THE DELAWARE VALLEY
amateur ASTRONOMER
sharing the wonder and science of astronomy

VOL. 48 NO. 4
APRIL 2024

Daniel McCauley shot this beautiful nightscape at the Historic Rands Marina in Tuckerton, NJ.

It was created as a composite of a foreground shot taken during the blue hour, followed by a nighttime shot of the sky featuring Orion and other winter constellations.

Full image here

PLAN ON IT!

April 8 New Moon See the DVAA groups.io site for dark sky observing opportunities.

April 8 (2:00-4:30pm) Partial Eclipse Viewing - Valley Forge National Historic Park Setup at Wayne's Woods if clear, or Mini Grand Parade if overcast. More info

April 13 (7:30-10:30 pm) Public Star Party at Valley Forge National Historical Park model airplane field. Rain/cloud date April 14th. More info

April 19 (8:00-10:00 pm) John Heinz National Wildlife Refuge Star Party Telescope operators needed! More info

April 20-21 Northeast Astronomy Forum & Space Expo (NEAF) Featuring great speakers, vendors, discounts, raffle, and other surprises. More info

April 24 (7:30pm) Astrophotography Workshop on Zoom. More info

April 26 (7:00 pm) In-person General Meeting at Radnor Township Building and on YouTube. Featured speaker Dr. Ed Guinan on gardening on Mars (title and abstract TBA). More info

May 9-12 DVAA Members Spring Field Trip Big Dipper and Little Dipper Lodges at Cherry Springs. Link to event here

May 17 (7:00 pm) In-person General Meeting at Radnor Township Building and on YouTube. Member night: Soliciting your photos of the eclipse! More info

FOR ALL EVENT INFORMATION AND UPDATES, SEE THE DVAA WEBSITE www.dvaa.org.

CONTENTS:

Welcome New DVAA Members!

Celina Foran (Philadelphia, PA)
Jon Griffiths (Philadelphia, PA)
Prentis Hall (Lansdale, PA)
Stan Sienkiewicz (Philadelphia, PA)
Kenneth Smith (Hatboro, PA)
James Wright (Philadelphia, 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

DVAA Board & Committee Chairs

Title	Name	Email
President	Jan Rush	president@dvaa.org
Vice-President	Tom Nolasco	veep@dvaa.org
Secretary	George Keighton	secretary@dvaa.org
Treasurer & Astronomical League Coordinator	Scott Vanaman	treasurer@dvaa.org
Members-at-Large	Len Jensen John Leimgruber Andrea Saksek	mbratlarge@dvaa.org
Astrophotography	Lou Varvarezis	astrophotography@dvaa.org
Camping and MSSP	Bill McGeeney	camping@dvaa.org
Door Prizes	Ken Koeplinger	doorprizes@dvaa.org
Youth Awards	Al Lamperti	youthawards@dvaa.org
Newsletter Committee	*(see note at right)*	newsletter@dvaa.org
Night Sky Network	Al Lamperti	nightsky@dvaa.org
Light Pollution Abatement	Barry Johnson	ltpollution@dvaa.org
Observing	*(TBD)*	observing@dvaa.org
Outreach	Al Lamperti (*interim*)	outreach@dvaa.org
Programs	Jeremy Carlo	programs@dvaa.org
Publicity	Sarah Marley	publicity@dvaa.org
Scope Rentals	Joe Lamb	rentals@dvaa.org
Website	Louis Berman	website@dvaa.org
Welcoming	Brian Lee	welcoming@dvaa.org

Mark Your Calendars!

Upcoming Monthly Meetings

Friday, April 26, 2024 (7:00pm): Dr. Edward Guinan, Villanova University, on agriculture on Mars (title and abstract TBA)

Monthly Meetings are held at the Radnor Township Building and are livestreamed. All are welcome to attend in person. We gather beginning at 7:00pm; the program and the YouTube stream begin at 7:30pm.

Meeting Location: Radnorshire Room, 301 Iven Avenue, Radnor, PA 19087

Upcoming 2024 Meeting Dates (Friday evenings): April 26, May 17, June 21, July 19, August 23, September 13*, October 18, November 15 and December 13.

**Outdoor meeting at Fort Washington State Park*

2024 Public Star Parties

DVAA public star parties are held at Valley Forge National Historical Park on the Model Airplane Field. (Google Maps).

Public Star Party dates for 2024 (all Saturday evenings): **Apr. 13** (7:30), **May 18** (8:00), **Jun. 15** (8:30), **Jul. 13** (8:30), **Aug 10** (8:00), **Sep. 14** (7:00), **Oct. 12** (6:00), **Nov. 9** (4:30).

Backup dates: In the event of inclement weather, the Sunday following each scheduled date will be reserved as a backup option.

Register for the event in order to receive an email (also a text message, if enabled) regarding last-minute updates. The latest weather-related event information is always available at www.dvaa.org.

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

If you would be interested in joining us on the Newsletter Committee, or serving as guest editor for one month, just drop us a line at newsletter@dvaa.org — we'd love to have you on board, regardless of your experience level! Online tutorials are available to get you quickly up to speed.

Thanks to Tom Nolasco for serving as lead editor for January and February. George Keighton is the lead editor for March and April.

Follow the DVAA on Facebook and YouTube!

DVAA Facebook Group
DVAA YouTube Channel

2024 star parties/conventions in or near MERAL

The following is a list of non-DVAA regional astronomy events, courtesy of Don Knabb of the Mid-East Region of the Astronomical League (MERAL). Please visit https://www.meralastronomy.org for the most current information.

