THE DELAWARE VALLEY
amateur ASTRONOMER
VOL. 45 NO. 4
APRIL 2021
sharing the wonder and science of astronomy

Star Parties Resume at Valley Forge

The DVAA held its first star party of the year at Valley Forge National Historical Park on March 20th. Following the successful modified format employed last year for the pandemic, visitors enjoyed talks by DVAA members covering a range of topics. Head to page 7 to read an attendee's personal experience of bringing his father to this event.

To register for upcoming star parties, see the events calendar at dvaa.org. Attendance is limited, so act fast!

Photo credit: Al Lamperti

PLAN ON IT!

April 1-30 Virtual Astronomy Events. Browse the listings at NASA's **Night Sky Network** for virtual events hosted by astronomy clubs nationwide!

April 5-12 International Dark Sky Week. See page 12. Check **groups.io** for updates on any club observing activities (New Moon April 11).

April 10 Northeast Astronomy Forum (NEAF). Will be held virtually at **https://www.neafexpo.com/.**

April 17 (7:15 - 9:15 pm) Public Star Party at Valley Forge National Historical Park model airplane field. Free and open to the public in a new distanced format (must pre-register for this event).

April 23 (7:30 pm) Monthly Meeting via Zoom (members) and YouTube (public). Dr. Dan Werthimer from UC Berkeley on the Search for Extra-terrestrial Intelligence (abstract on page 2). Watch for an email from Program Chair Jeremy Carlo with the meeting links.

April 27 (8:00 - 9:30 pm) Astronomy Extravaganza Star Party. Anderson Farm Park. Registration is required at the Upper Providence Parks & Rec website.

Star Party Weather Hotline: 484-367-5278

CONTENTS:

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

This is Why We Have Liberal Arts

Harold Goldner email

Possibly one of the most spine-tingling moments at a DVAA Meeting happened during March's recent meeting when our guest speaker, Stephanie LaMassa of the Space Telescope Science Institute (and a fellow Boston University alumna) played for us the Data Sonification of the Chandra Deep Field South in X-rays. Those of us who study the objects in the sky are used to silent views. Saturn's rings don't make a sound. Jupiter's moons whirl around the gas giant quietly. When Mars is at opposition it isn't any "louder" than it is at other times in its orbit. A full moon makes just as much noise as a new moon to us as we stand on the earth and gaze up. That's why it was so amazing to put a sound to an image.

Who comes up with such an idea?

The purpose of a liberal arts education is to immerse the student in the traditional fields of natural sciences, social sciences, arts, and humanities. Cross-pollination is an after thought, although presumably, it's thought that a well-rounded student will profit from immersion in all of the liberal arts.

The thing is that we declare majors, we wander into our own specialties, our own strengths (hopefully) and our own preferred subjects. So it is that I never took a laboratory science course past high school chemistry but have taken nearly a dozen courses or so on Shakespeare. But just like when all you have is a hammer everything starts to look like a nail, specialization breeds tunnel-vision. That orthopedist who only works on shoulders looks at every new patient like "how will I do *this* surgery?" That basement contractor who only puts in a particular combination of pumps and pipes looks at every other basement like, "where will I put my stuff and how do I sell this to the homeowner?"

Those moments when the arts cross-over and complement each other are genuinely marvelous. So it was that during an alumni course on the Iliad I have been taking, we were discussing the role of the Greek Gods and the Fates versus free will in assessing that the characters battling over Helen of Troy choose to do or not to do. And as I thought about the battle and the force, I thought of a black hole bending space time around it, and how that would draw mass towards the event horizon until it was beyond the power of that mass to alter its course. So, too, was it with Agamemnon, Menelaus, Hector, and especially Achilles on the Plains of Troy before Ilium.

I could never have conceptualized Homer's epic in that way if I hadn't been exposed to the idea of black holes, and the presentations that we see at our General Meetings or read about black holes in Sky & Telescope or Astronomy. Similarly, it had to be an exposure to liberal arts that inspired the NASA engineers to create the Rube Goldberg-like method for landing on Mars. A sky crane? Seriously? What were they smoking when that popped into their heads? Can I have some?

When I stare up into the Milky Way, my clients vanish like the coma of a comet blown away by the solar wind. When I continue to attempt to learn the constellations and even names of stars, my biggest, most troublesome cases are as visible and detectible as dark energy. When I come back to those challenges in daylight, however, my nights under the heavens inspire me to new ideas, ideas that I cannot fathom from whence they came.

It has to be outer space. That and a liberal arts background.

Don't Miss the Next Monthly Meeting: April 23, 2021

Are We Alone? The Search for Extraterrestrial Civilizations

Dr. Dan Werthimer, University of California, Berkeley and SETI (Search for Extraterrestrial Intelligence)

What is the possibility of other intelligent life in the universe? Can we detect radio, infrared, or visible light signals from alien civilizations? Current and future projects searching for such signals may provide an answer. Dan will describe SETI@home, the new PANOSETI observatory, future searches, and show how new technologies are revolutionizing the search for extra-terrestrial intelligence (SETI).

DVAA Virtual Meeting: April 23, 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*

Photo courtesy of UC Berkeley

Welcome New DVAA Members!

