

# THE OBSERVER



M27 Not a Comet - APOD September 1, 2011  
Image Credit & Copyright - Martin Pugh

## From the Desk of the President

by Tom Mozdzen

It is hard to believe, but the All Arizona Star Party is just five weeks away - Friday and Saturday nights, Oct 5th and 6th. Start making your plans and finish buying any new equipment you would like to use. Click [here](#) for more details about the party.

I recently checked with the Veterans Oasis Park in Chandler to see if the replacement Solar Walk Panels were installed. They are in hand but haven't been installed to replace the old weather worn signs yet. Perhaps they are waiting for cooler weather. The signs were replaced under warranty as there was a flaw in the manufacturing

process, and the new ones should last 10+ yrs. Our joint fundraising with the Howard Israel estate in 2012 provided enough funds to keep replacing the signs for the next 40 yrs. If we split the cost with the City of Chandler, we could support refurbishment for the rest of the century, as the replacement cost today turns out to be about \$3000.

Help still wanted in several categories: 1) GRCO can still use more help. Please contact Claude if you think you could spare a weekend evening helping out in any capacity. 2) More organizers for the Christmas party (or other club

## UPCOMING EVENTS:

- EVAC Star Party - September 1*
  - Public Star Party - September 7*
  - EVAC Star Party - September 8*
  - EVAC Monthly Meeting - September 21*
  - EVAC Star Party - September 29*
- Check out all of the upcoming club events in the Calendars on page 9.*

## INSIDE THIS ISSUE:

<i>From the Desk of the President</i>	1
<i>September Meeting Minutes</i>	2
<i>Mars 2018 - An Old Friend Returns</i>	3
<i>The Moon as an Optical Test Part II</i>	4
<i>Let's Party for July</i>	6
<i>Announcements</i>	8
<i>Classified Ads</i>	9
<i>Meeting Maps</i>	12
<i>Calendar</i>	13
<i>Membership Form</i>	14

social events) would be quite welcome. Janet Evelan is one person who is willing to help, so please contact one of us if you'd like to assist, we do need your help.

As a warm up to our August featured speakers, John Evelan talked about SkyPi in Pie Town, New Mexico, and the availability to lease a sheltered observatory pier or to do remote observing. Our featured speakers, Bob Buchheim, Bernard Miller, and Wayne Thomas, gave us their stories on how and why their observatories got built and what they do with them. See the meeting minutes for more details.

## EVAC General Meeting Notes for August 2018

*by Tom Mozdzen*

Tom Mozdzen opened the meeting and welcomed several visitors. He reminded us that the All Arizona Star Party (AASP) is getting closer - just five weeks away - Friday and Saturday nights, Oct 5th and 6th. Details are available on our website [AASP](#). Lana Young once again reported that we are keeping within our monthly budget and that paid membership stands at 112 paid members.

Ray Heinle gave a member presentation on filters and reminded us that many objects emit infrared radiation (IR), and that we should be aware that our CCDs are made from silicon which is very sensitive to IR. Our images may record structures, wanted or unwanted, that our eyes do not see. John Evelan also gave a member presentation and talked his observatory named SkyPi in Pie Town, NM, which is at 8000 ft elevation. He has piers for rent for those wishing to set up a robotic telescope, and a telescope for community viewing for those staying in the area. More information can be found at [www.skypionline.com](http://www.skypionline.com).

Our featured speakers were EVAC's very own Bob Buchheim, Bernard Miller, and Wayne Thomas. They described their home-built observatories, what they went through to get them designed and built, and what they do with them now. Bob transitioned from a visual observer to an asteroid observer who needed a more permanent setup to avoid the setup-teardown drill. His solution was a nice big two-story dome. His Gold Canyon neighbors gladly embraced Bob's observatory, as they were proud to have such a nice cool asset located in the community - win-

The September meeting will feature Dr. Steven Levine who will be speaking about the challenges of commissioning the New Discovery Telescope. We also plan to have a short update about the Lowell Observatory public outreach expansion plans given by Bruce Kosaveach. The September meeting will be quite Lowell centric.

