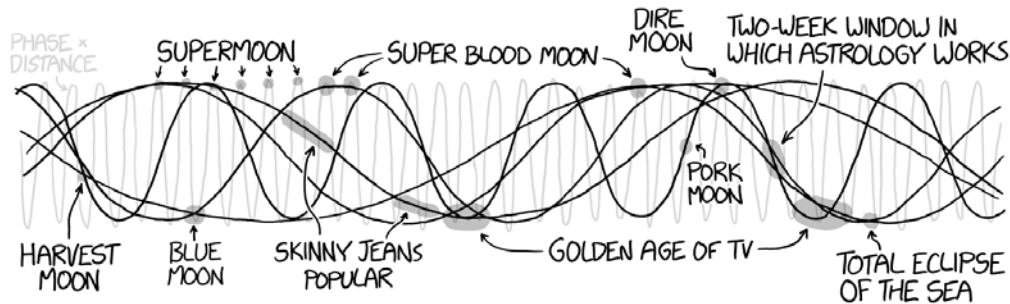
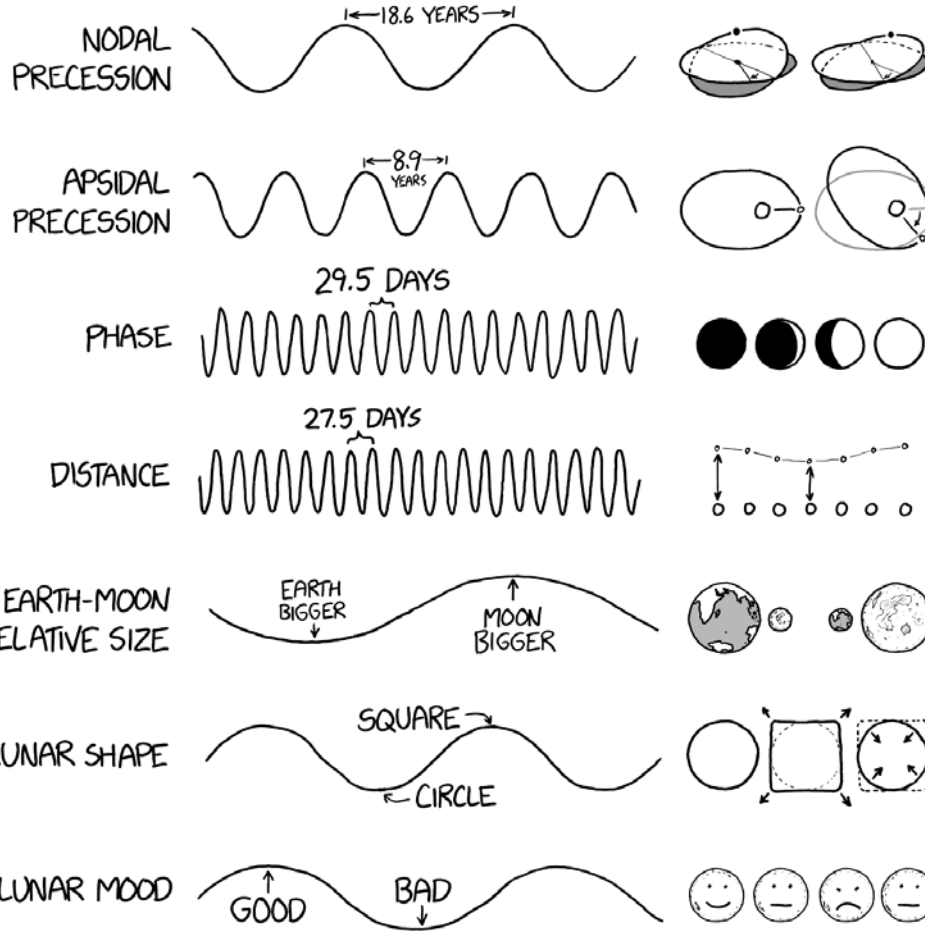


# UNDERSTANDING LUNAR CYCLES



# Howard Astronomical League



July 18, 2019



# July HAL Meeting Warmup

## Who am I?

I'm 4.6 billion years old

12 men and no women have visited me

I make all visitors feel good about their "weight".

ANSWER





From the Enquirer ... What ever happened to the Astronaut that stowed away?



