

# The Observer

The Official Publication of the Lehigh Valley Amateur Astronomical Society

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April, 2018

Volume 58 Issue 4



## ad astra\*\*\*\*\*

At our last general meeting, I was really impressed when our speaker, Terry Benner, told us that he had reported over 18,000 visual magnitude estimates of variable stars to the American Association of Variable Star Observers (AAVSO.) The amazing thing was that he hadn't made these measurements with a photometer, but had simply compared the brightness of a particular variable star with that of its nearest neighbors in the celestial sphere while looking through a telescope: yes, he simply used his eyes!

You have to make sure, of course, that the "comparison stars" are not themselves variable stars, and you need to be able to make estimates at regular intervals, "Something that isn't always possible in Pennsylvania skies," says Terry.

Variable stars play a crucial role in our understanding of the universe. They need to be systematically observed over decades in order to determine their long-term behavior which is something that professional astronomers have neither the time nor the unlimited access to equipment to do. It is a field where amateur astronomers are making a real and highly useful contribution to science. To be honest, I hadn't realized how many variable stars there were - over 150,000 variable stars have been catalogued. Also the variation in brightness can be huge - the largest being that of Chi Cygni, a Myra type variable not far away from Deneb, which varies in magnitude from 3.3 to 14.2!

If you would like to try it yourself there are some really good exercises in The 10 Star Training Tutorial which you can download from the AAVSO website, <https://www.aavso.org/10-star-training>. One involves comparing the apparent magnitude of Betelgeuse with Rigel and Saiph. The AAVSO website is packed with lots of other goodies, such as a Stellar News Feed which highlights some of the latest discoveries, and a presentation library where you can view some interesting PowerPoint Presentations.

Well, I did have a little word with the astronomy gods and we could not have asked for a better sky for the night of the March star party. It was also wonderful to see so many LVAAS members there. We had over 80 visitors that night which meant that both planetarium shows and talk were presented to full houses. I would like to thank Ron Kunkel and Fred Bomberger for all their hard work in preparing their presentations. Ron had so many questions after his talk, we had to delay the start of the 8 p.m. planetarium show - an indication how much interest he created. The people who couldn't get into the shows weren't too disappointed however, because they treated to some fantastic views of the Moon, the Orion Nebula and the Pleiades - in fact, it was one of the best views of the lunar Apennines I've seen in a while.

Our next star party will be held on Saturday, April 28th. Earl Pursell will be presenting both planetarium shows and Dr. Bonnie Buratti will be giving a talk entitled, "Life in the Universe: What we now know" - an evening that would be a shame to miss.

Being able to host such a successful event takes a lot of hard work, most of which is done behind the scenes. I would like to give a **BIG THANK YOU** to **Bill Dahlenburg, Pete Brooks, Mike Clark and Earl Pursell** who tirelessly maintain our South Mountain facility, fixing the leaks in both the roof and the water pipes; replacing the ceiling tiles; cleaning and waxing the floor, and arranging for a plow to clear the snow. These are just a few of the many tasks they have done over the winter months.



Here are Mike Clark, Blaine Easterwood, Len Schiavino and Bill Dahlenberg taking a break while the shows were on.



Here is Chris Kiely setting up the 12 -inch telescope.



One of our visitors takes a look at the Moon with the 12." (photo courtesy Frances Kopy)



Pete Brooks showing one of our visitors a view of Venus through the 14." (photo courtesy Frances Kopy)

On March 30th we held a special star party to celebrate the 70th birthday of Frank Spacek. Frank is the son of Mike Spacek, a former LVAAS member who built and donated the 8" refractor that is now in the Kawecky Observatory at Pulpit Rock. In March 1977, the LVAAS membership voted unanimously to



bestow an honorary membership to Mike for all the work he had done for the society. You can read more about the life of Mike Spacek and the many things he did for our society in an article written by Sandy Mesics that was published in The Observer in March 2017. Here is a photo of the Spacek family outside our South Mountain headquarters. After posing for their photo, they were given a tour of the observatories. At first, it was really cloudy, but as the evening



progressed, eventually the clouds dissipated and it became an excellent night for observing. Frank was even able to see his “birthday star,”  $\zeta$  Leporis - a star 70 light years away. This star is in a transitional state between an A-type main sequence star and a subgiant. There is also an asteroid belt in orbit around this star, and it's *the first extra-solar asteroid belt to be discovered*.

Above, Assistant Director, Rich Hogg, is showing the Spacek family a few astroimages that our members have taken, and some equipment that Mike Spacek had made.

As you know, our members are involved in a lot of outreach activities, some of which are off- site, in libraries, schools and other venues. Recently, Eric Loch, our Public Relations Director, donated this lovely banner to our society. I think he has come up with the perfect slogan for our society - thank you Eric!