Until next month,

Tom Mozdzen

win. Bernard went the remote imaging route with a roll-off roof style enclosure. His expert advisor was familiar with a roll-off roof and it enabled a second telescope to be placed inside without making the enclosure much bigger. Coming to an agreement to collocate the observatory on the property of a resident in N.M. was vital to making this work, as on-site humans are a must when the power goes out and the roof refuses to close on its own. We often see the amazing images he creates and posts on AZ-Observing. Finally, Wayne talked about his design considerations at his observatory near Florence, AZ. The prison lights necessitated a high northern wall, and the many awesome items in the southern sky necessitated a low southern wall. His observatory also went the roll-off roof style and was built to withstand the high winds we sometimes experience. Wayne's observatory is also handicapped accessible, which enables him to offer outreach sessions to a wider audience.

The September meeting on the 21st will feature Dr. Steven Levine who will be speaking about the challenges of commissioning the New Discovery Telescope. We also plan to have a short update about the Lowell Observatory public outreach expansion plans given by Bruce Kosaveach.

We look forward to seeing you at the September meeting,

Tom Mozdzen

# The Backyard Astronomer

by Bill Dellinges (September 2018)

## Mars 2018 – An Old Friend Returns

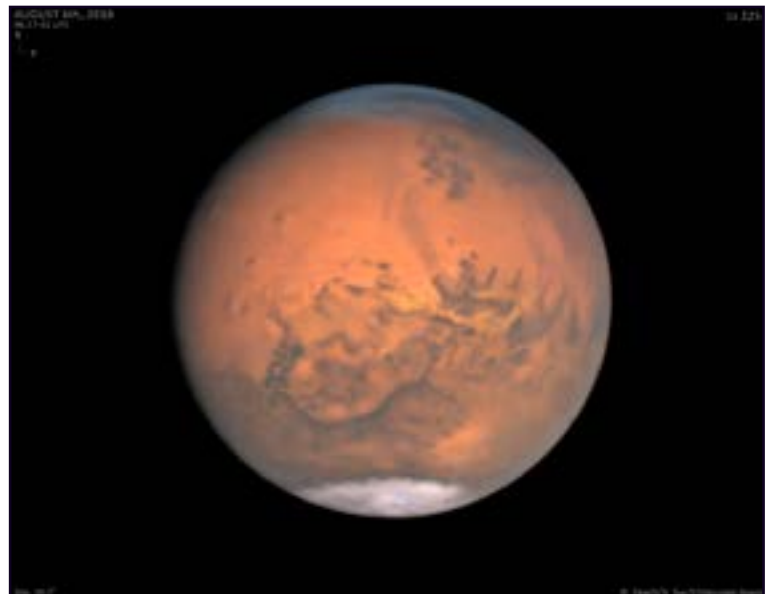
Many stargazers know Mars makes a close approach to Earth every 15 to 17 years. These events are called perihelic oppositions: The Sun, Earth, and Mars are lined up with Mars on the opposite side of Earth. Additionally, Mars is at its perihelion point in its orbit (closest to the Sun). We cherish these oppositions because Mars, being only half the size of Earth, needs to be close for us to see detail on its surface. Even though we pass the planet every two years due to our faster orbital velocity, the distance between the two planets when we pass Mars, can vary from 35 million miles to 62 million miles. This year, the magic moment came on July 31st, when we came within 35.8 million miles of the mysterious red planet. The planet displayed a disk size of 24.3" arc seconds which is about as big as it can get (in the last close approach of 2003, Mars was only 34.6 million miles away and 25.11" in diameter).

It's interesting (at least to me!) to look back at my Martian history (no, I'm not from Mars). My first experience of a Martian perihelic opposition occurred in 1956. I was a 13-year-old budding amateur astronomer armed with a funky but serviceable Criterion 4" Newtonian reflector. At the next pass in 1971 I had a 4" Unitron refractor - no gain in aperture, but much better resolution! By the 1988 event, I had graduated to a Celestron C-14. A few years before the 2003 opposition I had also acquired a 5" APO refractor. That year the two instruments provided me with the best views of Mars I've ever had. Having finally joined the GoTo world in 2006, I have since replaced the C-14 with a Celestron CPC-11. This year I was looking forward to my fifth close approach of Mars when the bad news arrived that Mars was experiencing one of its infamous dust storms.

