

amateur ASTRONOMER



sharing the wonder and science of astronomy

Star Party at Norristown Farm Park



As the DVAA continues to resume its regular outreach events, the club held its first star party at Norristown Farm Park on September 10th, with about 35 attendees. See pages 8 and 9 for highlights from our recent activities!

Photo by George Keighton

PLAN ON IT!

October 6 New Moon Dark sky observing at various sites. See the [DVAA groups.io](https://dvaa.groups.io) for more info.

October 6-10 York County Star Party #2 at Susquehannock State Park (see p. 2)

October 15 (7:30 pm) DVAA General Meeting (see p. 4).

October 16 (5:50-8:30 pm) Public Star Party at Valley Forge National Historical Park. Weather hotline: (484) 367-5278.

October 19 (7:00-9:00 pm) Anderson Farm Park Star Party Sponsored by Upper Providence Parks and Rec.

November 13 (4:15-6:45 pm) Public Star Party at Valley Forge National Historical Park. Last party for the season. Weather hotline: (484) 367-5278.

FOR ALL EVENTS, SEE THE DVAA WEBSITE FOR ADDITIONAL INFORMATION AND UPDATES.

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A link to Dave Mitsky's Celestial Calendar can be found at dvaa.org on the Home Page.

Welcome New DVAA Members!

Amy Baldwin (Philadelphia, PA)
 Teja Berberich (Downingtown, PA)
 Ben Buono (Wyndmoor, PA)
 Kevin Kebea (Media, PA)
 Nelson Krupp (Roslyn, PA)
 Mohamed Osman (Conshohocken, PA)
 Damiano Pettine (Gilbertsville, PA)
 Christopher Robinson (Harleysville, PA)
 Julie Robinson (Harleysville, PA)
 Corinne Simmins (Conshohocken, PA)
 Lynn Wassel (Gilbertsville, PA)
 William Wassel (Gilbertsville, PA)

We welcome all new members to enjoy the most our club has to offer by participating in DVAA activities. You are encouraged to ask questions and pursue your interests in astronomy through the club.

We suggest that new members attend our observing events and special interest group meetings, or volunteer to help with an outreach event or committee. Participation can advance your skills and enjoyment of the hobby and help you get to know your fellow members. New members are entitled to all benefits of membership.



Brian Lee
 Welcoming Committee Chair
welcoming@dvaa.org

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Women of DVAA	Jan Rush	women@dvaa.org

Mark Your Calendars!

Upcoming Monthly Meetings

Friday October 15, 2021: Featured Speaker: John Conrad, NASA/JPL Solar System Ambassador: "Lucy: The First Mission to the Trojan Asteroids" (see p. 4).

Due to an overwhelming member preference for virtual monthly meetings, we will continue with the Zoom/YouTube format for the remainder of the year. Watch your email for sign-on directions.

Upcoming 2021 Meeting Dates: (all Friday evenings): Oct. 15, Nov. 19, and Dec. 17.

2021 Public Star Parties

DVAA public star parties at Valley Forge National Historical Park are returning to our normal format as COVID-related precautions are being relaxed. They will be held at Valley Forge National Historical Park on the Model Airplane Field. ([Google Maps](#)). **Weather Hotline: 484-367-5278.**

All attendees are asked to wear a mask.

Public Star Party dates for 2021 (all Saturday evenings): Oct. 16 (5:50), Nov. 13 (4:15).

Note: Consistent with recommendations from Governor Wolf and the Centers for Disease Control, some live DVAA public events have been cancelled or postponed. Monthly meetings are being held via Zoom and livestreamed via YouTube. Check the website (www.dvaa.org) for updates.

Follow the DVAA on Facebook!



DVAA [Facebook](#) group
 DVAA [Photo Enthusiasts](#)

Newsletter Editorial Committee: Jeremy Carlo, George Keighton, Tom Nolasco, Dana Priesing, Jan Rush and Barclay Thorn.

If you would be interested in joining us on the Newsletter Committee, just drop us a line at newsletter@dvaa.org — we'd love to have you on board, regardless of your experience level!

Thanks to Jan Rush for being lead editor last month.

George Keighton is the lead editor for this issue.

Star Party!

Harold Goldner [email](#)



There are extroverts and there are introverts. I had to listen to Science Friday to learn this fact (not). You can always tell the introverts at parties. They're the one's hanging by the snack table trying to look casual while they take a chance someone will actually talk to them. The extroverts are the ones loudly holding forth with others around them. It's just party politics.

That's not what a star party is all about. It's dozens of amateur astronomers on a field struggling with their equipment, trying to be sure they get the very best view or image of whatever it is they are looking for --- or as many views as they possibly can if they're trying to tick off objects on a checklist. It's waiting for near dark for everyone to try to align their finder scopes (will that pole work? How about the moon? Not a great idea). It's staring at the sky waiting for the first bright object. Hey! Is that Jupiter? Is it Vega? No, it's a plane.