Sheila Burke-Gaskill (Oreland, PA)
John Gaskill (Oreland, PA)
Arunan Karthik (Warrington, PA)
Vinobha Pannerselvam (Warrington, PA)
Paul R Smaglik (Hazle Township, PA)
Maura Smith-Mitsky (Camp Hill, PA) (returning)

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

DVAA Board & Committee Chairs

Title	Name	Email
President	Harold Goldner	president@dvaa.org
Vice-President	Jan Rush	veep@dvaa.org
Secretary	Mike Tucker	secretary@dvaa.org
Treasurer & Astronomical League Coordinator	Louis Berman	treasurer@dvaa.org
Members-at-Large	Roy Patton Tracey Trapuzzano Barry Johnson	mbratlarge@dvaa.org
Astrophotography	Lou Varvarezis	astrophotography@dvaa.org
Camping & MSSP	Nate Prentice	camping@dvaa.org
Door Prizes	Roy Patton	doorprizes@dvaa.org
Newsletter Committee	*(see below)*	newsletter@dvaa.org
Night Sky Network	Al Lamperti	nightsky@dvaa.org
Light Pollution	Barry Johnson	ltpollution@dvaa.org
Observing	Andrew Hitchner	observing@dvaa.org
Outreach	Jan Rush	outreach@dvaa.org
Programs	Jeremy Carlo	programs@dvaa.org
Publicity	Bill McGeeney	publicity@dvaa.org
Scope Rentals	Joe Lamb	rentals@dvaa.org
Website	Louis Berman	website@dvaa.org
Welcoming	Brian Lee	welcoming@dvaa.org
Women of DVAA	Jan Rush	women@dvaa.org

Mark Your Calendars!

Upcoming Monthly Meetings

Friday April 23, 2021: Featured Speaker: Dr. Dan Werthimer, University of California, Berkeley and SETI (Search for Extra-terrestrial Intelligence) "Are We Alone? The Search for Extra-terrestrial Civilizations." See abstract on page 2. The regular monthly meeting will be livestreamed. Watch your email for sign-on directions.

Upcoming 2021 Meeting Dates: (all Friday evenings): Apr. 23, May 21, June 25, July 23, Aug. 20, Sept. 17, Oct. 15, Nov. 19, and Dec. 17.

2021 Public Star Parties

DVAA public star parties at Valley Forge National Historical Park have been restarted with a revised format incorporating COVID-19-related safety precautions. Advance registration at dvaa.org is required. They are held at Valley Forge National Historical Park on the Model Airplane Field. (Google Maps). ***Weather Hotline: 484-367-5278.***

Public Star Party dates for 2021 (all Saturday evenings): **Apr. 17** (7:15), **May 22** (7:45), **Jun. 19** (8:00), **Jul. 17** (8:00), **Aug. 21** (7:30), **Sep. 18** (6:30), **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 Tom Nolasco for being lead editor last month.

George Keighton — lead editor for this issue

Al's Observing Tips: "Did I Really See That Feature in the Galaxy?"

Al Lamperti email

As you observe more and more galaxies, you may start noticing features like a dark lane, a star-like nucleus or tapered ends. You may even have noted that a particular galaxy looked "granular" or had a foreground star superimposed on a portion of it. Were you just too tired and imagined these features? A cloudy night project might be to find an image of the galaxy and compare your observing notes to that picture. More often than not, you will be quite pleased with the comparisons.

Now, where can you find images and descriptions of galaxies and other deep sky objects? There are books and free and purchased software out there for you to peruse. The following is a short, incomplete list of books you may consider: "Messier's Nebulae & Star Clusters" by Jones; "Atlas of Deep Sky Splendors" by Vehrenberg; "The Carnegie Atlas of Galaxies" by Sandage & Bedke; "Observing Handbook and Catalogue of Deep Sky Objects" by Lugenbuhl & Skiff; "The Night Sky Observer's Guide" by Kepple & Sanner; "The Deep Sky Field Guide to Uranometria 2000.0" by Cragin, Lucyk & Rappaport. The latter two books are very handy to have with you in the field as a quick reference.

There are several useful links to digitized images: LEDAS: Digitized Sky Survey is a resource from the Leicester Database and Archive Service and allows one to view an image (from the STScI DSS) of just about any deep sky object. It is now called HyperLeda: (http://leda.univ-lyon1.fr/). The Saguaro Astronomy Club web site (https://www.saguaroastro.org/sac-downloads/) has many free downloads: The Saguaro Astronomy Club's Deep Sky Database, Version 8.1 contains information on over 10,000 star clusters, galaxies, and nebulae of all types. The Double Star Database, Version 4.0 contains information on over 10,000 multiple star systems. NED - the NASA/IPAC Extragalactic Database - a master list of extragalactic objects with many useful data on objects as well as images (http://ned.ipac.caltech.edu/). The NGC/IC Home Page can be accessed at https://ngcicproject.observers.org and, lastly, Telescopius (https://telescopius.com/?fromdsobrowser) can help you plan your observing session.

Making this a project for cloudy or Full Moon nights will help keep your enthusiasm high for the next clear, moonless observing session. It will also help make your eye attuned to those finer features that are awaiting you.

Be sure to check out Al Lamperti and Frank Colosimo's article on Variable Galaxies in the April issue of Sky & Telescope!