My first couple of looks at Mars in early August showed a nice large orange disk completely devoid of any surface detail. Then came reports that the dust storm was clearing! Sure enough, on August 15th, I could detect dark markings and the south polar cap on Mars – the Martian global dust storm had definitely abated. Furthermore, in comparing what I was seeing with a map of Mars, I had observed the prominent markings known as Syrtis Major, Sinus Meridiani and the Hellas Basin. A great wave of relief swept through me. I had feared the dust storm

might preclude any chance of seeing the Martian surface. Now I could get down to business! Several resources aided me in identifying features on the planet. Sky and Telescope (S&T) magazine had a handy "Mars Profiler" at their web site under Resources/Education, Interactive Tools, Mars Profiler, where you can find which side of Mars is facing Earth on any given date and hour. I also had a Mars map I copied from S&T back in June 2003 during the last apparition. Lastly, my S&T 12" Mars globe helped me refamiliarize myself with Mars's prominent surface features. (Disclaimer: I'm not getting any kickbacks from S&T!).

Now don't lament you'll have to wait another 17 years (2035) to witness the next perihelic opposition of Mars. Yes, you do. But fear not, nature provides a loophole! If you check an ephemeris, you'll notice that Mars still puts on a respectable performance 2 years before and after a perihelic opposition. Take for instance the next opposition on October 13, 2020. The closest approach to Earth occurs on October 6th, when Mars will be 38.58 million miles away with a disk diameter of 22.56". Not bad. Better yet, its declination of +5 degrees 27' (compared to the current -25 degrees 30") puts it higher in the sky, meaning less atmosphere your telescope needs to punch through. That means better resolution; we might see more detail on Mars than this year! Maybe even one of Elon Musk's Martian settlements.



APOD August31, 2018 - Image Credit D. Peach, V. Suc

# The Moon as an Optical Test Part II

by Don Wrigley

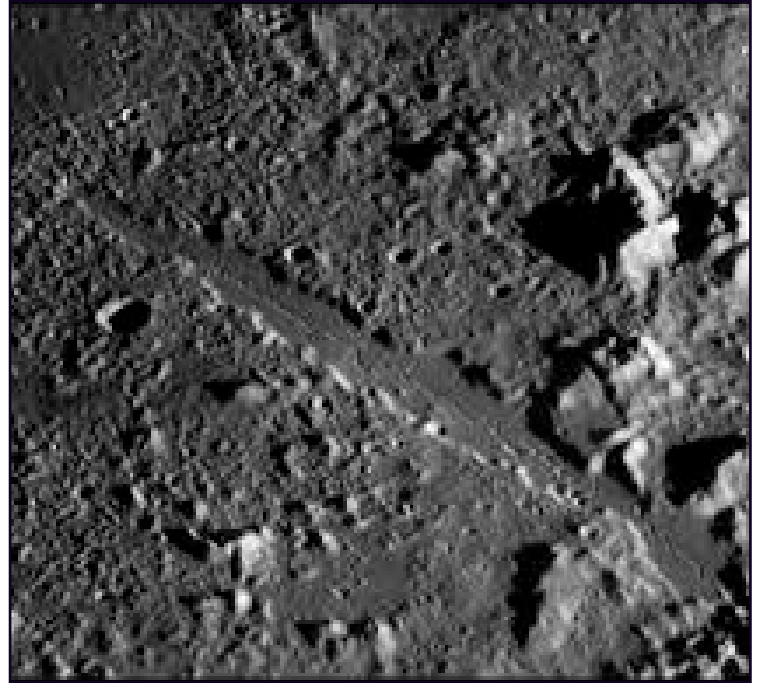
(Note: This article originally appeared in the EVAC newsletter of July, 1993. It has been edited and updated.)