Here are Eric and Dave Raker holding up the banner at South Mountain. (Photo courtesy Frances Kopy)



## Does anyone wish to become LVAAS's Director of Education ?

As some of you are aware, I was LVAAS's last Director of Education but because I was involved in a lot of outreach activities for the society, I didn't do the position justice. Our previous Director of Education, Mike Tapper, did an excellent job of arranging courses and tutorials on observing and astroimaging for our members. It would be fantastic if someone could step into his shoes. If you feel you would like to do this job, please do not hesitate to contact me.

**2018 Mega Meet**  
**May 11th-13th**

The 2018 Mega Meet, the annual LVAAS weekend camping and observing event, will be held at our Pulpit Rock site on May 11-13th. This event is always a lot of fun even if you just go along for one evening. Many people camp for the whole weekend, however, space is limited. If the weather gods look as if they are not going to cooperate, then we will arrange a rain date. For further information visit the Mega Meet webpage on our website: <https://lvaas.org/staticpages/index.php?page=megameet>.

Before signing off, I just want to remind you that the Northeast Astronomy Forum (NEAF) will be held on April 21st and 22nd at the SUNY Rockland Community College. It is well worth attending as this year there are some excellent speakers. There is also the chance to buy that telescope you've always wanted. For more information visit: <http://www.rocklandastronomy.com/neaf.html>

ad astra,

Carol Kiely, Director

".. Be brave. Be determined. Overcome the odds. It can be done." ~ Steven Hawking



# LVAAS General Meeting

## Public Welcome!

Sunday, April 8, 7:00 p.m.

Grady Planetarium, South Mountain Headquarters  
620-B East Rock Road, Allentown, PA, 18103

## "Astronomy for Older Eyes"

*a presentation and book signing by author*

### James Chen



James Chen is the author of 5 books on amateur astronomy, including "How to Find the Apollo Landing Sites," "A Guide to the Hubble Space Telescope Objects," "The Vixen Star Book User Guide," "The NexStar Evolution and Sky Portal User Guide," and "Astronomy for Older Eyes." Get your copy at [amazon.com](https://www.amazon.com) and the author will sign it for you.

## Minutes for the LVAAS General Meeting - March 11, 2018

The March 2018 LVAAS General Meeting was held on March 11, 2018 in Trumbower Hall at Muhlenburg College in Allentown. The meeting was opened by Director Carol Kiely at about 2:00 p.m.

The speaker for the event was Terry Benner, whose topic was "Observing Variable Stars and the American Association of Variable Star Observers, (AAVSO.)" Terry became interested in astronomy in grade school, and soon became interested in variable stars. He is a member of AASVO and also of the International Occultation Timing Organization, but has focused exclusively on variable stars since 1992. Although all stars are probably variable to some extent (our Sun has an 11-year sunspot cycle,) some are more variable than others and fall into 4 major classes: (1) Pulsating stars, e.g., cepheid variables, whose absolute luminosity is proportional to their period allowing them to be used as a standard candle for measuring distances; (2) Eclipsing binaries e.g., Algol; (3) Explosive / flare-type stars e.g., R Corona Borealis, which occasionally erupts carbon forming a cloud over the star's surface causing it to dim from 6th to 14th magnitude for a period of years and (4) Cataclysmic variables, (Terry's favorite), which include classical, recurrent, and dwarf novae. One example, Tau Corona Borealis, experienced 2 explosions 80 years apart -- the last in 1946 -- bumping it from 14th magnitude up to 9th magnitude, so it needs to be monitored on a weekly, if not daily, basis. Terry does all his observations by eye, although other observers use sensors, cameras, etc. to determine their brightness. He gave us an amusing explanation for the development of the naming system of variable stars, as well as a tour of the many useful features of the AAVSO website. Variable star monitoring is one of the areas where amateur astronomers still make valuable contributions to the science of astronomy, and anyone interested can join, monitor, and contribute. The talk was recorded, so if you wish to hear more, contact Dave Raker concerning availability. The talk and Q&A finished at about 3:15 p.m.

After a short break, Gwyn Fowler, Treasurer, gave an abbreviated financial report. The income for the General Fund for the previous month was \$2118.29, with expenses of \$860.20.

Scott Fowler, Membership Chair, conducted the readings of new members. Vincent Giranda of Doylestown had his first reading (he has applied to become a Life Member.) Bill Delaney and Dr. Joe Bacak (a former member, returning to the fold) had their second readings, and are now full members of LVAAS. Reminder: it is membership renewal time again, and renewals can be made at the meetings or by using the form from the website. Please mail the form and payment to Scott. Membership cards for those who have already paid their dues are now available and being handed out. The cards were printed and laminated by Assistant Director Rich Hogg, who is also in the process of updating the membership lists. If anyone is not receiving meeting notices, newsletters, etc., they should speak to Scott or Rich.