# Howard Astronomical League



July 18, 2019

# Introductions



# Green Bank Star Quest

## XVII

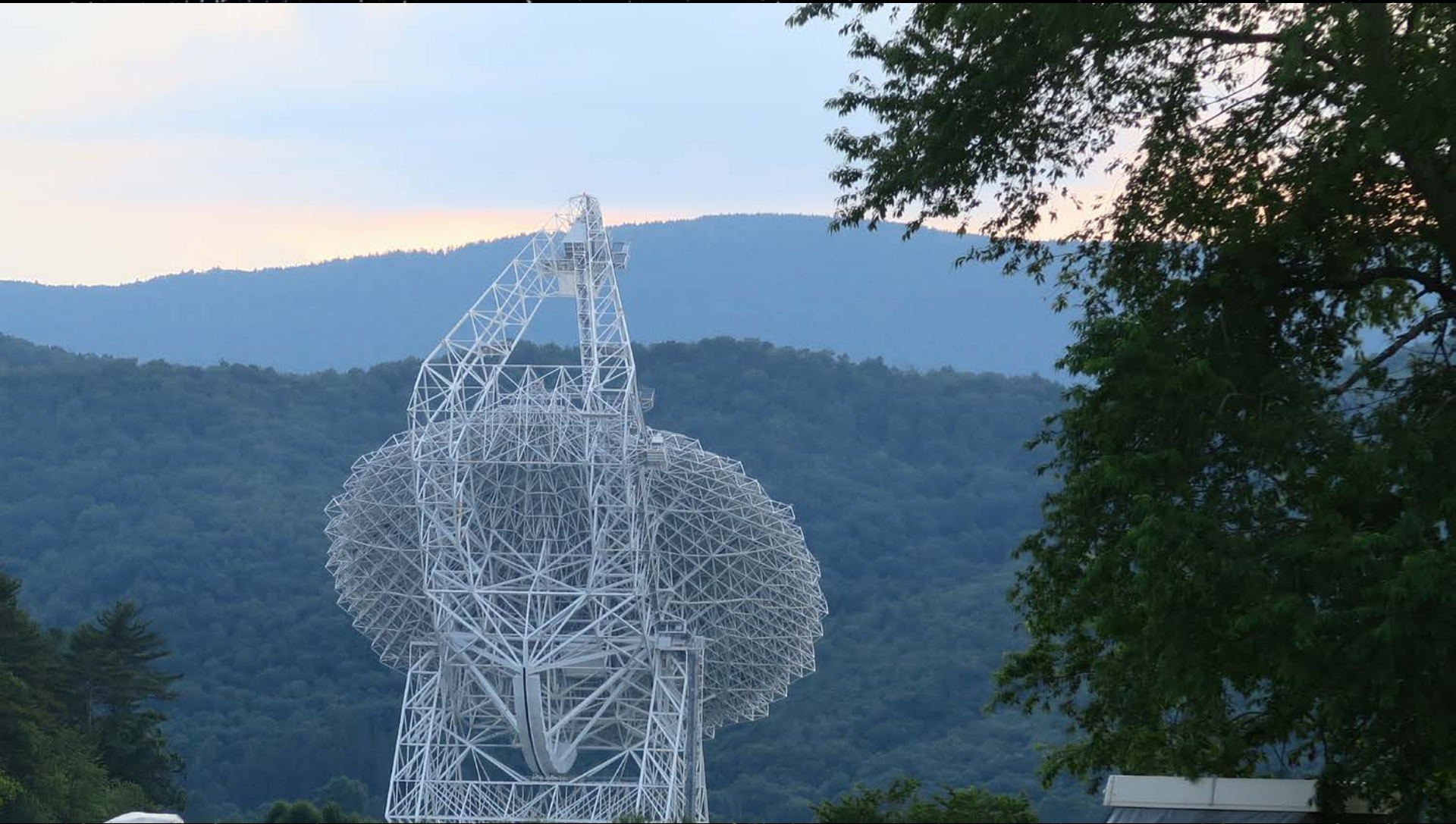


The Central Appalachian Astronomy Club





# Green Bank Star Quest XVII



# Green Bank Star Quest XVII



# Green Bank Star Quest XVII



# Green Bank Star Quest XVII



# Green Bank Star Quest XVII



# Side Trip to Steve Jaworiwsky's



# SOLAR FEST



# SOLAR FEST





# SOLAR FEST



# SOLAR FEST





# Officers Reports

<b>President</b>	Phil Whitebloom	president@howardastro.org
<b>1st Vice President</b>	Mike Krauss	1stvp@howardastro.org
<b>2nd Vice President</b>	Victor Sanchez	2ndvp@howardastro.org
<b>Treasurer</b>	Chas Rimp	hal_treasurer@howardastro.org
<b>Secretary</b>	Cheryl Kerr	secretary@howardastro.org
<b>Event Coordinator</b>	David Stein	events@howardastro.org
<b>Publicity Chair +</b>	Joel Goodman	halpublicity@howardastro.org
<b>Observatory Director *</b>	Joel Goodman	observatory@howardastro.org
<b>Librarian +</b>	Bob Dutilly	librarian@howardastro.org
<b>ALCor +</b>	Steve Jaworiwsky	halcor@howardastro.org
<b>Webmaster *</b>	Paul Montanaro	Use "Contact Us" Page