To introduce this month's article, I thought it would be appropriate to briefly discuss the topic of lunar cardinal directions, in order to clear up any discrepancies that may arise when referring to some older descriptions of the moon.

When looking at a photograph of the moon it is easy to describe a particular feature being either left or right, or up or down, (as in "just left of Plato and down a little") with respect to another feature, as long as everyone is looking at the same picture in the same orientation. Looking through a telescope is another matter; left and right or up and down no longer have any meaning, because no two observers share the same frame of reference. It is therefore necessary to use some form of cardinal directions, and requirements dictate that everyone agree on what is north, south, east and west.

Prior to 1961, directions on the moon were determined by its orientation as viewed from Earth, so that east on the moon appeared to face our eastern horizon and west appeared to face our western horizon. In 1961, the International Astronomical Union (the IAU) decided to adopt the system whereby east and west were to be determined as they would appear to an observer "on the Moon" (since they were planning to go there), a decision which effectively switched directions for east and west, an important fact to know if you are using an older lunar map. Directions on a lunar map now are the same as any map, with east to the right and west to the left. A simple rule of thumb is that east is the part of the moon you see during first quarter and west is the part you see during third quarter. North and south remain as they have always been, with the lunar highlands, with the crater Tycho and its extensive ray system in the south, and the Mare Imbrium in the north. Keeping this in mind should help clear up any confusion caused by the differing views offered by Newtonian reflectors, which simply invert the image, and telescopes using star diagonals (usually refractors and SCTs) which generally give upright, mirror images, with left and right reversed. However, one may now obtain high quality diagonals which give correct upright images, which is how most lunar maps appear.

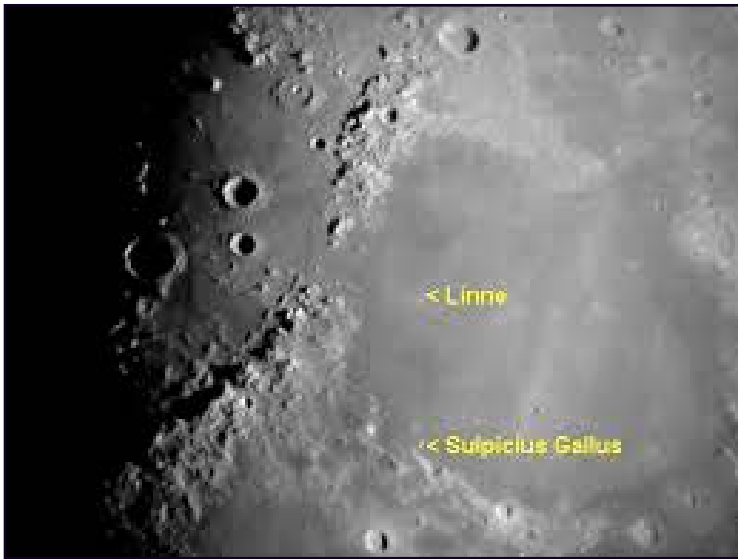
Having (hopefully) cleared up the problem of giving directions, let's see if we can use this information to describe a few more lunar features that are fun objects on which to test our telescopes.



**The Alpine Valley - Damien Peach**

**THE ALPINE VALLEY:** This marvelous formation is located in the northeast section of the Mare Imbrium, just east of the crater Plato. It is, in itself, little challenge for any optical device - it can easily be seen in binoculars! But initial impressions can be deceiving, for running through the very center of this 3 to 6 mile wide gash is a narrow rille, which has been photographed by earth-based telescopes, and should therefore be visible in larger sized amateur instruments. I have never been able to detect it in my 8 inch reflector, but have just been able to make it out in my 12.5 inch Spooner reflector at 500X. The seeing has to be nearly perfect. Those of you with larger scopes ought to give this one a try. If you do spot it, look for the tiny "double impact" crater that lies just outside the south entrance to the valley. Careful examination will show a thin septum, or dividing line, between the two adjoining craters, which is the earmark of a simultaneous impact, as compared with NASA test lab photos in high velocity impact experiments.