It's conscientiously going to a website or guidebook or star chart to make a list of possible targets and making sure they're in the order in which they will appear (otherwise the next object may have set by the time you get to it). It's worrying whether your battery will hold out, wondering if the dew will overcome your optics, puzzling over why your dew controller has a yellow flashing light, confused by hearing an alarm on your battery that you didn't even know it had.

It's knowing that you can stay as late as you want, and when you're finally exhausted (or your equipment is totally soaked) you can crawl into your tent and fall asleep until daylight awakens you.

It's not having great cellular service, but then again, who the hell cares about cell service at a star party? Are you going to Tweet something priceless from the dark?

I try to escape every summer for several days to a dark sky site like Cherry Springs, Blue Mountain Vista or elsewhere to enjoy stargazing while the night-time temperature is still in the 60's, or perhaps the upper 50's. I don't like to be cold. It also gives me a chance to wait for Orion to rise, at which point I can study the Orion Nebula for nearly an hour and not freeze my butt off.

I just enjoyed three nights at the York County Star Party (formerly the Mason Dixon Star Party) which was held at Susquehannock State Park in Drumore, PA. The state park is a small park (less

than 300 acres) along the top of cliffs overlooking the Susquehanna River, only 90 minutes west of the Main Line. It has decent darkness comparable to Blue Mountain Vista. The light domes from Philadelphia, York, Lancaster, Harrisburg and perhaps even Baltimore are on the horizon, but the observing field is tree-ringed, which helps conceal the light domes.

The Milky Way is readily visible. Objects near the zenith and along the ecliptic are easily seen. I was able to spend hours in or around Cassiopeia, Cygnus, Cetus, Hercules, and several other constellations. Even the teapot asterism of Sagittarius hung up long enough for me to catch an eyeful of a few Messier objects there.

There is no electrical service on the field, but the ball field where we camp is level, dry, and next to it is a pavilion with two outlets where we spent our days recharging. Small trailers are permitted on the field, but no RV's. I was in my tent (I use a 4-person tent which allows me tons of room plus the opportunity to stash all my equipment should the weather turn fickle, which it did not). There are cold water sinks and toilets about 100 yards across the road away, but the host has provided a port-a-potty just off the observing field.

We had participants there from North Carolina, Baltimore, Western Pennsylvania and New Jersey, as well as a handful from the DVAA and Chesmont clubs.

The party returns in October from Wednesday the 6th until Monday the 11th (not a typo, the organizer is prepared for a possible clear Sunday night). Pre-registration, which includes state camping fees is required at <http://yorkcountystarparty.org>. Phil De Rosa, whose baby this star party has been for decades, will reach out to you, and invite you to join the star party's Groups.IO page for announcements and updates.

Come join the fun, you party animal!

For further details and registration information:
<http://www.yorkcountystarparty.org/>

Stay updated on event news by joining the YCSP groups.io group:
<https://groups.io/g/YCSP>

Don't Miss the Next Monthly Meeting: October 15, 2021

Lucy: The First Mission to the Trojan Asteroids

John Conrad, NASA/JPL Solar System Ambassador

Boldly going where neither man nor robot has gone before, NASA will launch the Lucy spacecraft this October on a 12-year visit to unique bodies left over from the Solar System's formation. The special role of gravity – ruler of the universe – will be evident:

*- first in the Lagrangian Sun-Jupiter 'trapping' of these asteroid swarms (the Trojans)
- and then in the shifting orbits and trajectories enabling this visit to 8 different asteroids.*

Finally, the nature of these varied targets and what we expect to learn will be covered.



John Conrad is a retired aeronautical engineer who worked with the Air Force and NASA. He has given several excellent presentations to the DVAA in recent years, and this is sure to be another great talk!

DVAA Virtual Meeting: October 15, 2021, 7:30 PM (sign-on starts at 7:00pm).

- ◆ DVAA Members via Zoom (check your email for the link)
- ◆ Members of the public can watch the livestream on [YouTube](#)



Above: A finely detailed shot of Jupiter and Europa captured by Tom Nolasco. Taken through a 10 inch F/8.6 reflector using a ZWO ASI462-MC color camera.



Top left: North American and Pelican Nebulae, imaged by Dick Steinberg in H-alpha on September 12. As described by Dick, "Conditions were MISERABLE, with Deneb barely visible through the haze!"

Bottom left: Attendees were invited to look through DVAA telescopes at a fundraiser for Briar Bush Nature Center, held at Abington Art Center on October 1. Photo courtesy of Jan Rush.

Al's Observing Tips: "I Can't See a Thing!"