Carol then made the following announcements:

- ▶ **The next Public Star Party** will be Saturday, March 24th, with Carol giving the 6 p.m. planetarium show, followed by Ron Kunkel giving a presentation on The Milky Way at 7 p.m., and Fred Bomberger giving the 8 p.m. planetarium show.
- ▶ **Dr. Bonnie Buratti** will give the April Public Star Party presentation.
- ▶ **Venus and Mercury** are visible in the western sky at sunset.
- ▶ **The next Astroimaging group meeting** will be on Thursday, April 5th at 7 p.m. at South Mountain.
- ▶ **The Northeast Astronomy Forum (NEAF)** takes place in Suffern, NY, at Rockland Community College, from April 21st - 22nd. There are many vendors and presentations and it is the largest such event on the east coast. It is sponsored by the Rockland Astronomy Club.
- ▶ **The April General Meeting** will be held on Sunday, April 8th at 7 p.m. at South Mountain. The topic will be "Astronomy for Older Eyes" by James Chen.

The meeting was adjourned at about 4:00 p.m.

Minutes recorded and contributed by Secretary Earl Pursell



# Membership

## 2018 Dues are overdue

If you have not yet renewed your membership in the Society for the year 2018, please consider it. We need your financial support. Keep your standing in LVAAS current by making payment today. Dues can be paid in person at the next General Meeting or mailed at any time to our membership chair. A renewal form with the mailing address can be downloaded here:

[https://lvaas.org/filemgmt\\_data/files/2018\\_Membership\\_Renewal\\_Form.pdf](https://lvaas.org/filemgmt_data/files/2018_Membership_Renewal_Form.pdf)

*or*

## Interested in Membership?

You can join LVAAS at one of our monthly General Meetings. You can also join and support the Society as an associate member at any time by paying dues and submitting the application form. Visit this page for more info:

[https://lvaas.org/filemgmt\\_data/files/LVAASNewMemberForm.pdf](https://lvaas.org/filemgmt_data/files/LVAASNewMemberForm.pdf)

Thank you for your support of LVAAS

# UACNJ Astronomy Day

**Saturday, April 14, 2018, 3 p.m. to 9+ p.m.**

The United Astronomy Clubs of New Jersey (UACNJ) is a loosely associated networking group for New Jersey area amateur astronomy clubs. UACNJ itself is not a club, but a consortium of clubs united to support, coordinate, and communicate ideas among over 1400 individuals who make astronomy their hobby, in and around the state. LVAAS is one of the member clubs, allowing our members to participate in their activities and access their site. They are located in Jenny Jump State Park, near Hope, NJ.- 333 State Park Rd, Great Meadows, NJ

The annual Astronomy Day is a family-oriented program including presentations on astronomy topics (including astrophotography) and, weather permitting, both solar and night-sky observing. Their facility offers several telescopes in roll-off observatories, plus areas to set up your own equipment, if you desire. For more information, see their website [www.uacnj.org/astroday.php](http://www.uacnj.org/astroday.php) or contact the LVAAS representative to UACNJ, Earl Pursell, at 845-480-1728 or email Earl [ej\\_pursell@yahoo.com](mailto:ej_pursell@yahoo.com).

3:00 P.M.	Welcome to Jenny Jump with Ernie Kabert
3:00 P.M.	Solar Observing Begins
3:14 P.M.	Astronomy For Beginners with Ken Taylor
4:30 P.M.	Planets That We Can and Cannot See with Mary Lou West
5:45 to 6:45 P.M.	Picnic Break
6:45 P.M.	Photographing the Night Sky with Tony Sharfman
8:00 P.M.	Stories Of The Sky with Jason Kendall
9:00 P.M.	Night Time Observing and Star Party

# Library Announcement

by David Raker, LVAAS Librarian

The following books are new to the LVAAS library collection:

The Moment Of Creation

Space Stations

Milestones Of Space

Astrophysics For People In A Hurry

Kepler And The Universe

Night Sky With The Naked Eye

See It With A Small Telescope

The Practical Astronomer

Chandra's Cosmos

Mars: Making Contact

The following videos are new to the LVAAS library collection:

Dr. Sheehen Ahmed: Baryons And Dwarf Galaxies In Cosmological Simulations

Krittanon "Pond" Sirorattanakul: Cepheid Variables

The Farthest: Voyager In Space

NOVA: Eclipse Over America

NOVA: Death Dive To Saturn

NOVA: Saturn's Titan

Skylab Program

The Great Courses: Radio Astronomy

## **BOOK SALE:**

The library has a number of used books for sale in the Red Shift. Most are around \$3.00 each. Please check out what is there for some good reading.

## LVAAS Library Book, Video and CD Loan Policies

- 1.) No more than two books and two VHS tapes/DVDs/CDs may be signed out from the library collection per month. Note that the DVDs are NOT in their cases. Please ask Fred Bomberger (assistant librarian) or myself to obtain them for you. All materials should be returned one month after they are signed out. This is usually from General Meeting to General Meeting, etc.
- 2.) If any library material(s) are not returned after three months from when they are signed out, a \$1 fine per item for each month overdue will be charged.
- 3.) If any materials are needed for an extended period of time (beyond two months,) the librarian should be contacted via e-mail. The item(s) can be renewed at general meetings. It is understood that not everyone can make it to every general meeting.