## The Moon as an Optical Test Part II



**LINNE:** This small, bright spot stands out boldly in the otherwise featureless moonscape along the western border of the Sea of Serenity, where this great sea merges with the Mare Imbrium. It was, for many years, an object of intense interest and controversy, and the source on many reported Lunar Transient Phenomena (LTPs). As the story goes, it was a well defined crater up until the 1860s, when it suddenly disappeared and was replaced by a bright white spot. Some speculated that another impact had obliterated the original crater, leaving behind only the white spot. Close up photographs from the Apollo program laid to rest all scientific interest in the object, when it was revealed to be simply a small, deep impact crater with an unusually bright ejecta blanket surrounding it. Still, it remains an interesting and challenging object to observe telescopically, as it is likely to be a good example of a fairly fresh impact.

Locating Linne is easy: it appears in the aforementioned location just before first quarter, and its bright halo remains visible until third quarter. The crater itself is a tiny black dot located in the center of the bright spot. It is visible in my 8 inch reflector, and is probably visible in smaller instruments, although I have not been able to see it in my 3 inch refractor. The great depth of this crater allows its interior to remain in shadow for several days after the terminator has passed it. I would be interested in hearing from anyone else who may see this crater, as I consider it a difficult object. Of particular interest to me are the size of the telescope used, the placement of the terminator, and the seeing conditions.



**CRATER CHAIN NEAR STADIUS:** Just east of the great crater Copernicus, lies the ghost crater Stadius. Though large, it can be difficult to see unless it is quite close to the terminator. Beginning at the northwest wall of Stadius and heading northward is a chain of craterlets which completely bisect the plain that lies between the craters Copernicus and Eratosthenes. Once believed to be the result of vulcanism, they are now believed to have been created by large pieces of debris thrown out by the impact that created the crater Copernicus, a theory that has led to the study of a new class of craters called "secondary craters". The main chain of craters is fairly easy to see in even the smallest of telescopes, and is a good test for a 60mm refractor. Larger telescopes reveal a host of smaller pits in the plains surrounding Copernicus that often appear to be elongated in the direction of Copernicus, a feature which clearly indicates the true nature of their origin. Look for them even in the southern part of the Mare Imbrium, near the crater Pytheas. They are quite small, but with good seeing should be quite easy in medium sized telescopes. Once seen, they cannot help but impress the observer with the enormous forces at play in the creation of a great impact crater. Look for secondary craters around other fresh impact craters. You'll be surprised how many you can find!

# Let's Party for September

Astronomical objects for public (and private) star parties, arranged by type.

by *Fulton Wright, Jr. Prescott Astronomy Club*

Flashy, deep-sky objects, visible in the middle of the month, at the end of astronomical twilight, 7:10 PM this month, (when it really gets dark). This list customized for Prescott, Arizona, should work well anywhere in the state, and be usable anywhere in the old 48 states.

## Double Stars (2 or 3 stars, close together)

\*name: Beta Cygni  
--alt name: Albireo, SAO 87301  
--magnitudes 3.4 (yellow) & 4.7 (blue)  
--separation: 35 arc-seconds  
--R.A.: 19hr 31min  
--dec.: +27deg 58'

\*name: Zeta Ursae Majoris  
--alt name: Mizar, SAO 28738  
--magnitudes: 2.2 & 3.9  
--separation: 14 arc-seconds  
--R.A.: 13hr 24min  
--dec.: +54deg 56'

\*name: Epsilon Lyrae  
--alt name: Double-Double, SAO 67310 & 67315  
--magnitudes: 5.0 & 6.1, 5.3 & 5.4  
--separation: 2 arc-seconds, 2.5 arc-seconds  
--R.A.: 18hr 44min  
--dec.: +39deg 40'

\*name: 70 Ophiuchus  
--alt name: SAO 123107  
--magnitudes: 4.0, 6.0  
--separation: 7 arc-seconds  
--R.A.: 18hrs 06min  
--Dec.: +02deg 30'

## Open Clusters (about 50 bright stars)

\*name: Collinder 399  
--alt name: Coat-hanger  
--magnitude: 3.6  
--size: 90 arc-minutes  
--R.A.: 19hr 25min  
--dec.: +20deg 11'