Al Lamperti [email](#)



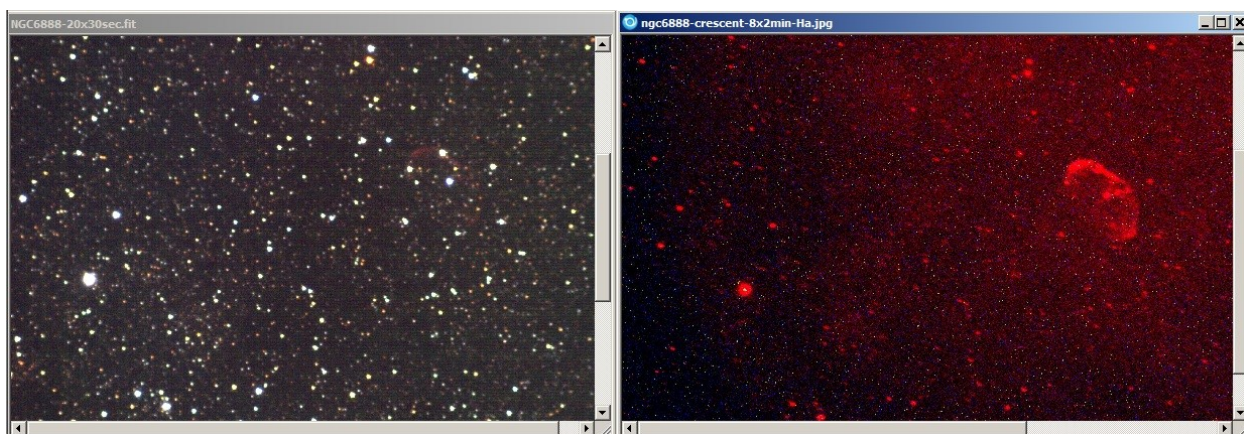
How many times have you heard this, whether you are observing by yourself or with a group? Sometimes we can not see any faint fuzzies because the sky conditions inhibit us and we really do not have much control over them. Other times we need more patience, perseverance or other tricks. For example, as your equipment cools down and your eyes dark adapt, those photons that were elusive start to appear. As nighttime progresses the rest of the world tucks into bed and more lights go out. The night might even seem calmer after the earth cools off from daytime heating. Some of the best conditions are later in the night if your observing and work schedules allow it.

Given the above-mentioned sky, what else can you do to increase your chances of seeing a faint galaxy? One, increasing magnification gradually increases the contrast between the object and the background sky. Most times that will work, particularly for those objects that generally are smaller than what you are used to observing. Knowing the size of the object and how much of the field of view it will occupy in your eyepiece will get your eye trained to look for a larger or smaller object. Researching those two bits of information ahead of time does help and increases your observing efficiency while decreasing frustration. Often times face-on galaxies do not take higher magnification well since their surface brightness is spread out over a larger area. M-33 in Triangulum looked like a bright balloon in binoculars from a dark sky site in the Poconos but dimmed considerably with

higher magnification in the telescope.

Second, use averted vision to allow the more peripheral parts of your retina, which are more sensitive to dim light, to pick up those photons. Slight movement of the telescope also helps; often times I catch a glimpse of the object as I move the telescope into the area. A slight tapping of the telescope may provide that small movement for your eye to catch the light. Third, a dark cloth over your head or a large hood blocks out any extraneous light. It doesn't matter what you look like (the observing field is not a fashion stage), but rather what and how you look at an object matters more. Fourth, use a light pollution filter that blocks out the wavelengths of man-made light and allows those wavelengths of your deep sky object to come through. A nebular filter allows even less light through, i.e. only those emitted by emission nebula. Those filters tend to be too narrow and dim galaxies even further, unless you are interested in observing nebula in the M-31 galaxy in Andromeda.

Often times a coffee or snack break is what we need. With experience you will learn what works best for you and you may even come up with some ideas of your own that you can share with us.



Dick Steinberg recently acquired these images of the Crescent Nebula (NGC 6888). While the object is difficult to discern in the unfiltered image on the left, it pops out readily under the H-alpha view on the right.

The September Monthly Meeting

Jeremy P. Carlo [email](#)



The September 2021 DVAA meeting was opened by President Harold Goldner. Harold started by talking about the recent York County Star Party, held in Susquehannock State Park, which both he and your humble correspondent attended. The skies are comparable to Blue Mountain Vista, and the attendees were a friendly group. The next party is scheduled for October 6-11.

Harold welcomed our new members and announced that our membership roster is up to 2021! Harold then gave a brief update on outreach events. These include an event at Brooke Elementary School in Spring City on October 1, an event at the Briar Bush Nature Center in Abington on October 1, and a request for astronomers at an event for Girl Scout Troop 7287 in Royersford.

Next, DVAA and CCAS member Don Knabb gave the observing talk. Don started by speaking a little about the nationwide Astronomical League, and the regional division for our area, known as MERAL (Mid-East Region of the Astronomical League), which he currently chairs. The Astronomical League is a consortium of over 300 clubs (including DVAA), and almost 21,000 members. About 40 of those clubs are members of MERAL, which covers PA, southern NJ, DE, MD, DC, VA, and WV. One of the Astronomical League's largest ventures is in sponsoring observing programs, and Don discussed one of the AL's newest programs, Constellation Hunter. This program can be completed with no special equipment other than a simple sky chart. The objective is to observe and sketch all constellations visible in the northern sky (a total of 39; there is an analogous program for southern constellations). Because of the passage of the seasons, this program typically takes about a year to complete. You can find more information about the program at the Astronomical League website.