Northeast Astronomy Forum, April 20/21
Rockland Community College, NY (Not in MERAL, but close!)
https://www.neafexpo.com/

South Jersey Astronomy Club Star Party, May 2-5
Belleplain State Forest, NJ
http://www.sjac.us/star-party/

Mega Meet at Pulpit Rock, May 3-5
Pulpit Rock, PA
https://lvaas.org/page.php?page=megameet

Northern Virginia Astronomy Club, Astronomy Day, May 4
https://www.novac.com/wp/

York County Star Party #1 June 5-9
Susquehannock State Park in central Pennsylvania
https://www.yorkcountystarparty.org/

Cherry Springs Star Party, June 6-9
Cherry Springs State Park, PA
https://www.facebook.com/CherrySpringsStarParty/

Green Bank Star Quest, July 3- 6
Green Bank WV
http://www.greenbankstarquest.org/

Astronomical League Convention, July 17-20
Kansas City, MO
https://www.astroleague.org/alcon-2024-kansas-city/

Stellafane, August 1-4
Springfield, Vermont (Not in MERAL, but too important to not include)
https://stellafane.org/

West Virginia Astrophotography Association Annual Conference August 2-4
Blackwater Falls State Park, WV
https://www.facebook.com/WVAA1 https://www.wvaa.us/

Almost Heaven Star Party August 30-September 3
Spruce Knob Mountain Center in Circleville, WV
https://www.ahsp.org/

York County Star Party #2 September 4-8
Susquehannock State Park in central Pennsylvania
https://www.yorkcountystarparty.org/

Black Forest Star Party September 6-8
https://bfsp.org/

Blackwater Falls Astronomy Weekend, September 12-14
Blackwater Falls State Park, WV
https://kvas.org/index.html

2024 star parties/conventions in or near MERAL (continued)

Northern Virginia Astronomy, Star Gaze, September 28
C.M. Crockett Park, Midland, VA
https://www.novac.com/wp/

Staunton River Star Party (Fall), September 30-October 6
Staunton River State Park, VA
http://chaosastro.org/starparty-home/

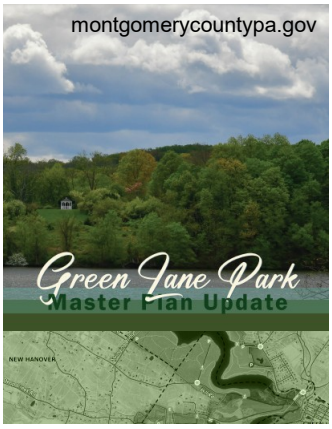
James River State Park Star Party, November 1-2
James River State Park, Gladstone, VA
https://www.dcr.virginia.gov/state-parks/event?id=2024-01-05-14-36-16-803959-4dy

Green Lane Park Draft Master Plan Published

Over a year in the making, the 241-page draft Master Plan for Green Lane Park has been published and public comment is now being solicited. Efforts on behalf of DVAA members to bring attention to the park's dark sky resources have proven fruitful:

- DVAA is mentioned on p. 9, 86, 199, 227, & 234
- Astronomy is mentioned on p. 198 & 227
- Dark sky is mentioned on p. 57, 86, 182, 199 & 229.

The entire report can be downloaded at the Montgomery County website and a link to provide feedback remains open. A final public meeting was held on March 20, and the township will keep the public informed as the report's recommendations are implemented in the coming months and years. Thanks to Jan Rush for spearheading this effort and to everyone who advocated for this important DVAA observing site!



DVAA's 30 Seconds of Fame

Jan Rush email

The WHYY-TV van arrives at Heebner Park for our "staged" star party. Photo credit: George Keighton

Well, actually it's 3 minutes and 30 seconds. A couple of months ago, WHYY-TV producer Steve Kwasnik approached DVAA through the publicity@dvaa.org email address with a request to include DVAA on a segment of the WHYY-TV program "You Oughta Know." This program airs weekly on Fridays at 7:30pm and covers diverse organizations and events in our region.

Steve wanted to use the upcoming solar eclipse as a timely lead-in to introduce viewers to our club as a local astronomy resource. Constrained by a limited public television budget, the video needed to be acquired on a single week day (to avoid weekend overtime for the cameramen). We settled on a plan to host a small "staged" star party on Friday, March 1, to occur regardless of clouds and featuring different types of telescopes, solar displays, and many of DVAA's junior members. Unfortunately, the weather didn't cooperate and the sun was nearly set when the producer and cameramen arrived very late, so we weren't able to demonstrate the solar viewing tools we had assembled. (That was the day Interstate 476 was closed due to a road rage incident...) Due to heavy cloud cover, there were no objects visible in the sky. However, the producer was undeterred and took about 2 hours of footage at our staged event promising that the weather wouldn't matter thanks to the "magic of television." The WHYY-TV star party video was augmented by video and photos from the 2017 total solar eclipse (donated by Gary and Tracey Trapuzzano, and my husband Skip), and additional footage from our recent indoor telescope clinic on Feb. 16 (taken by Skip).

In all, about 4 hours of video and over 150 photos were condensed into a succinct 3 minutes and 30 seconds of great publicity for DVAA! You can catch it on Friday, April 5 at 7:30pm; DVAA will be the final story in that episode. After it airs, the episode will be available on the WHYY-TV website:

https://whyy.org/episodes/eclipse-enthusiasts-prepare-for-big-event/

Thanks to everyone who contributed to this event, sure to bring more astronomy enthusiasts into our orbit!