### Process of signing out library materials when the librarian is unavailable

- 1.) All library materials have a card in a pocket in the back of the book, or on the media items.

#### On the card:

- a.) Put the date the item is signed out under “Date Loaned.”
  - b.) PRINT your name under “Borrower’s Name.”
  - c.) The “Date Returned” is not to be filled out by the person borrowing the item.
- 2.) All library materials have a “Date Due” slip opposite or under the loaning card. Put the next month’s date on the slip. This will remind you when the item is due whenever you open the book, etc.
  - 3.) Place the loaning card in front of the filed cards on the desk. This way I will know that something has been recently signed out.
  - 4.) Please rewind all VHS tapes before returning them to the library.

Thank you for your cooperation.

# Ron's Ramblings

*Ron's Ramblings is a monthly series of articles describing some recent or otherwise important event in astronomy. The ramblings will attempt to describe both the astronomical event and its significance. Obviously, the description will be that of a rambling amateur astronomer.*



## **Neutron Star Merger and Multi-messenger Astronomy**

In last month's article I discussed some of the specifics of the detection of GW170817, the merger of two neutron stars, by the aLIGO and Virgo collaborations. At the close of that article I mentioned that GW170817, unlike the prior detected black hole mergers, was predicted to emit energy across the entire electromagnetic (EM) spectrum. No less than 70 observatories searched across the EM spectrum and most reported observing some EM radiation from this neutron star merger. In this article I will discuss some of various "multi-messenger" observations of GW170817.

The merger of two neutron stars has long been theorized to be the source of short gamma-ray bursts. Both the Fermi Gamma-ray Space Telescope and the INTEGRAL spacecraft detected a 2-second long gamma-ray burst beginning about 1.7 seconds after the gravitational wave merger signal. The gamma-ray burst was designated as GRB 170817A. While Fermi and INTEGRAL both had limited directional capability, their detection area did overlap the gravitational wave position. The coincident detection of the GRB and the GW clearly indicates their common origin.

Additionally, the fact that the GRB was detected a mere 1.7 seconds after the GW, indicates that gravitational waves propagate at the same speed as EM radiation, as predicted by general relativity. Note, the origin of the GW170817 was located at a 130 million light-years distance, so a 1.7 seconds difference in the arrival times is insignificant.

Numerous other observatories detected optical transients in the EM spectrum from radio to

X-ray wavelengths in the days and weeks following the detection of GW170817. The source of these optical transients was identified to be a galaxy, NGC4993 which is located at about 130 million light-years distance in the constellation Hydra, in agreement with the proposed distance of the GW170817.

This long-awaited ability to simultaneously compare the sights (EM signal) and “sounds” (GW signal) from the same object in space opens up entirely new ways to explore the relationship between gravity, light, and matter. This is being heralded as a new era in astronomy, the era of multi-messenger astronomy.

In next month’s article I will discuss some other revelations from the multi-wavelength aspects of this neutron star merger.

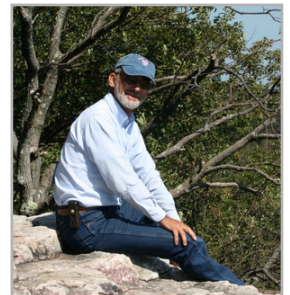
**References:**

GW170817. Retrieved from <https://en.wikipedia.org/wiki/GW170817>.

McLaughlin, M. (October 16, 2017.) Viewpoint: Neutron Star Merger Seen and Heard. Retrieved from <https://physics.aps.org/articles/v10/114>.

The end of my ramblings until next month.

Ron Kunkel

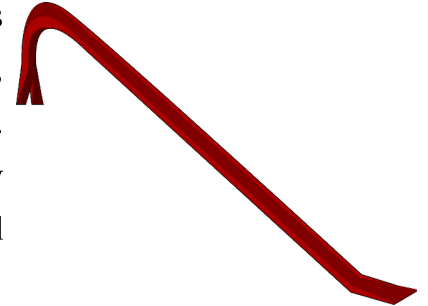


# Schlegel Observatory Report

by Rich Hogg — April 2018



I remember the day I asked my Dad about the crowbar, maybe ten years ago. It was in his basement, the old-style type with the hexagonal shaft, longer and heavier than the newer flat pry-bars that are more common now. I can't remember what I wanted it for, but he had already begun to slow down by the time I asked to borrow it. He looked at me meaningfully and said, "You can *have* the crowbar."



I think he would be amused, and glad, to know that it has found a purpose doing adjustments on the 40" telescope. Frank Lyter, Pulpit Rock Observatory Director, had the idea that we could use the cart intended for removing the mirror cell as a support to take some of the weight off the mount, as shown in the photo. With that in place, and with a suitable fulcrum, such as a stack of 1/2"-ID steel washers, you can get enough leverage with the crowbar, between the pier post and the mount, to lift up the north end of the mount without too much trouble. This has allowed us to replace the metal rollers that supported the two north corners of the massive instrument, with a stack of plastic pads and some lubricant, and now we can move the scope around a little bit without much difficulty.