\*name: IC 4665  
--alt name: ---  
--magnitude: 4.2  
--size: 70 arc-minutes  
--R.A.: 17hr 46min  
--dec.: +05deg 43'

\*name: NGC 6633 (use wide field)  
--alt name: ---  
--magnitude: 4.6  
--size: 30 arc-minutes  
--R.A.: 18hr 27min  
--dec.: +06deg 30'

\*name: M 23 (use wide field)  
--alt name: NGC 6494  
--magnitude: 5.5  
--size: 29 arc-minutes  
--R.A.: 17hr 58min  
--dec.: -18deg 59'

## Globular Clusters (about 200,000 dim stars)

\*name: M 22  
--alt name: NGC 6656  
--magnitude: 5.1  
--size: 32 arc-minutes  
--R.A.: 18hr 38min  
--dec.: -23deg 53'

\*name: M 5  
--alt name: NGC 5904  
--magnitude: 5.6  
--size: 3.5 arc-minutes  
--R.A.: 15hr 19min  
--dec.: +02deg 05'

\*name: M 13  
--alt name: Hercules Cluster, NGC 6205  
--magnitude: 5.8  
--size: 20 arc-minutes  
--R.A.: 16hrs 42min  
--Dec.: +36deg 28'

# Let's Party for September

*Continued from page 4*

Galaxies (about 200,000,000 very dim and distant stars)

\*name M 31, M 32, M 110

--alt name: (NGC 224, Andromeda Galaxy), NGC 221, NGC 205

--magnitude: 3.3, 7.9, 8.1

--size: 180 x 70, 8 x 5, 16 x 10 arc-minutes

--R.A.: 0hr 44min

--dec.: +41deg 22'

\*name: M 51

--alt name: Whirlpool Galaxy, NGC 5194

--magnitude: 8.0

--size: 14 x 12 arc-minutes

--R.A.: 13hr 30min

--Dec.: +47deg 12'

\*Bright Nebulae:

\*name: M 17

--alt name: Omega Nebula, Swan Nebula, NGC 6618

--magnitude: 6.0

--size: 46 x 37 arc-minutes

--R.A.: 18hr 22min

--dec.: -16deg 10'

\*name: M 8

--alt name: Lagoon Nebula, NGC 6523

--magnitude: 6.0

--size: 90 x 40 arc-minutes

--R.A.: 18hr 05min

--dec.: -24deg 23'

\*name: M 20

--alt name: Trifid Nebula, NGC 6514

--magnitude: 6.3

--size: 29 x 27 arc-minutes

--R.A.: 18hr 04min

--dec.: -23deg 02'

\*\*\*Planetary Nebulae:

\*name: M 57

--alt name: NGC 6720, Ring Nebula

--magnitude: 8.8

--size 1.4 x 1.1 arc-minutes

--R.A.: 18hr 54min

--dec.: +33deg 02'

\*name: NGC 6543

--alt name: Cat's Eye Nebula, Caldwell 6

--magnitude: 8.1

--size: 0.4 arc-minutes

--R.A.: 17hrs 59min

--Dec.: +66deg 38'

\*name: NGC 6826

--alt name: Caldwell 15, Blinking Planetary Nebula

--magnitude: 8.9

--size: 2.1 arc-minutes

--R.A.: 19hr 45min

--dec.: +50deg 31'

**LAST QUARTER MOON ON SEPTEMBER 2 AT 22:37**

**NEW MOON ON SEPTEMBER 9 AT 14:01**

**FIRST QUARTER MOON ON SEPTEMBER 16 AT 19:15**

**FULL MOON ON SEPTEMBER 24 AT 22:52**

## 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 on the Contact-Us tab. 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 that may be of interest is AZ-Observering. To subscribe click <http://www.freelists.org/list/az-observing>.

EVAC also has a Facebook Group where members may share ideas, photos, and Astronomy related information. To join: [EVAC Facebook Group](#).