Producer Steve Kwasnik interviews DVAA Junior Member Sylvie Stonberg. Photo credit: George Keighton

Anderson Farm Park Star Party Report

Stan Williams

Members of the DVAA along with the Upper Providence Township hosted a star party at Anderson Farm Park on March 21, 2024. This was the fall back date due to weather conditions on March 20. There were a total of 6 attendees, 4 adults and 2 children, for this event supported by 7 DVAA members. All attendees received personalized attention and were appreciative of the views through telescopes and information provided to them. Good views of the planets Mercury and Jupiter, the Moon, the Orion Nebula, and comet 12P/Pons-Brooks were highlights of the evening.

The DVAA members supporting this event were: Martin Knoblauch, Ken Koeplinger, Al Lamperti, Wayne Reed, Laura Todd, Betsy Williams, and Stan Williams. Ken Koeplinger demonstrated his newly acquired ZWO SeeStar telescope which resulted in at least two additional purchases of this telescope to date! Below are Ken's captures of the Moon and comet 12P Pons-Brooks during this Star Party:

The March Monthly Meeting

Jeremy P. Carlo email

Editor's note: A friendly reminder that we will be having a member night for the May 17th monthly meeting. Get ready to share your photos from the eclipse!

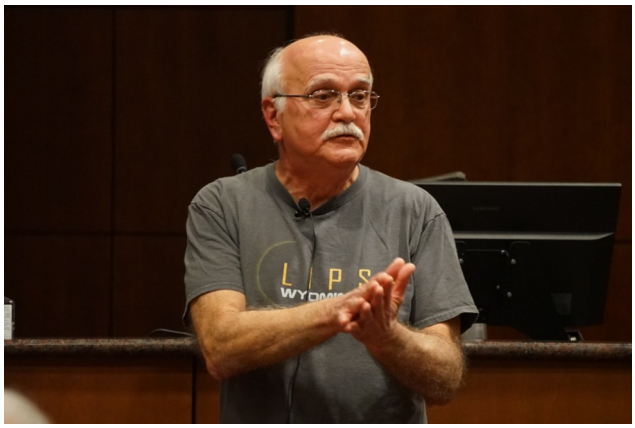
Bill McGeeney talks about the upcoming Cherry Springs trip as Jan Rush looks on. Photo credit: Mitch Berger

The March 2024 DVAA meeting was opened by President Jan Rush. Jan started by reminding everyone of the big event coming up next month: the total solar eclipse of April 8, 2024. The path of totality stretches from Texas to Maine, passing through Ohio, NW Pennsylvania, and upstate New York on its way across the country. The DVAA local area will see about a 90% partial solar eclipse, and DVAA will host an eclipse viewing event at Valley Forge. The last total solar eclipse to visit the Philadelphia area was back in 1478.

Jan then reminded attendees of other upcoming events, including star parties at the Tyler Arboretum on March 29, Valley Forge on April 13, the John Heinz National Wildlife Refuge on April 19, and of course the Northeast Astronomy Forum (NEAF) on April 20-21. Jan put out a "last call" for the 2024 DVAA Youth Awards; submissions are due by May 1. The upcoming DVAA Cherry Springs trip (to the Big and Little Dipper Lodges) will be on May 9-12, and is $115 per person. Finally, Welcoming Chair Brian Lee welcomed three new members to the club.

Next, VP Tom Nolasco presented the observing talk for the month, focusing (no pun intended) on solar eclipses. Tom explained the anatomy of solar and lunar eclipses, which occur when the sun, earth, and moon, are in perfect alignment; due to slight inclination of the moon's orbit relative to the earth's, eclipses do not happen every month but only in groups of 2-3 roughly every 6 months. In the case of a solar eclipse, the moon passes between the earth and the sun, and the moon's shadow, which is typically only about 50-100 miles wide, sweeps across the earth's surface at about 1500 miles per hour, and covers only about 0.3-0.5% of the earth's total surface. On average, a given point on the earth's surface is visited by a total solar eclipse about every 400 years. Tom outlined the need for eye protection during all phases of the solar eclipse aside from 100% totality. These can include "eclipse viewing shades" which fit like sunglasses, or filters designed to fit over the front ends (not the eyepieces!) of a telescope or binoculars. You can also project an image of the partially-eclipsed sun using a pinhole camera; if you're creative enough you can come up with your own "pinhole camera" using something like a colander or even the gaps between leaves of a tree. A "solar funnel" can also be used to project an image of the sun from a telescope.

Given that this eclipse is occurring in early April, weather is a key concern. Start checking weather forecasts about 10 days in advance to see whether you need to change your travel plans. Unfortunately, hotels along the path of totality have long since sold out, so flexibility may be difficult to manage!



Tom Nolasco talks about the upcoming eclipse. Photo credit: Mitch Berger

Tom then outlined the phases of a solar eclipse, assuming you're along the path of totality. Each "half" (ingress and egress) of the partial phase lasts a bit over an hour, with the moon gradually sweeping across the sun's disc, with a couple of minutes of totality when the moon completely overlaps the sun's disc. During totality the sun's corona may be seen; this is the only time the sun's atmosphere may be seen from the ground; this has led to a number of important discoveries including the element helium. During totality the sky darkens (although not completely) and some bright stars and planets become visible. At either end of totality are a variety of phenomena. Baily's Beads are seen as only small amounts of sunlight peek out over the edges of lunar craters, and are seen for 5 to 15 seconds before and after totality. In the final 1-2 seconds, the "diamond ring" becomes visible; this is your cue to remove (and replace) your solar filters! On the ground, many things happen as well.

(Continued on next page)

The March Monthly Meeting (continued)

You may notice the moon's shadow sweeping across the terrain. You may notice animals behaving strangely, as if night came unexpectedly quickly.