This was a plan that I worked out with Frank and Ron Kunkel, Pulpit Rock Maintenance Director, to improve our chances of achieving polar alignment after our previous difficulties. We had an idea roughly how much we needed to move the mount, and I had created a 3D CAD model of the mount base and the tops of the pier posts to help us figure out what "proper alignment" would look like. Initially I suggested the idea of inserting some ball bearings into the joints, and Frank had proposed some kind of sliding pad. Frank pointed out that the ball bearings would probably dig into the mild steel the plates were made of, and I thought about adding a sheet of something harder, like a cabinet scraper, to prevent that. I was also



considering making wedge-shaped shims to even out the gap.

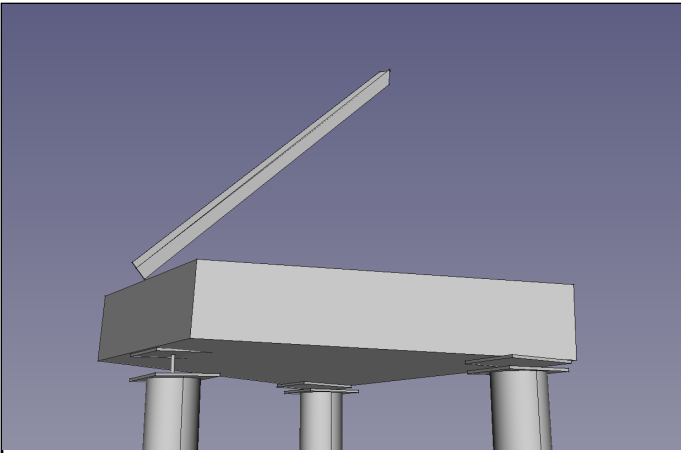
In the end, we went with combining the wedge idea with the sliding pad. Frank had some blocks of high-density polyethylene and a chop saw big enough to cut the wedges we wanted. I purchased some thin pads of fiber-reinforced polyethylene to mate with them, as well as some kind of super-lubricant that was an impulse purchase in the checkout line at Lowe's. Those elements now form the stack that supports each of the north-side corners.

The photos at right show two views of the wedges, as fabricated by Frank, before installation. Below, we see one of the wedges installed between the north-east pier post and the mount; the thin reinforced UHMW polyethylene pad and the even thinner layer of lubricant are not visible. The photos in this article were taken by Frank Lyter.



The three of us met at Pulpit Rock on Sunday, March 18, in between the two most recent snowstorms, and we got this done. We also tested another item from my Dad's collection, a pipe clamp, which we used to apply some lateral force to the scope to move it. As a result we succeeded in turning it by about one degree, which translates into roughly an inch given the distance between the corners.

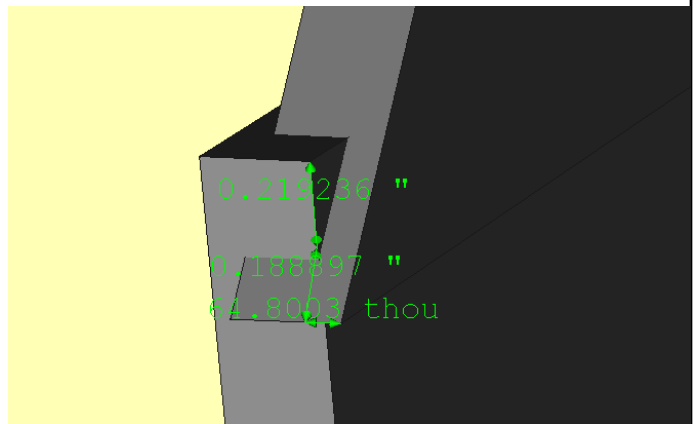
Having got that far, Frank wondered if we might be getting pretty close to where we need to be, and suggested I plan another alignment check. Well, that is still the plan, but currently there is about a foot of snow in the way of doing it. However, before we closed up the dome and left for the day, I did make some additional careful measurements of the distances and offset between the corners of the various metal plates at the three corners. Then, I spent a few hours at home adjusting the CAD model, after spending a couple of days figuring out exactly how to make said adjustments, and writing some code in Python to accomplish it. (You think it's easy, just try it sometime.)



Here is an illustration, created from the model in FreeCAD, that represents the base of the mount as it now sits on the three pier posts. I believe that all of the measurements in the model are accurate to within 1/4", and most to within 1/8". The model includes a virtual pair of parallel bars, pointed skyward at an angle that corresponds to the RA axis of the telescope — in fact, the lower pointer bar is designed to be exactly parallel to the RA axis, and the upper one

points precisely at the North Celestial Pole. When the two are parallel, theoretically, we will be correctly aligned.