***Looking for that perfect weekend activity?***

***Why not resolve to getting involved?***

***Contact Claude Haynes to join the staff at GRCO***

***Email: [grco@evaconline.org](mailto:grco@evaconline.org)***





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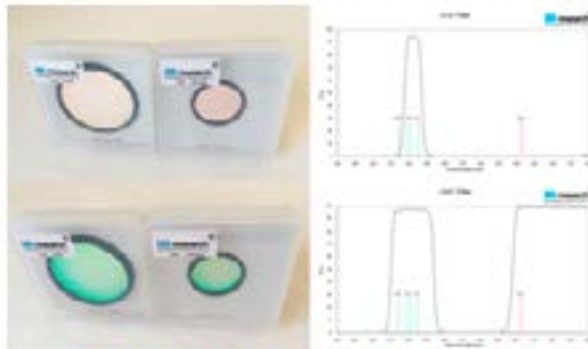
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# Field of Dreams Star Party

at  
**Top Of The World Oct 5, 6 & 7**

*Come join the fun at Top Of The World's Field of Dreams Star Party.*  
For more information on this fun filled weekend or to find a home for your remote telescope and/or dome, contact John Evelan at (480) 241-7401, [jevinids@gmail.com](mailto:jevinids@gmail.com).

**The darkest, most Pristine, sky in the continental U.S. !**

**At the site: Bathroom facilities, running water, 5 pads w110v, wifi, acres of grassy camp sights.**

**From the site: Very Large Array 42mi e, The Astronomical Lyceum 55mi e, MRO Observator 80mi e**

IC 405

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[SkyPi Remote Observatory](#)