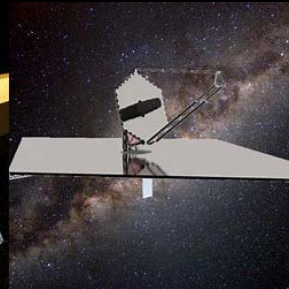
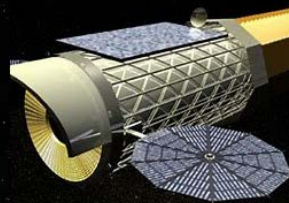
# It's time once again for:

## Astronomy

### Past

### Present

### Future



# There was a time when the Moon did not exist 460 BCE – 370 BCE



Anaxagoras

Democritus

**Democritus and Anaxagoras** taught that there was a time when the Earth was without the Moon. Aristotle wrote that Arcadia in Greece, before being inhabited by the Hellenes, had a population of Pelasgians, and that these aborigines occupied the land already before there was a moon in the sky above the Earth; for this reason they were called Proselenes.

Proselenes – Those that were before the Moon. Lived in the central mountains of Greece called Arcadia.

July 10, 2019

## Modeling early meteorite impacts on the moon

*Date:*

July 10, 2019

*Source:*

University of California - Davis

*Summary:*

A detailed reconstruction of meteorite impacts resolves a longstanding problem and gives new insight into how the moon formed.

**Elements such as gold, iridium, platinum and palladium (known as highly siderophile or 'iron-loving' elements) are relatively scarce on the moon compared to Earth.**

**Why is this??**

# Captains Log: Star Date the future







WHAT'S UP

July 2019

**A Special Feature from  
“What’s Out Tonight”**

# July 2019

[www.whatsouttonight.com](http://www.whatsouttonight.com)

## Clusters, Nebulae, Galaxies +

- Albireo. This 3rd magnitude stars becomes two stars, a blue and gold splendor, in a telescope with just 50x.
- Coma Cluster. Sprinkle of 40+ stars. Appears as a faint haze in dark skies. Spans 4.5°. In COMA BERENICES.
- Coathanger Cluster. Ten stars that form the shape of a singlewire coathanger. In VULPECULA.
- IC4665. A cluster of 30 stars that is best in binoculars. It spans an area larger than the Moon. In OPHIUCHUS.
- Kemble's Cascade. Twenty magnitude 8 stars in a 2.5° line. The middle star is a "bright" 5th mag. In CAMELOPARDALIS
- Mizar. Two stars with good eyes or binoculars. Three stars with a telescope at 50x. Located in the handle of the Big Dipper.
- M4. Globular Cluster. Distance: 7,200 ly / Diameter: 68 ly / Mag 5.6 / Spans 30'. Contains 10,000+ stars. In SCORPIUS.
- M6. Similar to and above M7, this cluster also has 80 stars but it is a little fainter and 1/4 the size. In SCORPIUS.
- M7. Ptolemy's Cluster. A great cluster, nice in binoculars or telescope. About 80 stars at magnitude 3.3 spanning an area larger than the Moon. Can see as a "patch" with eyes. In SCORPIUS.
- M13. Globular Cluster. Distance: 21,000 ly / Diameter: 104 ly / Mag 5.8 / Spans 17'. Contains 500,000 stars. In HERCULES.
- M22. Globular Cluster. Distance: 10,400 ly / Diameter: 88 ly / Mag 5.1 / Spans 29'. 100,000+ stars. In SAGITTARIUS.
- M57. Ring Nebula (Planetary). Distance: 1360 ly / Diameter: 0.5 to 1 ly / Mag 9 / Spans 1.3'. In LYRA. Remnants of a dying star.
- M81/82. Bode's Galaxies. Visible in many light polluted skies. M82 shaped like a cigar. Mags 6.8/8.1. In URSA MAJOR.