An image of the Sunflower Galaxy (M63/ NGC 5055) recently captured by Lou Varvarezis. What particular features do you notice?

Capture details: Total exposure 3h 50m (23 x 600 sec lights, 50 flats, no darks) Canon EOS Rebel XS (1000D) Astronomik Clip-in CLS CCD filter, Celestron Edge HD8, 0.7x focal reducer, TCF Leo, Orion thin OAG, QHY5L-II-M guide camera.

Stacked and processed with PixInsight. DBE, PCC, EZ Denoise, ArcsinhStretch. Luminance extracted after DBE, EZ Denoise script and MaskedStretch. LRGBCombination, HDRMultiScale (with and without masks), MMT and Curves.

The March Monthly Meeting

Jeremy P. Carlo email

DVAA President Harold Goldner opened the March 2021 DVAA meeting with an update on recent events. A Public Star Party was held at Valley Forge earlier in the month. Asteroid 4 Vesta recently reached opposition in Leo, and in early April the Ingenuity helicopter will make its inaugural flight on Mars. A "new" nova has been spotted in Casseiopeia, and the next full moon in April will occur near perigee, making it a "Supermoon." Harold also discussed an astronomy book club being hosted by the Delaware Astronomical Society; contact Harold if you'd like to be added to the list!

Next, we heard from various DVAA committees. Welcoming Chair Brian Lee welcomed 4 new members and one returning member. Treasurer Lou Berman announced we are now up to 159 members, as well as the receipt of a recent unsolicited donation. Donations to DVAA are always welcome, whether in the form of cash, door prize donations, bequests, or corporate donations. Secretary Mike Tucker gave an update on the recent Valley Forge star party, which had great turnout despite the socially distanced format. VP and Outreach Chair Jan Rush said that there would be an upcoming Outreach event in April at Upper Providence Township, to be led by Al Lamperti. Jan also plugged the ongoing introductory astronomy lecture series being conducted by the Chester County Astronomical Society; while the course may be complete by the time you read this, contact Don Knabb at the CCAS for info about future courses!

With committee reports complete, Programs Chair Jeremy Carlo then introduced the evening's invited speaker, Dr. Steph LaMassa from the Space Telescope Science Institute. Steph's presentation was entitled "Black Holes – How Do We See That Which Gives Off No Light?" Steph is an expert in using observatories at a variety of wavelengths – including visible, ultraviolet, infrared, and x-ray – to study these most extreme and enigmatic of objects.

Steph started by introducing the basic tenets of General Relativity, our most up-to-date understanding of the phenomenon of gravity. Spacetime, which is what you get when you combine the three dimensions of space with one dimension of time, it turns out, is rather stretchy. Like a bowling ball stretching the surface of a trampoline, or a drumstick deforming the surface of a drum, mass causes spacetime to stretch and bend. These curves in the fabric of spacetime, in turn, affect the motion of nearby objects. This stretching and warping of spacetime gives rise to the phenomenon we know of as "gravity."

All masses, like that bowling ball, form a sort of indentation in the fabric of spacetime. Any object trying to escape from it must climb "uphill" out of that well. The minimum speed required to escape from a given location (such as the surface of a planet or star) is known as the "escape velocity." From the surface of the earth, the escape velocity is 11.2 kilometers per second. That's quite fast by everyday standards, but pretty slow compared to the speed of light, which is nearly 300,000 kilometers per second.

But what if an object were so dense – that is, so much mass was packed into such a small volume – that the escape velocity exceeded the speed of light? Then even light would not be able to escape. This is, in a nutshell, the principle behind a black hole. And this gives rise to the question posed in the talk's title – how the heck could we ever see such a thing?

Astronomically speaking, there are essentially two known types of black holes. One represents the endstate of evolution of the highest-mass stars. These stars blow off their outer layers in a supernova explosion, leaving behind a collapsed core, which could either be in the form of a neutron star (in which nuclear forces are sufficient to halt further collapse), or a black hole. These typically have about 3 to 100 times the mass of the sun. The other, much larger, type, reside at the centers of most galaxies, and are millions to billions of times the sun's mass. This gives rise to their name, "supermassive black holes." In theory, it's possible for a black hole with intermediate mass to exist (and they would be called "intermediate mass black holes"), although to date none have been discovered and it's not entirely clear how they would form. (As you might imagine, it would be extremely interesting if one of these were to be discovered!)

But getting back to the titular question, how do you

(Continued on next page)

The March Monthly Meeting

(Continued from previous page)

find these things? Essentially, there are two answers. You can deduce the presence of a black hole by its effects on its surroundings. Steph showed some work by Andrea Ghez and collaborators (for which she shared the Nobel Prize in Physics in 2020) in which stars can be clearly seen orbiting around what looks like nothing in the center of our galaxy. That "nothing" is quite small, yet contains about 4 million solar masses, based on the motion of those stars. You can also detect black holes while they are "eating." When matter is unfortunate enough to fall into a black hole, it gets spun up into an accretion disk, spiraling inward toward its inevitable doom. As it spirals inward, it becomes quite hot, and emits copious amounts of radiation. Some of it may escape, because of some interesting physics related to that spiral motion, but even if not, it will emit plenty of radiation as it spirals inward. Unfortunately, though, visible light isn't well suited to this sort of study.