This image zooms in on the ends of the two pointers, which are chamfered to a 45-degree angle to make sure that the important vertices are always visible, along with a measurement of the amount of misalignment. The length of the bars is set so that a misalignment of 1" corresponds to 1 degree. You can read the azimuthal misalignment directly, "64.8003 thou" or 0.0648 degrees. For the altitude misalignment, you need to apply the Pythagorean formula to the vertical 0.219236 and horizontal 0.188897 figures, yielding a result of 0.28939 degrees.



It will be exciting to see how closely reality agrees with the model. We shall need to wait for a clear evening, after the snow melts off the dome, to find out; but preliminarily, it looks like Frank was right! Assuming we are as close as the measurements indicate, the next step will be to install the new pivot bolt in the south post, as well as new hold-down bolts on the north, enabling us to make the final adjustments and then "lock it down."

**Current Status and Activities:** We are waiting for snow to get out of the way, so we can finish fixing the problems with mounting the telescope to the pier, and complete the preliminary polar alignment.

by Gary A. Becker



## Sizing Up the Universe

For my first lesson which focuses upon developing a simple, but meaningful definition for astronomy and discussing the subject in its broadest sense, I have my students write a list of all the words that each believes are related to the subject. It is a timed exercise, five minutes in length, and currently, Joe Hall, a former Moravian astronomy student, holds the record for having written 70 entries in that space of time. I'm not even sure I could ever be that quick. In fact, after Joe's record setting accomplishment, I had to redesign the page to accommodate additional spaces because originally there were only 60. The winner this semester was Beth Thomas who had 66 words. The definition that I developed for astronomy 46 years ago, and that my students discover during the lesson, goes something like this. Astronomy is the science that investigates all matter and energy in the universe.

When I met my first astronomy class in 1972, we didn't know exactly how old the universe was; the estimates ranged from eight to 20 billion years. Now we know that it is 13.82 billion years in the making, and because of that fact, we know from "end to end" it measures over 50 billion light years. A light year is the distance that light travels in one year, about 5.8 trillion miles. In 1972 we fully understood that the universe was expanding, but the fact that we didn't have the most accurate rate of expansion produced the improbability of its size and age. Then there was the problem of how the universe began. We are still puzzling the answer to that one, but because it was expanding, we anticipated that it had a beginning. Astronomers envisioned an explosive event, something today that we call the "Big Bang." Currently, it appears to be more of a very gentle pop, although the term "Big Bang" is here to stay. An explosion would have triggered humongous amounts of turbulence which would have created large thermal differences in our observation of the early universe. What we find are differences in temperature across the early universe of a miniscule  $1/100,000$  K or about  $1/180,000$ -degree Fahrenheit. This is exactly what we should expect if the universe evolved based upon what we observe its structure to be today—like a sponge with huge voids and the spongy material being vast superclusters of galaxies.

Another question was the ultimate fate of our universe? The current answer is not philosophically pleasing. We thought (hoped) at one time that the gravity of all of the structures in the cosmos would pull the universe back together to be reborn in perhaps another Big Bang, the Oscillating Universe, but today we know that won't happen. In the mid-1990s, Hubble telescope observations of distant supernovae (exploding stars) revealed that the universe was accelerating, and that what we see in the cosmos around us is only about five percent of the real picture. Twenty-seven percent of the universe represents something called dark matter, which we have hypothesized since the 1930s, and the rest of the universe, about 68 percent, is composed of dark energy. As the universe expands, the amount of matter (dark and what we see) continues to thin, but the amount of dark energy remains constant per unit volume, thus causing the acceleration. Although no matter can touch the speed of light, space may expand beyond that limit.

One day into the distant future sentient creatures will wake up to a universe where all of the stars of our Milky Way and the other galaxies that have combined with it will have died. The few other galaxies that might still be shining will be so distant that no light from any of them will reach us. The heavens will be black. It makes me happy to realize that we are at least living in the springtime of our universe, an epoch when it is awash with the glow and brilliance of billions of new stars and vibrant galaxies wherever we look. That fragile blush of youth will not last forever.

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Moravian College Astronomy - [astronomy.org](http://astronomy.org)



*If you look beyond the light pollution, a beautifully clear sky reveals Orion and Canis Major over Princeton, NJ. All images by Dave Raker, using a Kodak Easyshare camera 200 iso, 13 seconds, f4.8.*

Here are two photos of the Schanck observatory, Rutgers University, New Brunswick, NJ. The Schanck observatory was built by Rutgers University in 1865 in honor of Daniel S. Schanck of New York. The building is a reproduction of the Tower of Winds, a monument located in Athens, Greece, in reference to the eight winds in Greek Mythology. The Schanck Observatory was originally built for the purpose of astronomical observations, and in its early history was utilized by corporate astronomers, as well as by members of the University community.



