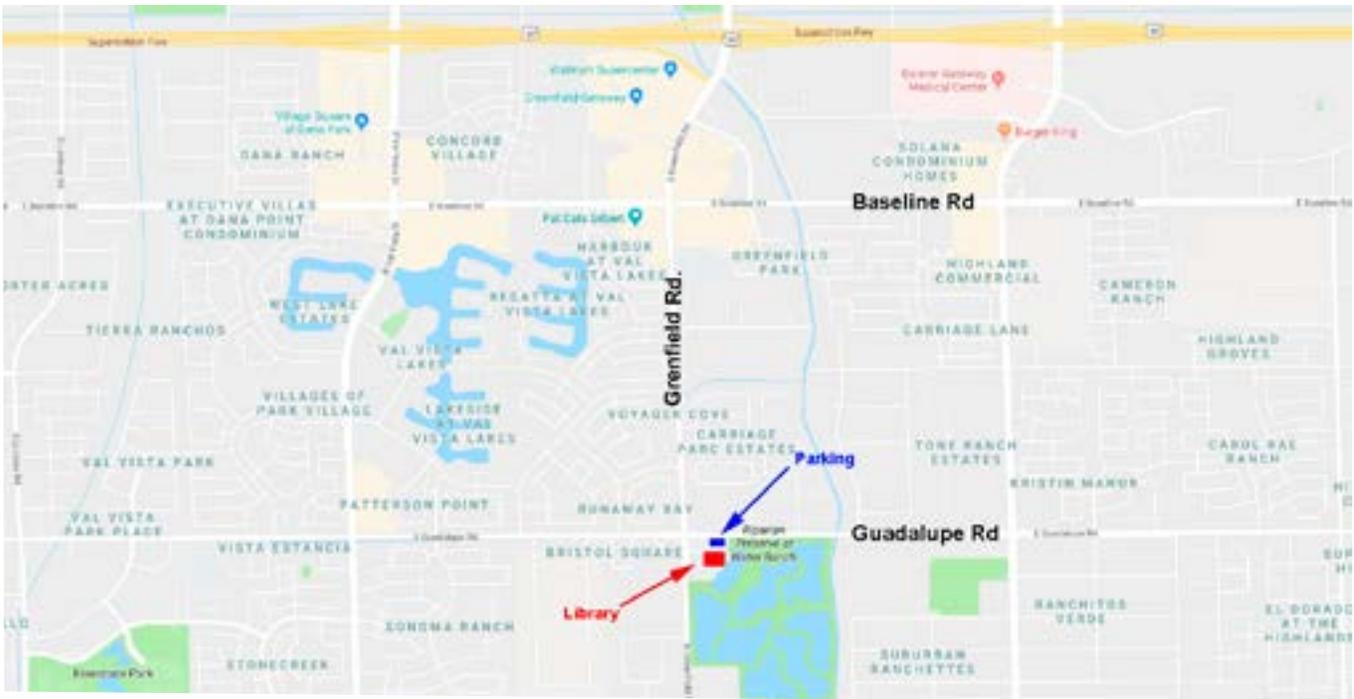
Monthly Meetings will be presented live online using Zoom. See the EVAC Website for updates. All other events are on hold until health concerns are resolved.

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**



## APRIL 2021

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

**April 16** - 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.**

## MAY 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	<b>21</b>	22
23	24	27	25	26	27	28

**May 21** - 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)

	<b>Individual</b>	<b>Family</b>	
January, February & March	<b>\$30.00</b>	<b>\$35.00</b>	
April, May & June	<b>\$22.50</b>	<b>\$26.25</b>	
July, August & September	<b>\$15.00</b>	<b>\$17.50</b>	
October, November & December	<b>\$37.50</b>	<b>\$43.75</b>	<i>(Includes following year)</i>

**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:**

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Payment will be made using PayPal

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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 \_\_\_\_\_

*The Observer is the official publication of the East Valley Astronomy Club. It is published monthly and made available electronically as an Adobe PDF document the first week of the month. Please send your contributions, tips, suggestions and comments to the Editor at: [news@evaonline.org](mailto:news@evaonline.org). Contributions may be edited. The views and opinions expressed in this newsletter do not necessarily represent those of the East Valley Astronomy Club, the publisher or editor.*

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