Steph gave an overview of the electromagnetic spectrum. Visible light is but one octave in a vast symphony of electromagnetic waves. Electromagnetic waves with longer wavelengths than visible light include infrared, microwaves, and radio waves. In the direction of shorter wavelengths (and higher energies) we have ultraviolet, x-rays, and gamma rays.

It turns out that each region of the electromagnetic spectrum excels at probing certain types of matter or certain energy ranges. Stars emit lots of visible light, but visible light is strongly absorbed by gas and dust, making it virtually useless to study deep inside galactic cores. But that cool gas and dust emits loads of infrared, making infrared useful for studying that sort of matter. Extremely hot material (millions of degrees, versus the thousands of degrees on stellar surfaces) emits copious ultraviolet and x-rays, as well as radio waves.

Steph showed some examples of galaxies, which look very different depending on what wavelength band is used. Visible light images show mostly the distribution of stars in the spiral arms. Infrared shows the distribution of gas and dust. Radio and x-ray images, however, show lots of activity near the galactic center, and in some cases long jets – of that lucky material which manages to escape before being captured by the black hole - are seen emanating from the galactic center. Using spectroscopy – breaking up light into its component wavelengths – you can even determine the elemental composition of the material falling in, and also make deductions about the physical conditions present (such as temperature, density, and magnetic field), which helps to understand the underlying physics.

It turns out that not all supermassive black holes are created equal. Some, like the one in our own galaxy, are rather quiescent, and have only a puny few million solar masses of material. Others are actively gobbling up their surroundings, and can be up to several billion solar masses! The latter are known as "active galactic nuclei," the most active and distant of which are also known as quasars. (However, there is some evidence that "our" black hole may have been more active some 6-9 million years ago, although this is still a topic of debate.)

Steph then talked about some of the most interesting recent findings regarding black holes, some of which we've heard about in other DVAA talks. Recently, for the first time, astronomers were able to directly image a supermassive black hole, by combining signals from telescopes spread over the world, a collaboration known as the Event Horizon Telescope. Mergers of black hole pairs have been observed through their emission of gravitational waves. And searches are currently ongoing to find the most distant supermassive black holes in the universe, as we are seeing them when the universe was a small fraction of its current age.

Steph concluded by reviewing some of the most important questions remaining in the field. How did the first supermassive black holes form? What role do they play in shaping their host galaxies? What controls their "feeding" habits? Similarly, how do they build up mass? Is this mostly through mergers with other black holes, or is it a more gradual process of accretion of gas and dust? Finally, what is the mass distribution of black holes? Do intermediate-mass black holes exist? What are the highest and lowest masses for black holes?

The future for black hole research is, ironically, bright. With the James Webb Space Telescope hopefully launching later in 2021, we'll soon have a new window to study black holes both near and far with unprecedented depth. Many thanks to Steph LaMassa for an engaging and entertaining presentation on this most extreme of topics!

To watch this meeting or any of the DVAA's previous Zoom meetings, visit our YouTube playlist.

"A Five-Star Birthday"

Andrew Buchan

The gods of weather smiled upon me on March 20th.

March 20th is special for my family because it is not only the first day of spring, but it is also my father's birthday. My father instilled in me a love of astronomy when I was three years old; he would take me to Zany Brainy and buy me books and puzzles about the solar system. I received a telescope one Christmas when I was in elementary school, and we took advantage of the fact that we live down the road from Valley Forge National Park to attend star parties hosted by the Delaware Valley Amateur Astronomers (DVAA).

Fast forward to the present decade, and star parties, like so many other things, were temporarily put on hold during the pandemic. However, the DVAA began having a new method of having star parties in November 2020 that entailed limiting attendance, social distancing, wearing a mask and projecting a video livestream from one of the telescopes onto a screen.

I gave my father a new CD of Handel's *Messiah* because our family's old CD began to skip shortly after Christmas, and I had thought taking a trip down memory lane would be especially welcome this year with so much else being different due to the pandemic. I remembered the DVAA holds its star parties on the third Saturday of the months March through November, so I registered my father and myself to comply with the attendance cap.

Any amateur astronomer can tell you that clouds have an annoying habit of showing up on the most unwelcome dates. (I don't think I will ever get over the horizon-to-horizon clouds that stubbornly refused to budge on June 5, 2012, which was the last date of the 21st century on which Venus crossed the face of the sun – it happened in the afternoon! On a school day! My bedtime wouldn't have even been an issue!) My phone's Weather app's prediction of a 70% chance of snow on Friday was a little worrisome, but fortunately Friday came and went without even a single snowflake. The stage was set for the big day.

My father's relatively warm birthday began with a beautifully cloudless blue sky. To my immense relief, the sky remained cloudless throughout the entire day; the sun I had drawn on my father's birthday card seemed encouragingly prophetic. I let my mother, the Julia Child of our family, know I would have to have dinner served especially early, and a game of 20 Questions with my father ensued when I wiggled the "Buchan Observatory" sweatshirt, which I had received as a Christmas present in 2019, at him. I revealed my big surprise just before we ate the delicious stuffed shells my mother had baked.