For more information on the Schanck Observatory, please see *The Observer*, August 2016, pp. 21-25 for an article by Sandy Mesics on its rededication in June, 2016. ~ editor's note.



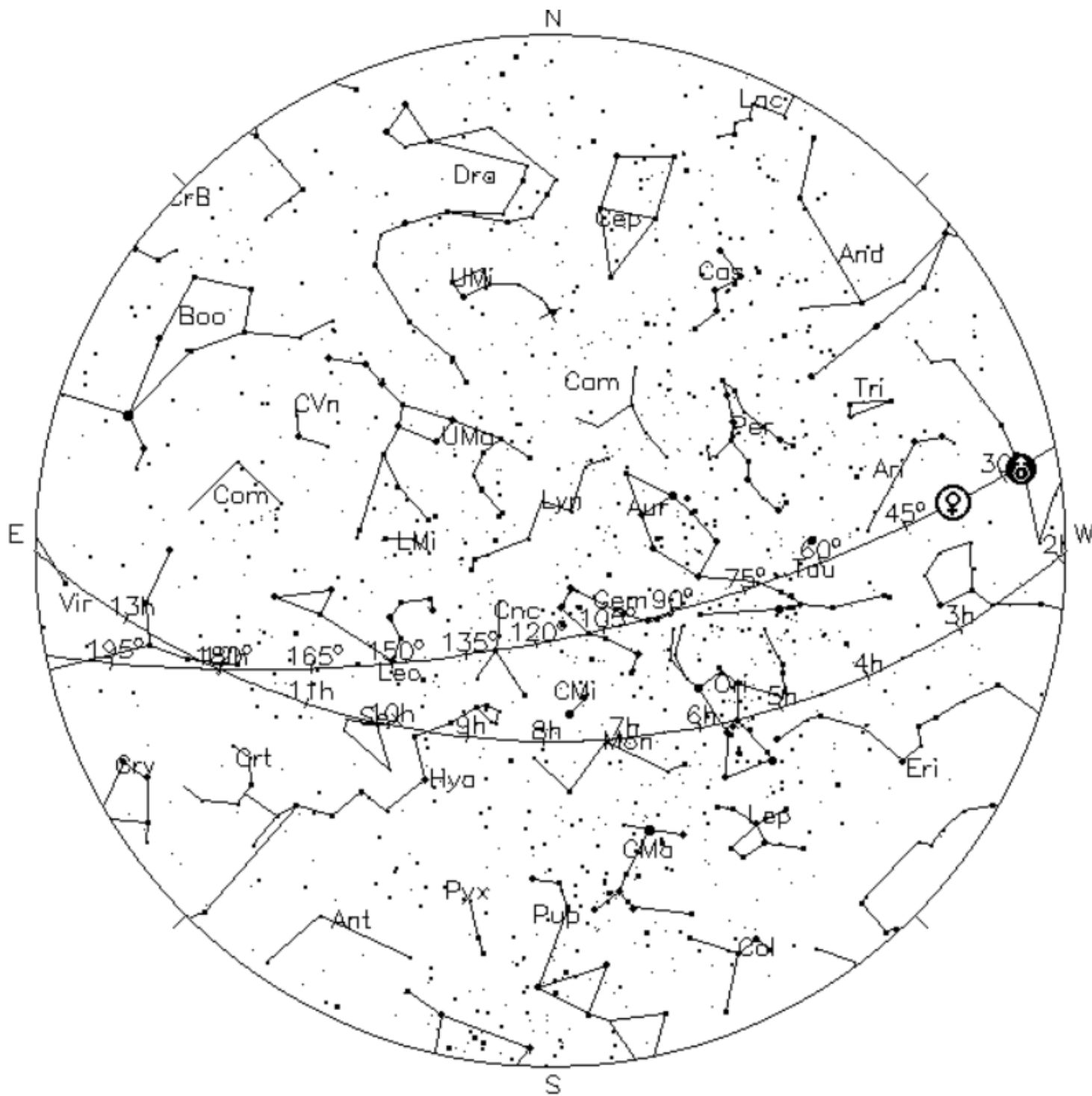
## What's Up - April 2018



<https://www.nasa.gov/mediacast/jpl/whats-up-april-2018>

(Click "Watch Now" or subscribe to the podcast.)

# Sky above 40°33'58"N 75°26'5"W at Thurs 2018 April 6 0:01 UTC



**Your Sky was implemented** by John Walker in January and February of 1998. The calculation and display software was adapted from Home Planet for Windows.

The GIF output file generation is based upon the ppmtogif module of Jef Poskanzer's pbmplus toolkit, of which many other components were used in creating the images you see here.

ppmtogif.c - read a portable pixmap and produce a GIF file

Based on GIFENCOD by David Rowley

Lempel-Zim compression based on "compress"

Modified by Marcel Wijkstra

Copyright © 1989 by Jef Poskanzer.