After Don's presentation, Programs Chair Jeremy Carlo introduced the evening's invited speaker, Dr. Paul Halpern of the University of the Sciences in Philadelphia. Paul is a prolific author and is frequently interviewed for radio and TV programs. Most recently, Paul has written *Flashes of Creation* (which can be purchased from Main Point Books, a local bookseller in Wayne, which also has autographed copies available if you like).

Paul started by listing some ancient cosmic questions. Did time have a beginning? If so, what happened then? How did the stuff of the universe emerge? How large is the cosmos? Will the universe someday perish, or last forever? Until the twentieth century, no scientific ways of answering these questions existed, so these debates were mostly left to the philosophers. But in the early 20th century, a number of advances made it possible to begin to address these questions scientifically, and this is where Paul's talk sets off.

In the first decades of the 20th century, several major discoveries revolutionized the physics world. In 1915, Albert Einstein published his General Theory of Relativity, which describes gravitation in a much more general and fundamental way than Newton's earlier theory. Einstein postulated that masses curve spacetime in their vicinity, and that curvature causes other objects to move along apparently curved paths. In parallel, atomic physicists were beginning to understand the nature of matter on the smallest scales, which led to the development of quantum mechanics.

Once Einstein's theory was published, other physicists rushed to determine its implications. Alexander Friedmann, who was a meteorologist by training but also dabbled in cosmology, found such a solution by 1922. One problem – Friedman's solution predicted that the universe must be rapidly expanding or contracting; if correct, our intuitive notion of stable and static spacetime must be an illusion. Friedman had as one of his students George Gamow, a promising young cosmologist who would also come back to play a key role in the story later, although in 1925 Friedman died (at the age of 37) before they could complete any work in cosmology.

Einstein, of course, found this expanding universe business preposterous, and realized his equations prescribe a "cosmological constant" (for the mathematically inclined, it's akin to a "constant of integration" which arises in calculus), which could be tweaked to stabilize spacetime against expansion or contraction. Crisis averted, he thought.

But in 1929, the American astronomer Edwin Hubble discovered that most galaxies were moving away from us at high speed, building on crucial work by Henrietta Leavitt establishing Cepheid variables as "standard candles." Moreover, the recession speed appeared to be proportional to the galaxy's distance; this proportionality has since come to be known as "Hubble's Law." It turns out the universe is expanding after all – Einstein later came to describe missing this prediction as his "greatest blunder." Paul pointed out another interesting tidbit – Edwin Hubble was also a fantastic basketball player, who led the University of Chicago team, and later was a high school basketball coach!

But what does this all mean? Paul then turned to the Belgian priest and cosmologist Fr. Georges Lemaitre, who in the late 1920's and early 1930's argued that an expanding universe must have once been much smaller and, hence, had a beginning. He called this the "primeval atom," from which all of the universe's material started out. While Einstein was initially skeptical of Lemaitre's theory, he was converted once Hubble's observations were published and confirmed.

(Continued on next page)

The September Monthly Meeting

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While Lemaitre had the “big picture” correct, the details didn’t quite work out. The breakup of one single giant atom would lead to a matter distribution in the universe with lots of heavy elements. In contrast, the most abundant element in the universe by far is the lightest one, hydrogen. That is, matter formed in a “bottom up” fashion, rather than “top down.”

At around this time, other scientists were tackling the question of how stars shine. Early calculations based on chemical processes predicted that the sun couldn’t last for very long, far shorter than geologists knew the earth and solar system had existed. So there must be some other energy source, and that turned out to be nuclear – producing energy by fusing light elements into heavier ones, the details of which were worked out by Hans Bethe in 1938. However, Bethe’s model showed that only lighter elements (up to about iron) could be produced in stars through this process, and of course this doesn’t explain where those lightest elements originally came from. (Bethe soon afterward played a key role in the Manhattan Project, as this same knowledge was crucial to developing the nuclear weapons which brought a rapid end to World War II.)

At this point George Gamow re-enters the picture. Having fled the Stalinist Soviet Union in the 1930’s, Gamow settled first in Europe (working in Marie Curie’s lab) and later in the US, where he took a position at George Washington University, and considered the question of the origin of the elements. In 1948 he published, with student Ralph Alpher, a paper describing the synthesis of the lightest elements in the early universe – chiefly hydrogen and helium (atomic numbers 1 and 2). This all happened in the first 5 minutes or so after the universe formed, before the rapid expansion cooled the material so much that nuclear fusion could no longer occur. As it turns out, this constraint makes it exceedingly difficult to produce any elements heavier than lithium (atomic number 3); all heavier elements were therefore synthesized later inside stars. (As Carl Sagan would say decades later, “We are all made of starstuff.”) Cheekily, Gamow invited Hans Bethe (by then at Cornell University) as a co-author, so the paper became known as “Alpher-Bethe-Gamow,” which when the names are correctly pronounced sound very much like the first three letters of the Greek alphabet.