The sun was just beginning to set behind a hill as my father and I arrived at the park. One member of the DVAA had already connected his telescope to the projector, presenting an astronaut's-eye view of the moon's cratered surface. The luck of the Irish made its presence known in the form of the sunlit rims of a four-leaf clover quartet of craters that formed the Lunar X. DVAA member Andrew, who served as our tour guide of the video views, pointed out this time-sensitive cross of sunlight.

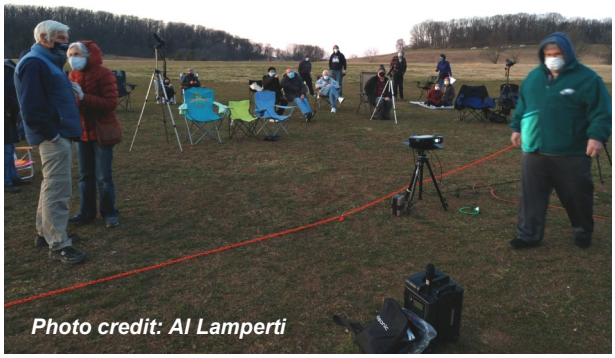


Photo credit: Al Lamperti

Mars was the next target, shining next to the Pleiades and Taurus, before Andrew showed the variety of open star clusters: the 37 Cluster and the ET Cluster, with their distinctive namesake shapes, and the Beehive Cluster. Andrew pointed out the winter sky's two most prominent asterisms, the Big Dipper and the Winter Hexagon, and took the attendees on a round-trip of Orion. I particularly liked when the gain was changed to demonstrate how a higher gain reveals many details the eye cannot see, whereas a lower gain gives a view that very closely approximates the view one would have through an eyepiece.

Andrew gave a great sense of the work astronomers do to make sense of the universe, including an explanation of how the solar system's place in the Milky Way dictates what we see at night, and introducing the Trumpler system of classifying open star clusters highlighted the differences between the many open clusters on view. A pass of the International Space Station was a delightfully unexpected surprise, and the planetary nebula in Gemini and M3 provided a nice display of the non-open cluster specimens visible in the vernal sky.

Thank you, DVAA – your star party was the perfect ending to a birthday that allowed me to give my father the sun, the moon and the stars!

Upcoming Regional Astronomy Events

The following is a list of upcoming notable regional and national astronomy events, compiled courtesy of MERAL Chair Don Knabb. While some events such as the Cherry Springs Star Party and Green Bank Star Quest have unfortunately been canceled for 2021, a number of events remain tentatively scheduled for the upcoming months. See websites where applicable for the most current information.

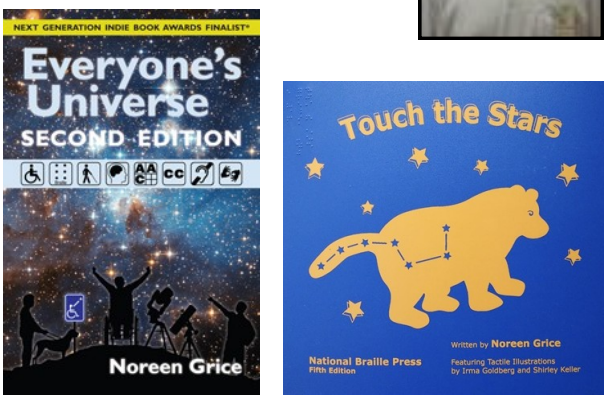
- Northeast Astronomy Forum, April 10 – 11, Rockland Community College, NY (Not in MERAL). Virtual event - https://www.neafexpo.com/
- Astronomy Day, May 15, Northern Virginia Astronomy Club - C.M. Crockett Park, Midland, VA. This event might need to be virtual this year due to health concerns, that is yet to be determined. https://www.novac.com/wp/outreach/astronomyday/
- Stellafane, August 5-8 (Not in MERAL), Springfield, Vermont. Website indicates the event is a go. https://stellafane.org/
- Almost Heaven Star Party at Spruce Knob Mountain Center in Circleville, WV over Labor Day weekend, 3 -7 Sep, 2021. https://www.ahsp.org/
- York County Star Party Sept 8-12 and Oct 6-11. http://www.skyshedpodpa.com/york-county-star-party.html
- Blackwater Falls Astronomy Weekend, September 9 – 11, Blackwater Falls State Park, WV. http://kvas.org/events.html
- Staunton River Star Party (Fall), October 4 - 10, 2021, Staunton River State Park, Virginia http://chaosastro.org/starparty/
- Northern Virginia Astronomy, Star Gaze, 10/9 Typically hosted at C.M. Crockett Park, Midland, VA. https://www.novac.com/wp/outreach/stargaze/
- South Jersey Astronomy Club Star Party. No fall star party date is currently listed. http://www.sjac.us/star-party/
- Mega Meet, Pulpit Rock, PA. No date is currently listed. https://lvaas.org/page.php?page=megameet
- Black Forest Star Party, the date is to be determined. https://bfsp.org/
- Delmarva Star Watch, Trap Pond DE. No information available, no website.

Above: Guests arrive at the DVAA star party at Valley Forge National Historical Park on March 20th. Photo courtesy of Al Lamperti.