Finally, Tom gave some hints. Concentrate on the experience. Look at things. Don't spend the event with your head buried in the eyepiece, or worse yet, futzing around with camera equipment. Tom also plugged the "Solar Eclipse Timer" app, which can be downloaded to your phone, and for $1.99 provides detailed information and timing of the eclipse for your location (or any latitude/longitude you enter).

Following Tom's excellent presentation, Programs Chair Jeremy Carlo introduced the evening's speaker, NASA/JPL Solar System Ambassador John Conrad, who spoke about "SpaceX and the Seven Dwarfs: Rocketships for the 21st Century."

John Conrad speaks to a very well-attended meeting. Photo credit: George Keighton

Rocketry has been subjected to a revolution in recent decades: private industry has moved in and taken over most of our spacefaring capabilities, at least in the US. SpaceX is by far the largest of these companies, although a number of smaller ventures, the "dwarfs" – some new and some old – are also participating.

To simplify matters, John divided these various companies into three groups. First is "old space," the companies which have dominated rocketry since the 20th century; these have been subject to a lot of restructuring and consolidation, and also carry a lot of "baggage" from their histories. Foremost among these are Boeing, the United Launch Alliance (ULA), and Northrup Grumman. Next is "new space," which are the companies which have arrived on scene in this century; foremost among these are SpaceX, Blue Origin, and Virgin Galactic. Finally, there are the "Space Lite" companies focusing mainly on cubesats and small satellites, chiefly Rocket Lab and Firefly Aerospace.

John spent the bulk of the talk describing SpaceX, which dominates US spacefaring capability. It was started by Elon Musk in 2002, and in the two decades since has grown to dominate in virtually all conceivable metrics – success rate, launch frequency, number of launches, diversity of markets served, and so on. Here are some milestones and metrics. SpaceX is unique in its capability to reuse boosters, which increases affordability. Historically, space travel has been extremely expensive, whether it be the Apollo program or the Shuttle (which was only partially reusable) which followed. SpaceX has been a "game changer," and now the rest of the world is racing to catch up (although China is close on our tails). SpaceX's first contract with NASA was in 2006, and the first successful Falcon 9 launch was in 2010, with the first cargo delivery to the ISS in 2012 (as of now about 40 such deliveries have been completed). The first successful Falcon 9 landing was in 2015, and the first successful launch of a reused rocket stage was in 2017; some have now been reused up to 20 times. In 2018 SpaceX introduced the "Falcon Heavy," consisting of three Falcon 9's strapped together. SpaceX's first delivery of crew members to the ISS was in 2020, marking the first US crew delivery since 2011 (in the interim, only Russia could deliver crew members to the ISS, a situation which has become entirely untenable especially since the invasion of Ukraine in 2022). The per-seat cost of crew delivery to the ISS via SpaceX is $60-72 million, well under the $90-100 million while working with the Russians or with Boeing equipment. In 2023 SpaceX conducted 96 launches, out of 116 total launches to space from the US and 230 launches worldwide; the cost to deliver a kilogram of payload to orbit is about $6000, a factor of several smaller than previous decades.

Of course, one of SpaceX's biggest projects is launching thousands of Starlink internet satellites in orbit, a project which elicits mixed reactions from the astronomical community. In parallel, SpaceX is working on the Starship project, which will support the latest endeavor to send human beings back to the Moon, and eventually Mars. This project entails construction of the largest rocket ever, at 397 feet tall and 30 feet in diameter, with more than twice the thrust of the venerable Saturn V which delivered the Apollo spacecraft to the moon. In all of this, SpaceX has endeavored to keep its activities public and in the spotlight – "fail fast and learn faster." A highly publicized failure is followed by an even-more publicized success. Stay tuned to see what's next from SpaceX!

John then spent some time talking about seven companies which have made smaller but integral contributions to our modern spacefaring capabilities.

From the "old space" group comes Boeing, which has been in the business since long before space travel was a thing. Chief past successes include the Saturn V first stage, and the orbiter for the Space Shuttle. Their first launch was in 1967, and currently Boeing serves as prime contractor for the Space Launch System, the Hu-

The March Monthly Meeting (continued)

man Launch System (Artemis), and the Starliner ISS crew capsule. The SLS program is simply enormous, with similar thrust to the Saturn V. The first crewed mission is Artemis II, scheduled tentatively for 2025-6, and Artemis III is slated to go to the moon in 2026 or 2027. Needless to say, this project has went well over budget, with $100 billion spent already.

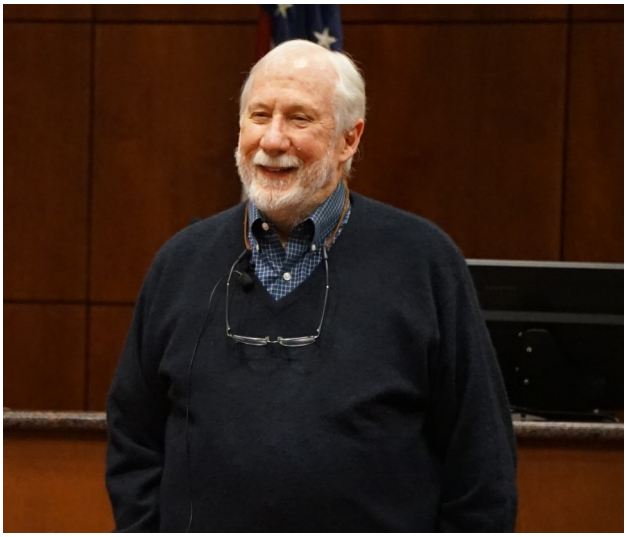
Next in the "old space" category is the venerable United Launch Alliance (ULA), formed as a joint venture of Lockheed Martin and Boeing, which has since "inherited" the remainder of the US Air Force's inventory of rockets. Chief among these are the Atlas V and the Delta, both of which have been workhorses for many decades, with about 700 launches each and success rates of 80-90%. However, the market is gradually moving away from expendable rockets, and the inventory of these storied vehicles is dwindling down, so ULA's days may be numbered.