Meanwhile, across the “Pond,” Fred Hoyle was an up-and-coming cosmologist at Cambridge, working with luminaries such as Eddington and Dirac, and became a professor at Cambridge in 1945. (Interestingly, he was born in 1915, the same year that Einstein published his theory of gravity.) Hoyle visited the US at one point, where he met Walter Baade, a pioneer in supernova research. While Baade mused about how supernovae may be significant in the production of heavy elements, Hoyle pursued the idea further. Hoyle realized that the heaviest elements must be formed inside supernovae, whose explosions then release that material into the

universe, where it can then form into new generations of stars and planets.

This got Hoyle to thinking whether this could be happening more generally. Paul tells the story of Hoyle and his colleagues Thomas Gold and Herman Bondi watching a film called “Dead of Night.” The film is structured in a way that the end of the movie leads right back into the beginning, an endless cycle. What if the universe could renew itself in this way? What if, as galaxies receded from one another, new matter popped up in the vast empty spaces created between them? As galaxies move away, new ones emerge to fill in the spaces. This “creation field” would give rise to an eternal universe, a “steady state” which persists for eternity, with no need for a beginning, and no dismal future of eternal emptiness, they proposed in 1948. Convinced of the merits of his model, Hoyle derided the “standard” competing model in a 1949 BBC interview, calling it the “Big Bang.” While this was not intended to be complimentary, the name stuck.

How would this debate be resolved? Gamow, proponent of the “Big Bang,” and Hoyle, proponent of the “Steady State” alternative, both went on to become prolific scientific popularizers in the English language. Each wrote a number of popular books in the 1950’s and 1960’s, and Gamow was also a cartoonist. One apparent “leg up” the steady state model had was that, according to the best data of the time, the oldest stars in the universe appeared to be older than the universe’s “expansion age.” (This turned out to be due to observational errors which would not be fully resolved until well into the 1990’s.)

The resolution, it turned out, came from a completely unexpected place, from New Jersey researchers Arno Penzias and Robert Wilson, who were testing out microwave receiver systems for Bell Laboratories in 1964. The mysterious background signal they discovered proved to have immense implications, finally settling the debate in favor of the “Big Bang.”

Paul concluded his presentation at that point, with a reminder that you can find out the rest of the story in his book, *Flashes of Creation*. If you’d like an autographed copy, call Main Point Books in Wayne and speak to the manager.

Many thanks to Paul Halpern for an engaging presentation on the history of cosmology and some of the colorful figures who contributed to it!

[To watch this meeting or any of the DVAA’s previous Zoom meetings, visit our YouTube playlist.](#)

Recent DVAA Events

Norristown Farm Park (September 10)

Approximately 35 attendees gathered at the top of the hill by the barn, a spot which offered excellent views of Jupiter, Saturn, Venus, and the Moon. The new program between the Park and the DVAA proved to be a huge success!

Clockwise from top right: Sunset by the barn with a crescent moon visible; Kris Kafka sets up his UniStellar eVscope; Roy Patton sets up his Dobsonian; evening observations underway after opening remarks by Jan. Photos of Kris and Roy by Jan Rush; other photos by George Keighton ([additional photos here](#)).



Constellation Hunter Pop-up Clinic, Heebner Park (September 11)

A favorable weekend forecast prompted a “pop-up” observing clinic, hosted by Jan Rush and Al Lamperti. Club members were offered the chance to familiarize themselves with the sky and the Astronomical League’s Constellation Hunter observing program.

Clockwise from top right: Attendees gather and await night-fall; Jan Rush directs guests towards some helpful observing resources; Al Lamperti points out notable summer constellations in the summer sky. Photos by George Keighton ([additional photos here](#)).



Recent DVAA Events

Valley Forge Star Party (September 18)

The monthly star party returned to its original format at the model airplane field, with upwards of 60 guests attending.

Clockwise from top right: Louis Berman helps an attendee un-box a vintage telescope; Larry Kenyon offers a young attendee a view through his Celestron; friend David Henderson sets up his Dobsonian as a crowd gathers. Photos by George Keighton ([additional photos here](#)).



Olszanowski Farm - Brooke Elementary Home & School Fall Festival (October 1)

Clockwise from top left: Al Lamperti setting up; Mike & Sofia Pascavage; Brian DeAngelis & Stephanie Pascavage; Al with Mary & Brian DeAngelis, Mike Pascavage in background. Photos by Joe Lamb.



Still More Observing Program Videos on the Astronomical League YouTube Channel

Al Lamperti [email](mailto:alamperti@temple.edu)

<https://www.youtube.com/channel/UCtvCHdJ1vOx0Tt4vR0g2taA>

As mentioned in the previous newsletters, listed below are new video uploads.



Any questions about ANY of the 70+ observing programs, please contact me (lamperti@temple.edu) or the Coordinator of the specific program you are interested in that is listed on the A.L. website. We are here to help you enjoy the hobby to the fullest.