Check out additional features of **Your Sky** at : <http://www.fourmilab.ch/yoursky/>

## APRIL 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<u>01</u> Easter	<u>02</u>	<u>03</u>	<u>04</u>	<u>05</u> Astro Imaging 7:00 PM	<u>06</u> Scout Group - South Mountain	<u>07</u> Passover, Last Day
<u>08</u> Last Quarter Moon General Meeting - South Mountain 7:00 PM	<u>09</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>
<u>15</u> New Moon	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u> NEAF
<u>22</u> NEAF Deadline for submissions to the Observer First Quarter Moon	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u> Star Party
<u>29</u> Full Moon LVAAS Board of Governors Meeting	<u>30</u>					

## May 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		<u>01</u>	<u>02</u>	<u>03</u> Astro Imaging 7:00 PM	<u>04</u>	<u>05</u>
<u>06</u> General Meeting - South Mountain 7:00 PM	<u>07</u> Last Quarter Moon	<u>08</u>	<u>09</u>	<u>10</u>	<u>11</u>	<u>12</u>
<u>13</u> Mothers Day	<u>14</u>	<u>15</u> New Moon	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u> Star Party
<u>20</u> Deadline for submissions to the Observer LVAAS Board of Governors Meeting	<u>21</u> First Quarter Moon	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>
<u>27</u>	<u>28</u> Memorial Day	<u>29</u> Full Moon	<u>30</u>	<u>31</u>		



# 2018 LVAAS Event Calendar

2018 LVAAS Event Calendar												
	Sundays		Board meeting	Thursday	Friday	Saturday	Mondays	Multi-Day Weekends Scouts at Pulpit R.	Moon Phase			
	General Meeting time	location		Astro-Imaging	Lunatics and Stargazers	Star Parties	Scouts at S. Mountain		New	First	Full	Last
<b>January</b>	2:00 PM	14 Muhlenberg	28	4		no mtg		no camping	16	24	1 31	8
<b>February</b>	2:00 PM	11 Muhlenberg	25	1		no mtg		no camping	15	23		7
<b>March</b>	2:00 PM	11 Muhlenberg	25	1		24		30-31-1	17	24	1 31	9
<b>April</b>		8 S.M.	29	5		21		27-28-29	15	22	29	8
<b>May</b>		6 S.M.	20	3		19		25-26-27	15	21	29	7
<b>June</b>		10 S.M.	24	no mtg		23		29-30-1	13	20	28	6
<b>July</b>	5:00 PM	7 S.M.	29	no mtg		21		27-28-29	12	19	27	6
<b>August</b>	7:00 PM	11 Pulpit	26	no mtg		18		24-25-26	11	18	26	4
<b>September</b>		9 S.M.	30	27		15		21-22-23	9	16	24	2
<b>October</b>		14 S.M.	28	25		13		26-27-28	8	16	24	31
<b>November</b>	2:00 PM	11 S.M.	25	29		17		no camping	7	15	23	29
<b>December</b>	2:00 PM	8 Grace Com	30	20		no mtg		no camping	7	15	22	29

July, Aug & Dec are Saturday meetings with rain date on Sunday  
 Jan, Feb & March meetings are at Muhlenberg College  
 August meeting is at Pulpit Rock  
 December meeting / Holiday Party is at Grace Community Church

**NEAF**  
**Cherry Springs S.P.**  
**Stellafane**  
**Black Forest**  
**Mega Meet**

**April 21-22**  
**June 14-17**  
**August 9-12**  
**September 7-9**  
**May 11-13 (tentative)**

## Publishing images is a balancing act!

When preparing your images for publication in The Observer, please consider the following guidelines:

### Put the quality in:

- ▶ Considering the "print" size of the image, make sure you have at least 150 pixels/inch.
- ▶ Use a reasonably good quality for the JPEG compression ratio.

### But watch the "waistline"!

- ▶ Don't go too much above 200 pixels/inch max.
- ▶ Use the lowest JPEG quality that still looks good!
- ▶ Shoot for <300KB for a 1/2 page image or <600KB for a full page.

**Tip:** If you're not Photoshop-savvy, you can re-size and compress undemanding images ("human interest" not astroimages), with an online tool such as

<http://www.ivertech.com/freeOnlineImageResizer/freeOnlineImageResizer.aspx>. It will also tell you the pixel size and file size of your original, even if you don't download the processed copy.

The Observer is the official monthly publication of the Lehigh Valley Amateur Astronomical Society, Inc. (LVAAS), 620-B East Rock Road, Allentown, PA, 18103 and as of June 2016, is available for public viewing. Please contact the editor at [editorlvaas@gmail.com](mailto:editorlvaas@gmail.com)

Members please use above email address for submissions.

Society members who would like to submit articles or images for publication should kindly do so by the Sunday before the monthly meeting of the board of governors (please see calendar on website) for the article to appear in the upcoming month's issue. PDF format is preferred. Early submissions are greatly appreciated. Articles may be edited for publication. Comments and suggestions are welcome.

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