**SkyPi Remote**  
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Janet Evelan  
(480) 241-7396

John Evelan  
(480) 241-7401

Bertle 1  
sky  
Pie Town, NM

Knowledgeable, dedicated staff

# Upcoming Meetings

September 21

October 19

November 16

December 21

January 18

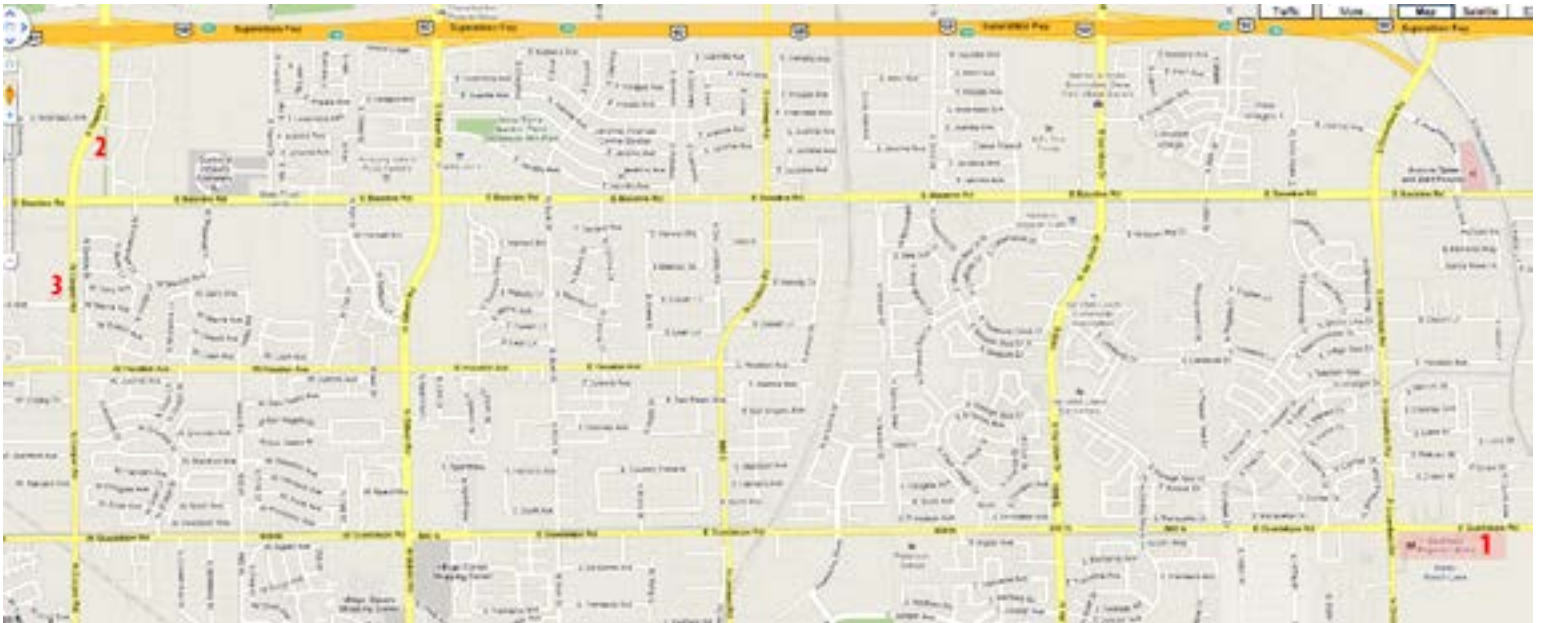
February 15

March 15

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 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!***



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



## SEPTEMBER 2018

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

**September 1** - EVAC Star Party

**September 21** - EVAC Monthly Meeting

**September 7** - Public Star Party

**September 29** - EVAC Star Party

**September 8** - EVAC Star Party

## OCTOBER 2018

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

**October 4-5** - All Arizona Star Party

**October 15** - CGCC Star Party

**October 15** - Red Mountain Library Star Party

**October 18** - EVAC Monthly Meeting

**October 11** - Public Star Party

**October 25** - Sheoherd Jr High Star Party

## East Valley Astronomy Club -- 2018 Membership Form

Please complete this form and return it to the club Treasurer at the next meeting or mail it to EVAC, PO Box 2202, Mesa, Az, 85214-2202. Please include a check or money order made payable to EVAC for the appropriate amount.

**IMPORTANT: All memberships expire on December 31 of each year.**

Select one of the following:

- New Member                                   Renewal                                   Change of Address

**New Member Dues** (dues are prorated, select according to the month you are joining the club):

- |   |   |
|---|---|
| <input type="checkbox"/> <b>\$30.00 Individual</b> January through March  | <input type="checkbox"/> <b>\$22.50 Individual</b> April through June       |
| <input type="checkbox"/> <b>\$35.00 Family</b> January through March      | <input type="checkbox"/> <b>\$26.25 Family</b> April through June           |
| <input type="checkbox"/> <b>\$15.00 Individual</b> July through September | <input type="checkbox"/> <b>\$37.50 Individual</b> October through December |
| <input type="checkbox"/> <b>\$17.50 Family</b> July through September     | <input type="checkbox"/> <b>\$43.75 Family</b> October through December     |
- Includes dues for the following year*

**Renewal** (current members only):

- \$30.00 Individual**                   **\$35.00 Family**

**Name Badges:**

- \$10.00** Each (including postage)    Quantity: \_\_\_\_\_

Name to imprint: \_\_\_\_\_

**Total amount enclosed:**

*Please make check or money order payable to EVAC*

- Payment was remitted separately using PayPal     Payment was remitted separately using my financial institution's online bill payment feature

Name:

Phone:

Address:

Email:

City, State, Zip:

Publish email address on website  
URL:

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.

- |  |   |
|--|---|
| <input type="checkbox"/> General Observing   | <input type="checkbox"/> Cosmology        |
| <input type="checkbox"/> Lunar Observing     | <input type="checkbox"/> Telescope Making |
| <input type="checkbox"/> Planetary Observing | <input type="checkbox"/> Astrophotography |
| <input type="checkbox"/> Deep Sky Observing  | <input type="checkbox"/> Other            |

Would you be interested in attending a beginner's workshop?     Yes                                   No

How did you discover East Valley Astronomy Club?

**PO Box 2202**  
**Mesa, AZ 85214-2202**  
[www.evaonline.org](http://www.evaonline.org)

All members are required to have a liability release form (waiver) on file. Please complete one and forward to the Treasurer with your membership application or renewal.

*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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PO Box 2202  
Mesa, Az. 85214-2202

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