New Videos of Observing Programs since the last newsletter:

Arp Peculiar Galaxy Observing Program: <https://www.youtube.com/watch?v=Rc5h4T0IUvE>

If you are a galaxy person and wish to see galactic interactions or their after effects, take a look at this video, as well as the requirements: <https://www.astroleague.org/al/obsclubs/arppec/arppec.html>

Sketching Program: <https://www.youtube.com/watch?v=gP1bwHSdNOA>

Sketching at the eyepiece is inexpensive, permanent, gives you a feeling of accomplishment and improves your observing skills. This video demonstrates how to sketch open & globular clusters, galaxies and nebulae with associated tips and tricks.

Hydrogen alpha Solar Observing Program: <https://www.youtube.com/watch?v=4D1S2DGjW0g>

This video will explore what can be seen with a dedicated solar telescope (e.g., PST) or with a solar filter attached to your own telescope. Solar features seen with a hydrogen alpha filter are really fascinating and truly dynamic. What better way to study our nearest neighboring star and you do not have to stay out late either!

Summary & Brief Overview of all Observing Programs of the Astronomical League:

<https://www.youtube.com/watch?v=SnehNHlmNsM>

IMAGERS: Don't forget that this one is for you!

<https://www.astroleague.org/content/foundations-imaging-observing-program>



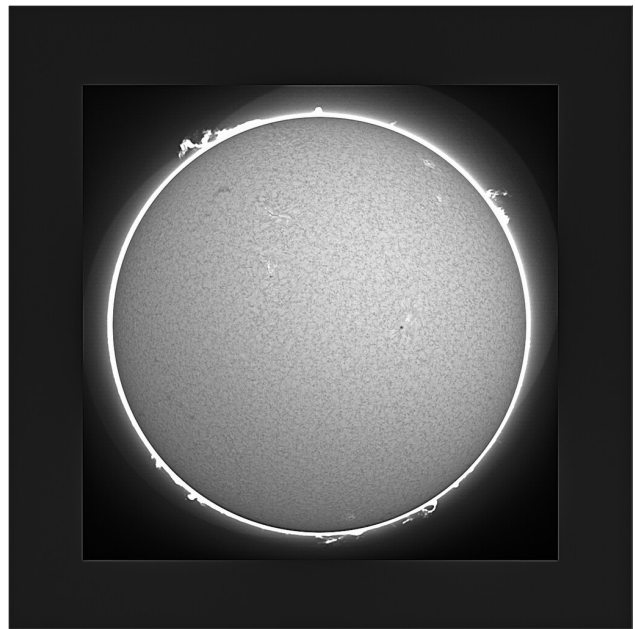
*Pictured above are just some of the awards that can be attained through the AL's observing programs!
Image courtesy of The Astronomical League.*

Astrophotography Highlights



Clockwise from top left:

- The Cocoon Nebula (IC 5146) by Lou Varvarezis. "This image was created with a bunch of old data shot with my one shot color camera that I just found on my PC. This forgotten data had a lot of issues, normally I wouldn't stack uncalibrated data but since there was so much of it I decided to test the law of averages. Although, the image could have been cleaner if the data was calibrated properly, I am pleased with the result." 114x300 sec (9.5 hours total).
- Tom Nolasco's image of an active chromosphere on September 4. Taken at prime focus through a Lunt 60mm pressure tuned solar scope using a ZWO ASI174-MM monochrome camera.
- A sunspot group observed by Bart Fried on August 30. 4.5" f/15 Brashear (1903) refractor, no drive. Brashear Herschel wedge, Televue 13mm Nagler Type 6; afocal projection into a Pixel 4A phone camera. The phone was in video mode with 2x Zoom selected.
- NGC 7331, an unbarred spiral galaxy in Pegasus. Dick Steinberg captured this image on September 26. Several satellite galaxies can be seen here.



Weird Ways to Observe the Moon

David Prosper

This article is distributed by NASA
Night Sky Network



International Observe the Moon Night is on October 16 this year— but you can observe the Moon whenever it's up, day or night! While binoculars and telescopes certainly reveal incredible details of our neighbor's surface, bringing out dark seas, bright craters, and numerous odd fissures and cracks, these tools are not the only way to observe details about our Moon. There are more ways to observe the Moon than you might expect, just using common household materials.

Put on a pair of sunglasses, especially **polarized sunglasses!** You may think this is a joke, but the point of polarized sunglasses is to dramatically reduce glare, and so they allow your eyes to pick out some lunar details! Surprisingly, wearing sunglasses even helps during daytime observations of the Moon.

One unlikely tool is the humble **plastic bottle cap!** John Goss from the Roanoke Valley Astronomical Society shared these directions on how to make your own bottle cap lunar viewer, which was also suggested to him by Fred Schaaf many years ago as a way to also view the thin crescent of Venus when close to the Sun:

“The full Moon is very bright, so much that details are overwhelmed by the glare. Here is an easy way to see more! Start by drilling a 1/16-inch (1.5 mm) diameter hole in a plastic soft drink bottle cap. Make sure it is an unobstructed, round hole. Now look through the hole at the bright Moon. The image brightness will be much dimmer than normal – over 90%

dimmer – reducing or eliminating any lunar glare. The image should also be much sharper because the bottle cap blocks light from entering the outer portion of your pupil, where imperfections of the eye's curving optical path likely lie.” Many report seeing a startling amount of lunar detail!