# Visual Observers Corner

Tonight's Guest Speaker

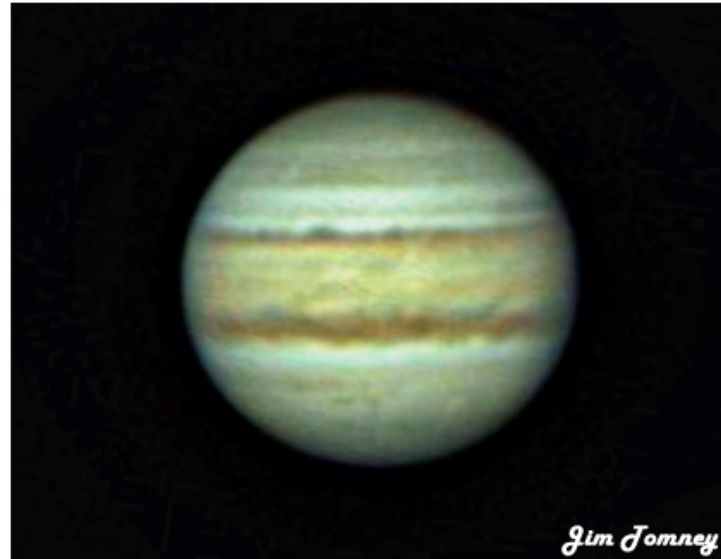
**Caitlin Ahrens**

**“Pluto: From the Lab to the Maps”**

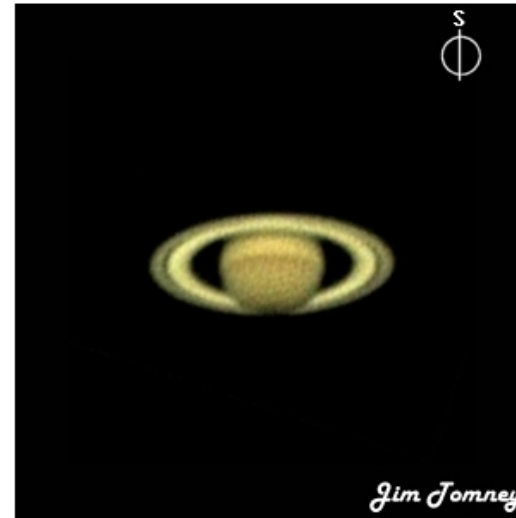


Member  
Astrophotos, Sketches, and  
Paintings

## July Hot & Hazy = Steady Seeing!



07/13/2019 02:13 UT



07/14/2019 Jupiter with GRS, Saturn a few days past opposition.