Making Astronomy Accessible for Everyone

George Keighton

As part of a year-long series commemorating the 75th anniversary of the Astronomical League, a Zoom meeting was held on March 18th, featuring the topic "Putting out the Welcome Sign for Accessible Astronomy." The meeting was opened by former AL president John Goss, who introduced the featured speaker Noreen Grice, founder and president of You Can Do Astronomy LLC (https://youcandoastronomy.com/).



Two books by Noreen Grice that will be helpful to have on hand for outreach events. Images courtesy of You Can Do Astronomy LLC and National Braille Press.

Noreen began by talking about an encounter she had with a group of blind children as a Boston University student while working at the planetarium of the Boston Museum of Science. After realizing that the children did not have an optimal experience with the planetarium show, she was determined to find ways to make astronomy more accessible for others. Noreen asked the audience to consider the "who, what, why, where, and when" of planning an astronomy event. Who is the audience going to be? What will be the strategy for learning? Why might some people not be able to participate, and who might be missing from your program? People with disabilities may encounter various challenges: Consider how mobility access might pertain to your equipment set up and field conditions. Non-visual access may not only refer to those who are visually impaired, but also to sighted people who are non-visual learners. It is also important to think about the emotional well-being of your participants, such as those who may be sensitive to over-stimulation or large crowds. People with speech difficulty may be using an augmentative and alternative communication (AAC) device. Captioning systems benefit not just the hearing impaired, but also those who may not be native speakers of English. Additionally, you may encounter service or emotional support animals at your event.

Noreen highlighted two key resources she created that every outreach coordinator should have on hand for their programs. "Everyone's Universe" can be ordered through Amazon, and provides ideas on improving accessibility for people with special needs, with case studies highlighted as examples. It also serves as a travel guide for those who may be seeking out organizations who are making such efforts. Centennial Observatory in Idaho, for instance, offers an extended eyepiece that wheelchair users can reach. The McDonald Observatory of UT Austin features the Wren-Marcario Accessible Telescope, designed specifically for mobility-impaired visitors. "Touch the Stars" is available through National Braille Press, and provides tactile images of constellations, eclipses, moon phases, and a range of astronomical objects. Sighted people can benefit from this experience as well, such as by offering guests a chance to feel a tactile image before they look through a telescope or while they are at the eyepiece. The key takeaway is this: "When you make materials accessible for one group of people, you are making materials accessible for *many* people with different learning styles."

Noreen offered some additional tips during the Q&A session. If you see someone at an event who may have special needs, don't be afraid to ask them how you can help. Work with advocacy groups such as organizations for the blind, deaf, or autistic to promote events and generate interest. Tactile images can be created using a Swell-Form, or thermal expansion machine. This process involves photocopying a suitable black-and-white image onto Swell-Form paper which can then be run through the machine to raise the black areas. Be sure to keep these prints in plastic page protectors as they are highly moisture sensitive. In addition to the tactile images, providing accurate pictorial descriptions can be very helpful in enhancing understanding.

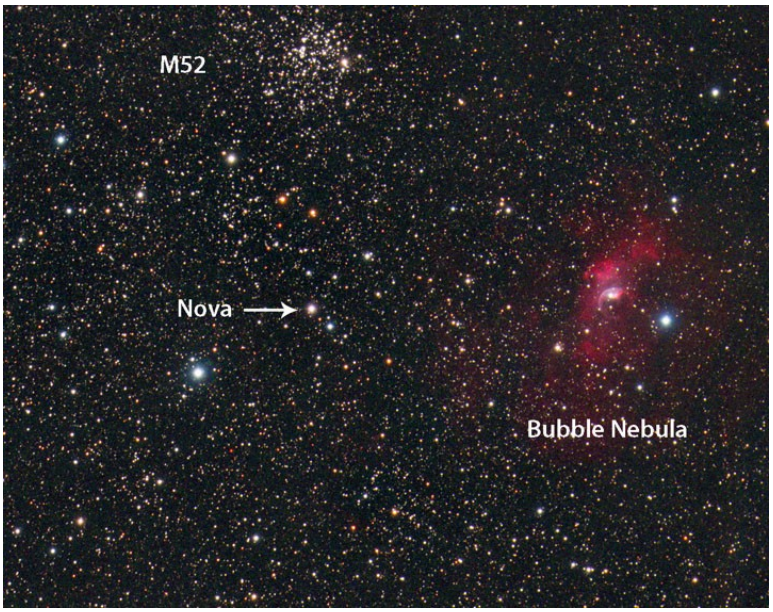
The editor would like to thank Noreen Grice for delivering a very informative talk and bringing awareness to this important topic which may be often overlooked. Thanks also go to Peggy Walker and John Goss of the Astronomical League for arranging and hosting this event. The full recording is available for viewing on the AL YouTube channel.

Nova in Cassiopeia

The observation of a new nova in Cassiopeia was reported on March 18th by Japanese amateur astronomer Yuji Nakamura. Designated V1405 Cas, the nova brightened over several days from magnitude 9.6 to 7.6. Classical nova eruptions occur when a white dwarf in a binary star system draws off hydrogen gas from its main sequence companion star, creating an accretion disk and triggering an explosion.