You can **project the Moon!** Have you heard of a “Sun Funnel”? It's a way to safely view the Sun by projecting the image from an eyepiece to fabric stretched across a funnel mounted on top. It's easy to make at home, too – directions are here: bit.ly/sunfunnel. Depending on your equipment, a Sun Funnel can view the Moon as well as the Sun— a full Moon gives off more than enough light to project from even relatively small telescopes. Large telescopes will project the full Moon and its phases, with varying levels of detail; while not as crisp as direct eyepiece viewing, it's still an impressive sight! You can also mount your smartphone or tablet to your eyepiece for a similar Moon-viewing experience, but the funnel doesn't need batteries.

Of course, you can join folks in person or online for a celebration of our Moon on October 16, with International Observe the Moon Night – find details at moon.nasa.gov/observe. NASA has big plans for a return to the Moon with the Artemis program, and you can find the latest news on their upcoming lunar explorations at nasa.gov.

(Continued from previous page)



Sun Funnels in action! Starting clockwise from the bottom left, a standalone Sun Funnel; attached to a small refractor to observe the transit of Mercury in 2019; attached to a large telescope in preparation for evening lunar observing; projection of the Moon onto a funnel from a medium-size scope (5 inches).

Safety tip: NEVER use a large telescope with a Sun Funnel to observe the Sun, as they are designed to project the Sun using small telescopes only. Some eager astronomers have melted their Sun Funnels, and parts of their own telescopes, by pointing them at the Sun - large telescopes create far too much heat, sometimes within seconds! However, large instruments are safe and ideal for projecting the much dimmer Moon. Small telescopes can't gather enough light to decently project the Moon, but larger scopes will work.

You can download and print NASA's observer's map of the Moon for International Observe the Moon Night! The map on the next page shows the view from the Northern Hemisphere on October 16 with the seas labeled, but you can download both this map and one of for Southern Hemisphere observers, at: bit.ly/moonmap2021 The maps contain multiple pages of observing tips, not just this one.

The above article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach. Visit <https://nightsky.jpl.nasa.gov/> to find local clubs, events, stargazing info and more.