Rounding out the "old space" group is Northrop Grumman, whose biggest success was the Apollo Lunar Module. More recently, they have acquired Orbital ATK, which built the Shuttle Solid Rocket Boosters, and have developed the Antares launch vehicle and the Cygnus freighter to deliver cargo to the ISS, launched from Wallops Island. Unfortunately, their existing craft all use Russian engines, which for aforementioned reasons are no longer available; to that end Northrop is looking to partner with Firefly (to be discussed later) to develop new engines for the Antares rocket.

Moving over to the "new space" category, we have Blue Origin. Blue Origin was of course started by Jeff Bezos (better known as the founder of Amazon) in 2000. Their focus has been space tourism, with short flights paid for by wealthy individuals. Their chief reusable rockets are the suborbital New Shepard and the orbit-capable New Glenn (named, of course, for the first two US astronauts, Alan Shepard and John Glenn). Test flights of New Shepard began in 2012, with the first crewed flights in 2018. Bezos himself has flown, as did William "Captain Kirk" Shatner in 2021. New Glenn is still in development, with the first launch scheduled for August 2024. Blue Origin is also planning to launch its own constellation of Starlink-style micro sats, and is in talks to acquire ULA. They are also working on the human landing system for the Artemis program.

Next up is Virgin Galactic, founded by "yet another billionaire" Richard Branson in 2004. Virgin is also chiefly focusing on space tourism, using rockets launched from aircraft. Seats are currently $450,000 each, for a 15-minute suborbital flight originating from New Mexico. Virgin has flown 6 commercial flights with 4 passengers each, and is working on a new generation spaceplane capable of carrying 6 passengers, with tests possible later in 2024.

Finally, there are two players in the "space lite" category. First up is Rocket Lab. Founded by New Zealander Peter Beck in 2006, its headquarters are currently in California, and there are currently about 1400 employees. Rocket Lab specializes in "smallsat" launches, with a number of contracts to launch cubesats. Rocket Lab developed the Electron small lift rocket capable of delivering 200 kg to low-earth orbit, with vertical landing and reuse capabilities. Electron's first launch was in 2018, with 37 successful missions to date. Rocket Lab is currently working on the Neutron medium lift vehicle, capable of delivering 8000-13000 kg to low-earth orbit, and similar in size to the SpaceX Falcon 9, with a test launch planned for the end of 2024.



John Conrad taking questions at the conclusion of his talk. Photo credit: Mitch Berger

The seventh "dwarf" is the "space lite" player Firefly. Firefly was started in 2014 by a Ukrainian investor, although a lawsuit from Virgin and issues related to Brexit caused massive delays and required the company to liquidate and restart. All Firefly assets were sold to the US government prior to the Russian invasion of Ukraine. Firefly's main work to date has involved smallsat launches (in competition with SpaceX and Rocket Labs), although they now have a contract with Northrop to develop a new Antares rocket engine to replace the Russian engines which are no longer available.

2023 was a record-breaking year for the US with a total of 116 launches, breaking the previous record of 108 set in the 1980's. The venerable Russian Soyuz, which for a decade following the Space Shuttle's demise was the world's only access to the ISS, has been overtaken by the latest US ventures. But the Chinese are coming, and India is too!

With that, John came to the end of an exciting and exhaustive survey of current US spacefaring capability. There are lots of new developments on the horizon, and the next few years and decades will be extremely exciting for space travel!

Participate in Eclipse Science

Kat Troche

This article is distributed by NASA's Night Sky Network (NSN). *The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!*

April is NASA's Citizen Science Month, and there is no shortage of projects available. Here are some citizen science projects that you can participate in on April 8th, on and off the path of totality right from your smartphone!

Eclipse Soundscapes, ARISA Lab / NASA

Eclipse Soundscapes

Eclipse Soundscapes will compare data from a 1932 study on how eclipses affect wildlife – in this case, crickets. There are a number of ways you can participate, both on and off the path. NOTE: you must be 13 and older to submit data. Participants 18+ can apply to receive the free Data Collector kit. Learn more at: eclipsesoundscapes.org/

GLOBE Eclipse

Folks that participated in the **GLOBE Eclipse** 2017 will be glad to see that their eclipse data portal is now open! With the GLOBE Observer smartphone app, you can measure air temperature and clouds during the eclipse, contributing data to the GLOBE program from anywhere you are. Learn more at: observer.globe.gov/

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Participate in Eclipse Science (continued)

HamSCI, The University of Scranton / NASA

HAMSCI

HamSCI stands for **Ham Radio S**cience **C**itizen **I**nvestigation. HamSCI has been actively engaged in scientific data collection for both the October 14, 2023, annular solar eclipse and the upcoming April 8, 2024, total eclipse. Two major activities that HamSCI will be involved in around the solar events will be the **Solar Eclipse QSO Party** (SEQP) and the **Gladstone Signal Spotting Challenge** (GSSC) which are part of the HamSCI Festivals of Eclipse Ionospheric Science. Learn more about these experiments and others at: hamsci.org/eclipse

SunSketcher™

SunSketcher, Western Kentucky University / NASA

SUNSKETCHER

If you're traveling to totality, help the **SunSketcher** team measure the oblateness, or shape, of the Sun during the eclipse by timing the flashes of Baily's Beads. You will need a smartphone with a working camera for this, along with something to hold the phone in place - don't forget a spare battery! NOTE: The app will need to run from five minutes *before* the eclipse starts until the end of the eclipse. Any additional phone use will result in Sun Sketcher data loss. Learn more at: sunsketcher.org/

Don't stop at the eclipse - NASA has citizen science projects you can do all year long – from cloud spotting on Mars to hunting for distant planets! By contributing to these research efforts, you can help NASA make new discoveries and scientific breakthroughs, resulting in a better understanding of the world around us, from the critters on the ground, to the stars in our sky.