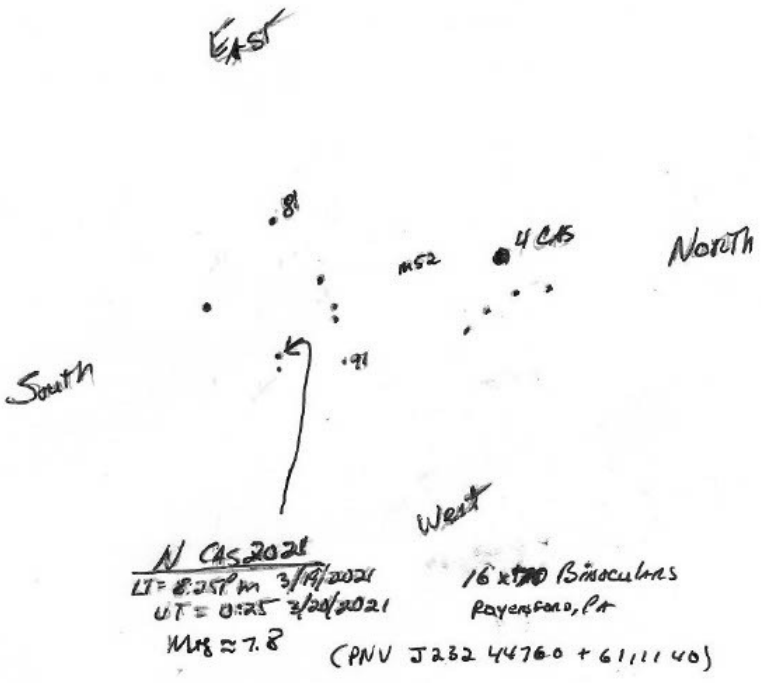
For star charts and the latest brightness measurements of the nova, visit the AAVSO website. Enter "V1405 Cas" into the "Pick a Star" box and select which data you wish to see.

Coordinates (J2000.0):
RA 23h 24m 47.73s
Dec +61° 11' 14.8"



The nova appeared in close proximity to the open cluster M52 and the Bubble Nebula, both shown in the same field of view here.

Image courtesy: Dennis di Cicco / Sean Walker MDW Sky Survey, obtained at https://skyandtelescope.org/astronomy-news/observing-news/bright-nova-erupts-in-cassiopeia/



Above: A sketch drawn by Al Lamperti on March 19th depicting the nova as seen through 16x70 binoculars. Here is his description: "Sketch was made and an estimated magnitude of 7.8 was gotten by comparing known magnitudes of stars on the AAVSO chart. On the sketch one of these stars was labelled 81, indicating that it was 8.1 (the decimals are purposely left out so as not to be confused with a star). I estimated that the Nova was definitely a bit brighter than 8.1 so I guessed 7.8. Could it also be seen with a pair of 10x50 binoculars? Yes, indeed."

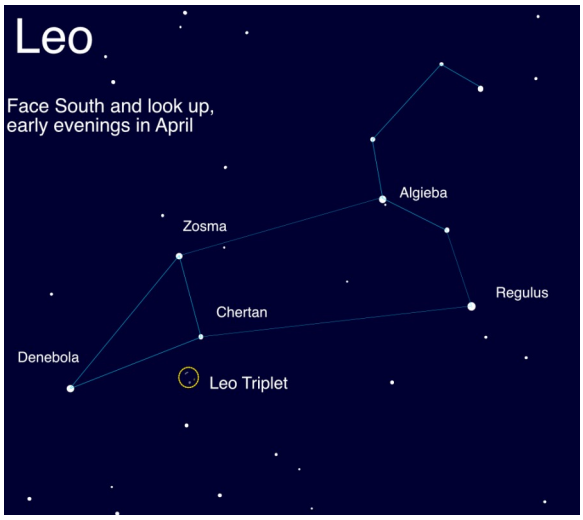
Watch the Lion: Celestial Wonders in Leo!

David Prosper

This article is distributed by NASA Night Sky Network

Leo is a prominent sight for stargazers in April. Its famous sickle, punctuated by the bright star Regulus, draws many a beginning stargazer's eyes, inviting deeper looks into some of Leo's celestial delights, including a great double star and a famous galactic trio.

Leo's distinctive forward sickle, or "reverse question mark," is easy to spot as it climbs the skies in the southeast after sunset. If you are having a difficult time spotting the sickle, look for bright Sirius and Procyon - featured in last month's article – and complete a triangle by drawing two lines to the east, joining at the bright star Regulus, the "period" in the reverse question mark. Trailing them is a trio of bright stars forming an isosceles triangle, the brightest star in that formation named Denebola. Connecting these two patterns together forms the constellation of Leo the Lion, with the forward-facing sickle being the lion's head and mane, and the rear triangle its hindquarters. Can you see this mighty feline? It might help to imagine Leo proudly sitting up and staring straight ahead, like a celestial Sphinx.



The stars of Leo: note that you may see more or less stars, depending on your sky quality. The brightness of the Leo Triplet has been exaggerated for the purposes of the illustration - you can't see them with your unaided eye.

Your view of the three galaxies in the Leo Triplet won't look as amazing as this image taken by the VLT Survey Telescope, unless you have a telescope with a mirror 8 feet or more in diameter! Still, even a small telescope will help your eyes pick up these three galaxies as "faint fuzzies": objects that seem blurry against a background of pinpoint stars. Let your eyes relax and experiment with observing these galaxies by looking slightly away from them, instead of looking directly at them; this is called averted vision, a handy technique that can help you see details in fainter, more nebulous objects.