International OBSERVE
THE MOON NIGHT 2021

SATURDAY
OCTOBER 16TH



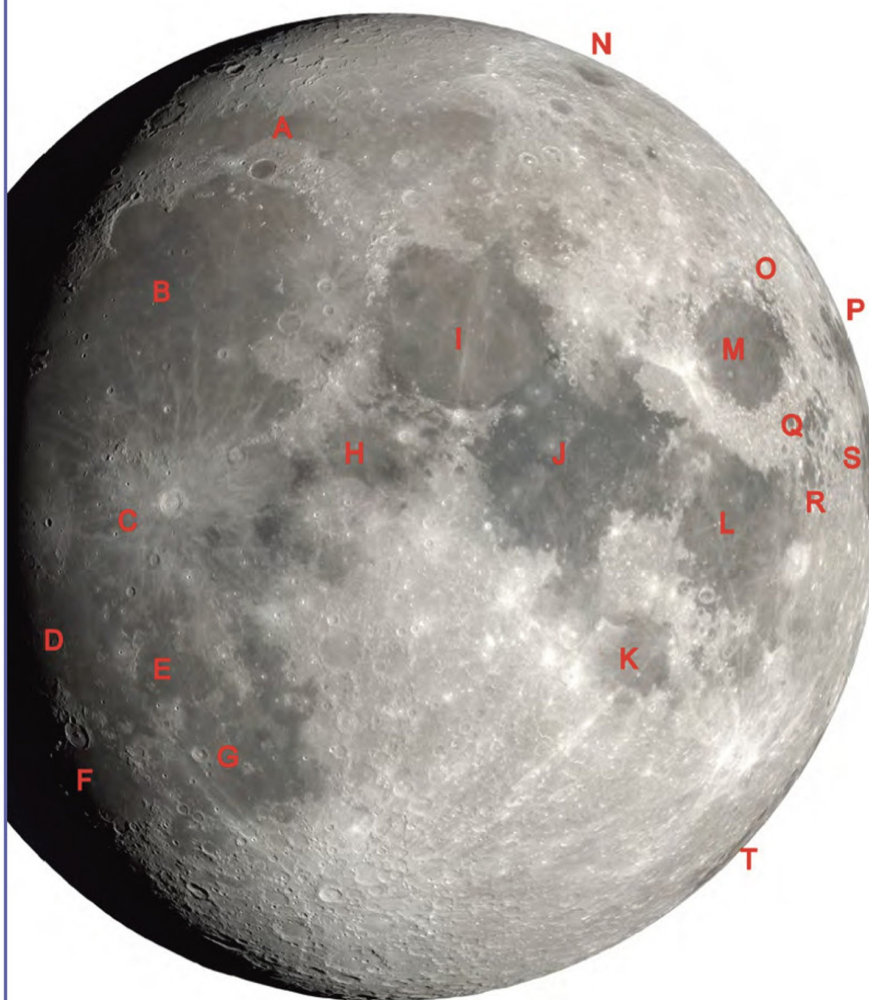
**NORTHERN HEMISPHERE MOON MAP WITH
LUNAR MARIA (SEAS OF BASALT)**

Moon Map

This map was created for International Observe the Moon Night 2021. It depicts the Moon as it will appear from the northern hemisphere at approximately 11:00 PM EDT on October 16, 2021 (3:00 AM UTC on October 17).

Lunar Maria (Seas of Basalt)

You can see a number of maria tonight. Once thought to be seas of water, these are actually large, flat plains of solidified basaltic lava. They can be viewed in binoculars or even with the unaided eye. Tonight, you may be able to identify 18 maria on the Moon. This includes four seas along the eastern edge that are often hard to see. Because of libration, a slight apparent wobble by the Moon in its orbit around Earth, tonight we get to peek slightly around the northeast edge of the Moon, glimpsing a sliver of terrain normally on the Moon's far side.



Map generated with NASA's Dial-A-Moon
(<https://svs.gsfc.nasa.gov/4874>)



- | | | |
|--|--|---------------------------------|
| A. Mare Frigoris (Sea of Cold) | H. Mare Vaporum (Sea of Vapors) | Q. Mare Anguis (Serpent Sea) |
| B. Mare Imbrium (Sea of Rains) | I. Mare Serenitatis (Sea of Serenity) | P. Mare Marginis (Border Sea) |
| C. Mare Insularum (Sea of Isles) | J. Mare Tranquillitatis (Sea of Tranquility) | R. Mare Spumans (Sea of Foam) |
| D. Oceanus Procellarum (Ocean of Storms) | K. Mare Nectaris (Sea of Nectar) | S. Mare Smythii (Smyth's Sea) |
| E. Mare Cognitum (Known Sea) | L. Mare Fecunditatis (Sea of Fertility) | T. Mare Australe (Southern Sea) |
| F. Mare Humorum (Sea of Moisture) | M. Mare Crisium (Sea of Crises) | |
| G. Mare Nubium (Sea of Clouds) | N. Mare Humboldtianum (Humboldt's Sea) | |

[MOON.NASA.GOV/OBSERVE](https://moon.nasa.gov/observe)

#ObserveTheMoon

Methacton SCHOOL DISTRICT

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Friday, September 17th

6:30 - Celestial Highlights & Planet Tour

8:00 - Celestial Highlights & Moons: Worlds of Mystery 

Friday, October 15th

6:30 - Celestial Highlights & Moon Witch

8:00 - Celestial Highlights & Space Exploration Update

Friday, October 29th

6:30 - Funny Thing About The Sky

8:00 - Funny Thing About The Sky (Encore)

Friday, November 19th

6:30 - Celestial Highlights & We Are Stars

8:00 - Celestial Highlights & Eclipses

Friday, December 3rd

6:30 - Celestial Highlights & Seasons of Light Holiday Special

8:00 - Celestial Highlights & Seasons of Light Holiday Special (Encore)

December 10th - 18th

6:30 - Laser Light Shows Return to the Mallon Planetarium!!!!!!

www.methacton.org/Planetarium

for Details, Tickets, & News

Arcola Intermediate School
4001 Eagleville Road
Eagleville, PA 19403

Adults: \$8

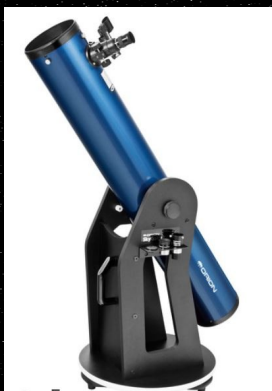
Children/Students/Seniors: \$6

DVAA Telescope Rentals

Celestron NexStar 5SE



6" Orion Dobsonian



DayStar 60 mm Solar Telescope



6" Orion StarBlast Dob



All scopes include tripod/base, eyepieces, manuals, power, etc. Rental is \$10/month with \$20 deposit. More info at www.dvaa.org under the OBSERVING tab. To rent one of these scopes, contact Joe Lamb at rentals@dvaa.org.

The Delaware Valley Amateur Astronomers

Since 1976, the **DVAA**, a non-profit corporation, has **shared the wonder and science of astronomy** with thousands of amateur astronomers and the public in the Philadelphia area. Each month we host dark-sky and local star parties, telescope workshops, science & astronomy lectures, educational outreach sessions, and more. To learn more or to join DVAA, please visit www.dvaa.org.

Check the schedule for our **free monthly meetings open to the public**, usually held on Friday via Zoom.

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