We'll be highlighting other citizen science projects with our mid-month article on the Night Sky Network page, but we want to wish all you eclipse chasers out there a very happy, and safe solar eclipse! For last minute activities, check out Night Sky Network's Solar Eclipse Resources section!

Recent Images by DVAA Members

If you would like to participate in DVAA's active astrophotography community, visit the Astrophotography Resource Page on the DVAA website, and check the calendar for upcoming astrophotography workshops and events.

A testament to what is possible in the heavily light-polluted skies of the Philadelphia suburbs: Doug Lentz captured these detailed images of M81/M82 as well as the Horsehead Nebula from Narberth, PA.

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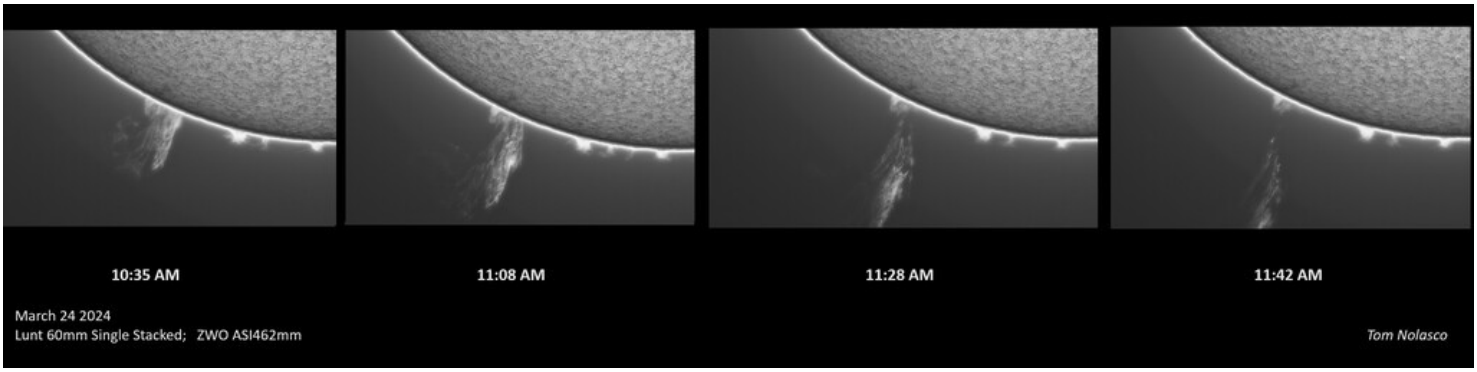
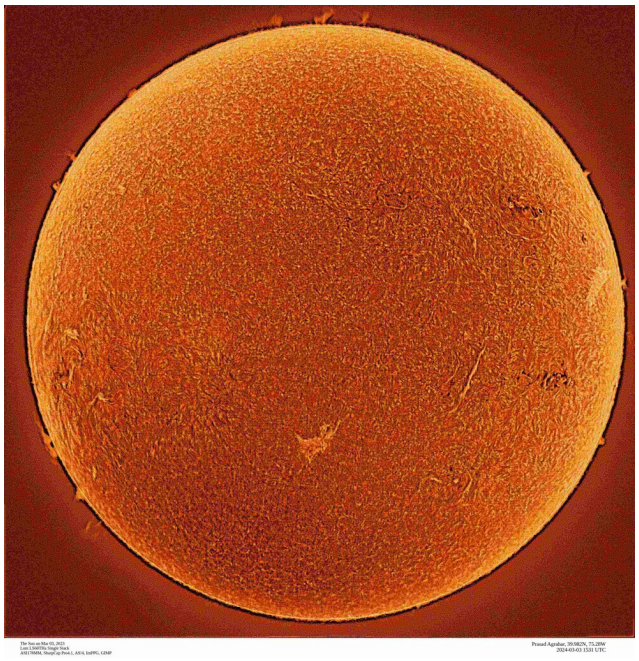
Recent Images by DVAA Members (continued)

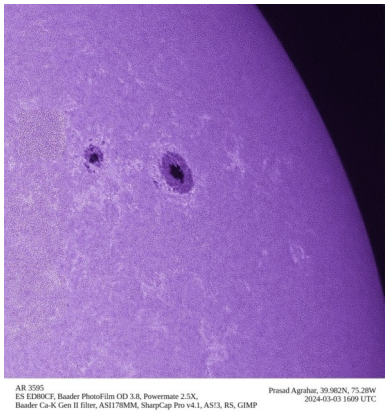


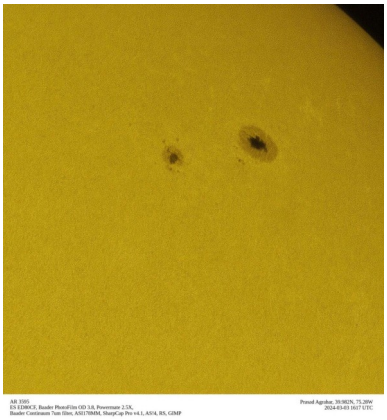
Tom Nolasco created this fascinating sequence of a large prominence detaching from the sun on March 24th, using a Lunt 60mm single stacked solar scope and ZWO ASI462mm camera.