Captured with 6" reflector.+ 2.5 Barlow and DFK21AU042 camera

Joel Goodman





Gary Frishkorn





*M13 Great Hercules Cluster - 20.5 Min - 8" f/4 8300 CCD*

MOON  
MARE SERENITATIS  
MARE VOPRUM  
MARE TRANQUILLITATIS

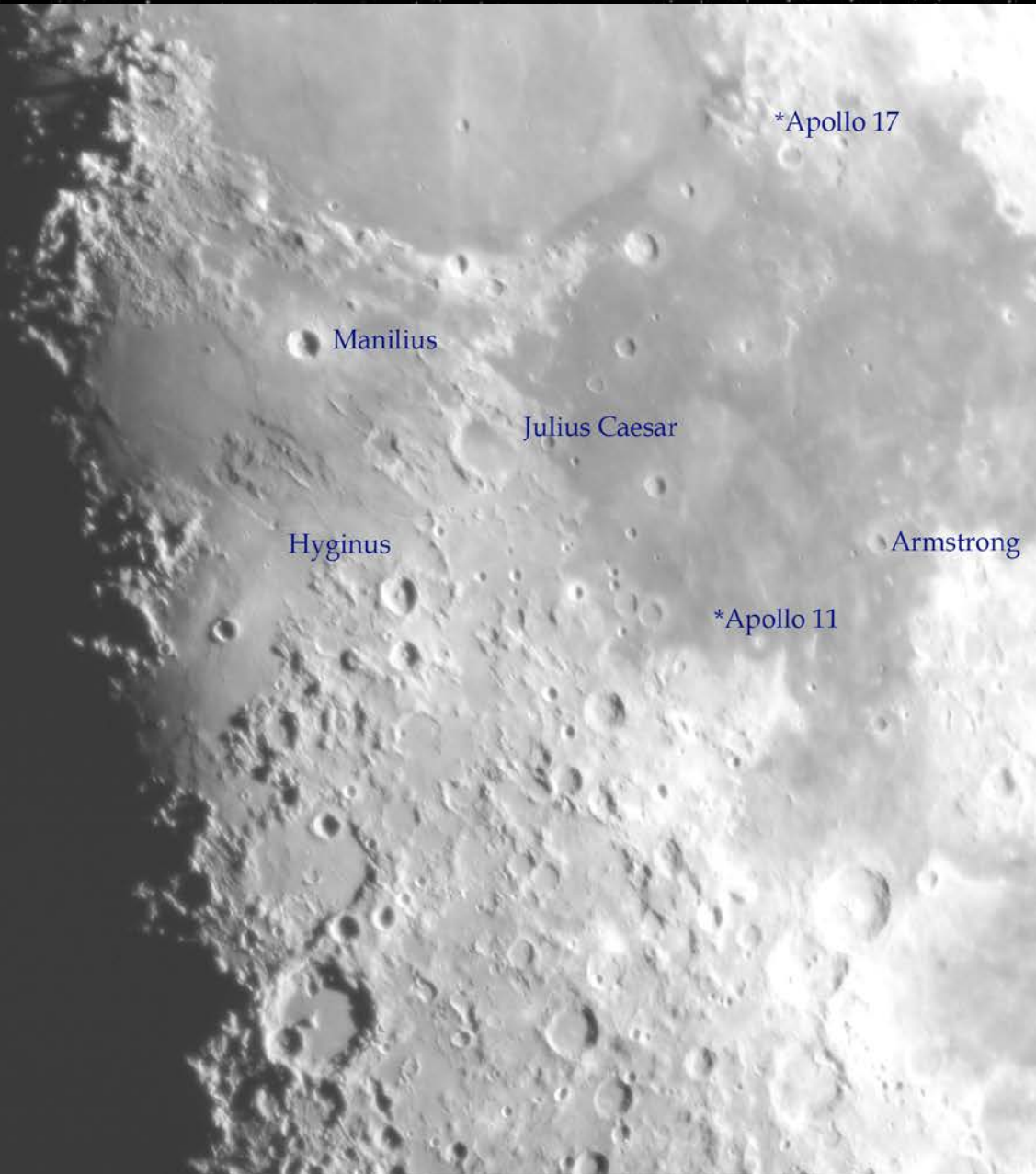
Highlighted Area  
Longitude: 16°S - 28°N  
Latitude: 8°E - 40°E

Date: 04/22/2018  
Time: 09:51 PM EDT  
Location: Elkridge, MD

Telescope: 3.5" Questar  
Camera: ZWO ASI 178MM  
Frames captured=20  
Binning=2x2  
ROI=1544x1040  
FPS (avg.)=17  
Shutter=4.623ms  
Gain=212 (41%)

Processing  
RegiStax6  
Adobe Photoshop  
Adobe Lightroom

Image by: Phil Whitebloom



## M17 (Swan/Omega Nebula)

Emission Nebula & Open Cluster

Constellation: Sagittarius  
Magnitude: 6.0  
Distance: 5,500 light years  
Actual Size Nebula: 30 light years across  
Apparent Size Nebula: 20 x 15 arcminutes  
Apparent Size Cluster: 27 arcminutes

Telescope: 110mm Refractor  
Eyepieces: 13mm Ethos (59x) & 6mm Delos (128x)  
Filter: Nebustar Type 2 & OIII  
Orientation: Diagonal View

Date: 22-23 June - 2019  
Time: 22:35 to 00:20  
Location: Carrs Mill Park  
Drawing by: Richard Orr

## JUPITER, GALILEAN SATELLITES & IO'S SHADOW

Date: July 13, 2019  
Time: 21:00 EDT  
Magnitude: -2.55  
Distance: 409,005,600 miles  
Size: 44 by 42 arcseconds



Telescope: 85mm Refractor  
Eyepiece: 4.5mm Delos (124x)  
Orientation: Inverted (South up)  
Location: Deck of House  
Drawing by: Richard Orr

# Upcoming Events

- **July 20: Public Star Party – Alpha Ridge**
- **August 1-4: Stellafane Convention – Springfield, VT**
- **August 3: Members Star Party – Alpha Ridge**
- **August 10: Public Star Party – Alpha Ridge**
- **August 16: HAL Monthly Meeting**
- **August 21-25: York County Star Party – Susquehannock State Park**
- **August 31: Members Star Party – Alpha Ridge**

# Lunar Humor



Next month's meeting is on Thursday,  
July 20st, 2019 at 7 PM

Dr. Lou Strogler – Scientist, Space Telescope Science  
Institute in Baltimore

Title: High Redshift Supernovae: Beyond the Epoch of  
Dark Energy