Image Credit: ESO, INAF-VST, OmegaCAM; Acknowledgement: OmegaCen, Astro-WISE, Kapteyn I.

If you peer deeper into Leo with a small telescope or binoculars, you'll find a notable double star! Look in the sickle of Leo for its second-brightest star, Algieba - also called Gamma Leonis. This star splits into two bright yellow stars with even a small magnification - you can make this "split" with binoculars, but it's more apparent with a telescope. Compare the color and intensity of these two stars - do you notice any differences? There are other multiple star systems in Leo – spend a few minutes scanning with your instrument of choice, and see what you discover.

One of the most famous sights in Leo is the "Leo Triplet": three galaxies that appear to be close together. They are indeed gravitationally bound to one another, around 30 million light years away! You'll need a telescope to spot them, and use an eyepiece with a wide field of view to see all three galaxies at once! Look below the star Chertan to

(Continued on next page)

(Continued from previous page)

find these galaxies. Compare and contrast the appearance of each galaxy – while they are all spiral galaxies, each one is tilted at different angles to our point of view! Do they all look like spiral galaxies to you?

April is Citizen Science Month, and there are some fun Leo-related activities you can participate in! If you enjoy comparing the Triplets, the "Galaxy Zoo" project (galaxyzoo.org) could use your eyes to help classify different galaxies from sky survey data! Looking at Leo itself can even help measure light pollution: the Globe at Night project (globeatnight.org) uses Leo as their target constellation for sky quality observations from the Northern Hemisphere for their April campaign, running from April 3-12. Find and participate in many more NASA community science programs at science.nasa.gov/citizenscience. Happy observing!

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 Dark Sky Week: April 5-12

As we head into the new moon period for April, people across the world will be turning out their lights in recognition of International Dark Sky Week (https://idsw.darksky.org/). This annual event aims to bring awareness to issues concerning light pollution and foster an appreciation for the night sky.

Mitch Berger observed this scene near his home in Wynnewood under last December's full moon- a particularly egregious example of how not to illuminate your property!

Left: "The Darkest Skies are the Brightest," an aptly-titled new album by Anneke van Giersbergen. Perhaps some inspiration for your next observing playlist?

Image courtesy: Inside Out Records

Created in 1988, the International Dark Sky Association works on a number of initiatives year-round to address light pollution. In addition to education and outreach, the IDA works with public officials to encourage enactment of good policy regarding lighting, and is responsible for advocating for the preservation of dark sky sites. Learn more about the organization's work here.

What changes can you make around your home and your community to promote good lighting? Read about the Five Principles for Responsible Outdoor Lighting published on the IDA website. There are several key points to consider. These include making sure the light has a specific, useful purpose, is no brighter than necessary, is only on when it is needed, and is targeted downward to prevent obtrusiveness. Warmer color temperatures are also preferred.

Looking to get more involved in helping to curb light pollution? Consider joining the IDA, or reach out to our very own Barry Johnson, Chairman of the DVAA Light Pollution Abatement Committee.

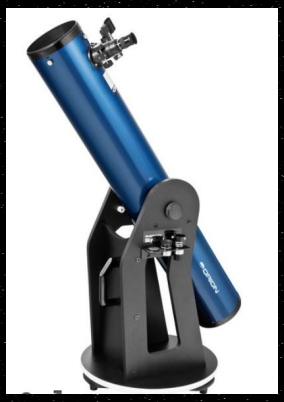
Above: An exquisite image of the Running Man Nebula (Sh2-279) captured by Lou Varvarezis. The full image capture details can be found on Lou's Reddit page.

On March 3rd, Mars and the Pleiades made their closest conjunction since 1991, appearing 2.6 degrees apart. Tom Nolasco captured the event above using a 300mm lens. The two won't be this close again until 2038!

DVAA Telescope Rentals

Celestron NexStar 5SE

6” Orion Dobsonian



DayStar 60 mm Solar Telescope

6” Orion StarBlast Dob

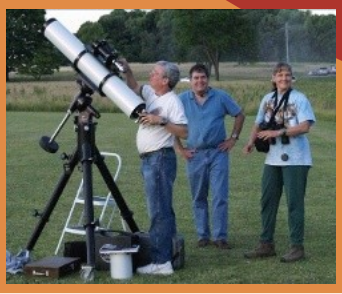
All scopes include tripod/base, eyepieces, manuals, power, etc. Rental is $10/month with $20 deposit. More info at www.dvaa.org under the OBSERVING tab. To rent one of these scopes, contact Joe Lamb at rentals@dvaa.org.

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.

get in on the fun:
JOIN the DVAA TODAY!



Dues are $40 per year for an individual, $60 for a Family Membership, or $10 for a Junior or Student Membership. **Membership benefits** include our monthly newsletter, membership in the Astronomical League (including its publications), access to our dark-sky observing sites, and inexpensive rentals of fine telescopes. You can join or renew online at www.dvaa.org. If paying by mail, include a note stating what you are paying and membership category desired. Make checks payable to “DVAA” and send to our treasurer: Louis Berman, 477 Turner Avenue, Drexel Hill, PA 19026, or for more information contact treasurer@dvaa.org.