Prasad Agrahar captured this full-disk image of the sun with his Lunt LS60THa Single Stack on March 3rd.

Below are some close-ups Prasad imaged of Active Region 3595 using his ES ED80CF with a Baader Ca-K Gen II filter (left) and a Baader Solar Continuum filter of FWHM 7 um (right).





Stan Sienkiewicz photographed the conjunction of the Moon and Jupiter around 19:06 in the evening on March 13, 2024.

Image Details:

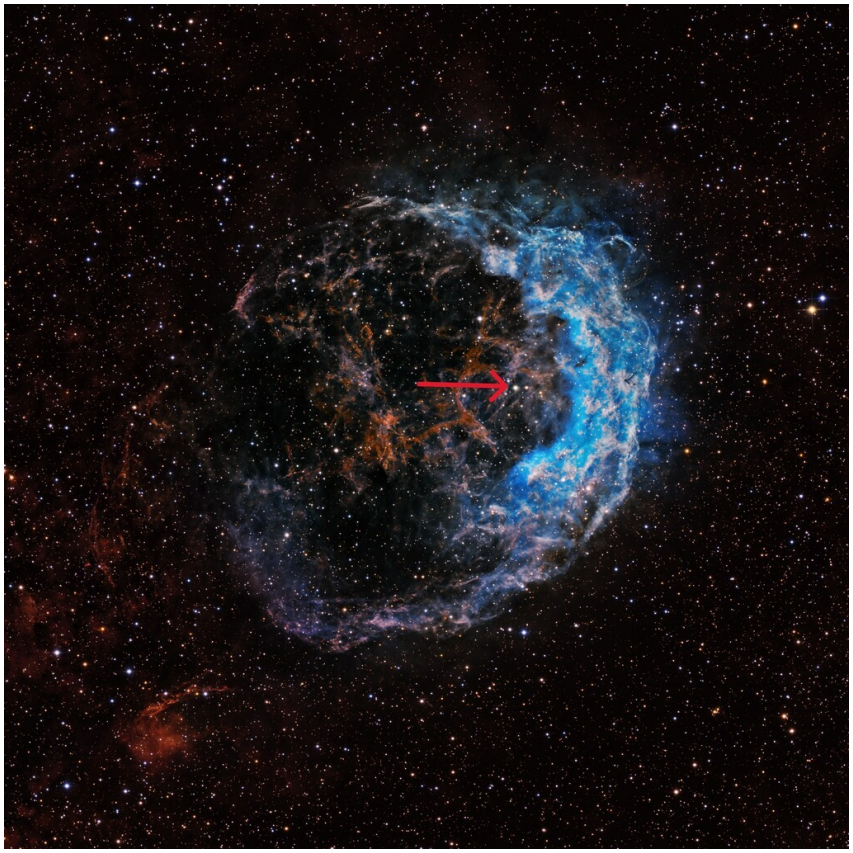
Canon M50
2.0 seconds
F/11.0
ISO 1600
184mm focal length
Sigma 150-600mm lens

Bortle 7 skies. Philadelphia 19115 near Welsh and Verree Rds.

Adobe Lightroom was used to tone down the crescent moon to allow a better visual of the Galilean Moons and earthshine.

(Continued on next page)

Recent Images by DVAA Members (continued)



Dan Stern's image of the Banana Nebula (NGC 3199), with an arrow pointing towards the Wolf-Rayet star WR18.

Description from Dan:

"NGC 3199, the Banana Nebula, is an emission nebula located in the constellation Carina. This banana-shaped cocoon of gas and dust lies 12,000 light-years away from Earth and is about 75 light-years across. The nebula contains a notable star named WR18, which is an unusual type of star known as a Wolf-Rayet star. Wolf-Rayet stars form from massive stars, but commonly have lost half or more of their initial masses by the time they show a WR appearance… WR18 generates incredibly intense stellar winds and outflows that smash into and sweep up the surrounding material, contributing to NGC 3199's twisted and lopsided morphology."

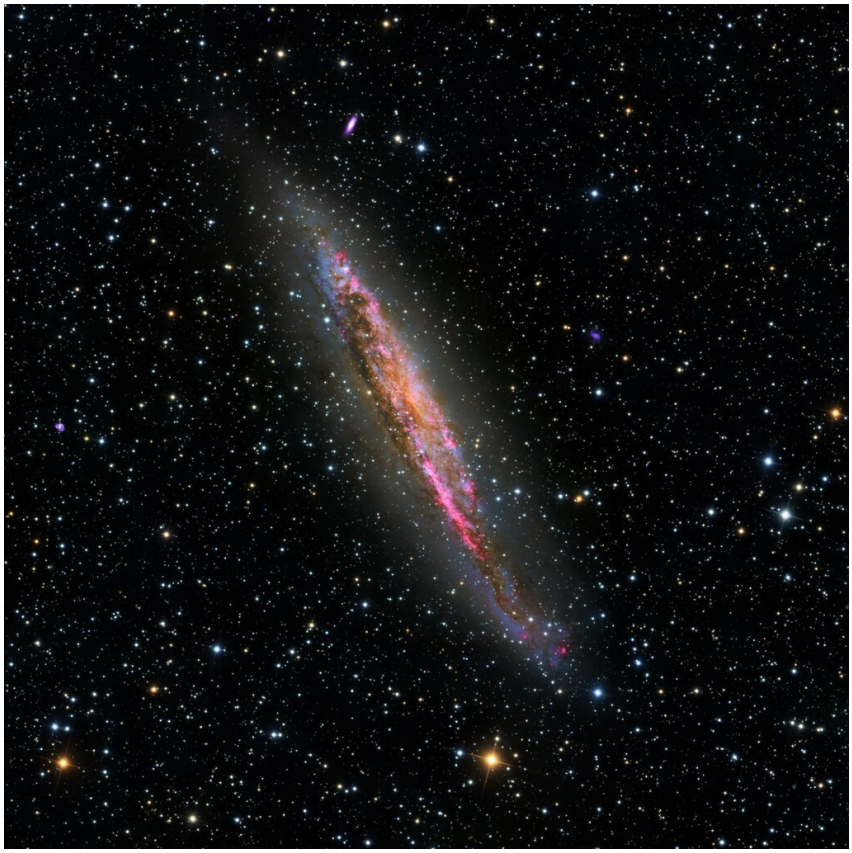
Dan Stern shot this image of Caldwell 83 (NGC 4945), often described as a "twin" of the Milky Way, as seen from an edge-on perspective.

Description from Dan:

"This is an unusual galaxy. It has both extreme starburst activity and a Seyfert-powered nucleus and is therefore considered to be a bit of an anomaly. It's unknown which energy source dominates. In this case there is an unusual amount of visual evidence of starburst activity by the presence of ionized hydrogen (Ha), the reddish clumps throughout the image. On the other hand, X-ray observations favor a Seyfert-powered nucleus."

Full resolution image at Dan's Astrobin:

https://www.astrobin.com/users/dstern/



Recent Images by DVAA Members (continued)

John Leimgruber shot this image of NGC 3079 from Green Lane Park last month. Zoom in on the upper right, however, and you will also see the “Twin Quasar” QSO 0957+561 A/B in Ursa Major. The effect comes from gravitational lensing, and this was the first example of a gravitationally lensed object to be identified in 1979.

Mark Firary imaged the Needle galaxy in Coma Berenices on his StarField Gear115 refractor (805mm FL) on March 11.

Full sized images and details can be found on his Flickr account:

Full frame

Cropped

Recent Images by DVAA Members (continued)

Image of the Sombrero Galaxy (M104) by Daniel McCauley. Captured with Takahashi TOA-130 with reducer (689mm) and ASI683 mono camera (R,G,B,L). Full resolution image here

Image of the Ring Nebula (M57) by Daniel McCauley. Full resolution image here & uncropped version

Recent Images by DVAA Members (continued)

Elias Varvarezis captured these images of M81 and M82 in February. Please click on the Astrobin links to view these at full resolution!

M81 Bode's Galaxy:
https://www.astrobin.com/32ln3q/

M82 The Cigar Galaxy:
https://www.astrobin.com/e7ftoy/

Imaging details:
100 x 180sec lights (5 hours total), 100 dark, 50Flat, 150Bias. Camera ZWO ASI 2600MC pro ; Celestron Edge HD8; 0.7x Focal Reducer; ZWO OAG; QHY5L-II-M autoguider; Celestron CGX Mount; Optec Leo TCF

Both images used the same exposure settings, with the same set of flats, darks, and bias applied to the 5 hours of data for each.

Recent Images by DVAA Members (continued)

Mark Firary photographed the comet 12P Pons-Brooks from Nantuxent Point in New Jersey (above).

Description from Mark:

"First image was with the Gear115 (805mm FL). I managed to capture 35x60s frames which I then registered on the comet so the stars are smeared in the background but I got some nice detail. Camera rotation was 0º

Full image on Flickr

Second image was with the Redcat51 (250mm FL). I managed to capture 29x60s frames which I registered on the stars. Camera rotation was -114º which is oriented to the horizon."

Full image on Flickr

Advocate for Dark Skies. Call Your PA House Representative About PA HB1803

Bill McGeeney email

Dear Dark Sky Advocates,

As you may already know, with the help of the West Chester Green Team's "Dark Skies Committee," Pennsylvania House Representative Chris Pielli recently introduced a responsible outdoor lighting bill to the PA legislature - HB1803: see https://legiscan.com/PA/bill/HB1803/2023 and https://legiscan.com/PA/text/HB1803/2023). As it currently stands, this bill has the potential to elevate our legislators' awareness of and knowledge about light pollution. In turn, this could have significant impacts upon the ways in which those decision-makers think about night-time environments in their communities. In the future, that awareness could translate into a desire to curb and regulate light pollution produced by private, as well as public, lighting fixtures. Essentially, this bill is thus an important first step in generating nonpartisan, State-wide support for the improvement of night-time environments all throughout Pennsylvania.

If this legislation is to see successful passage through the General Assembly, people like us will need to spread word of the bill's existence; petition their State Reps (and, then, their State Senators) to co-sponsor the bill; and encourage other citizens of the Commonwealth to join the action. If you have not already done so, then, please consider requesting that your House Rep. support HB1803. Assisted by Rep. Pielli's District Office Director, Dr. Julie Mesaros, we have created an advocacy template to help guide you. If you're unsure of who your Rep. is, then you can find out who they are here. And if you feel comfortable creating additional momentum for the bill, please also consider contacting members of the General Assembly's two Environmental Resources and Energy Committees: the House Environmental Resources & Energy Committee; and the Senate Environmental Resources & Energy Committee. If you have any questions, please reach me, Sandy Goldstein or Barry Johnson.

ADVOCACY TEMPLATE

Dear Representative INSERT NAME,

I am one of your constituents, and I urge you to co-sponsor Pennsylvania's newly proposed "Responsible Outdoor Lighting" Bill (HB1803). This legislation will improve the health, welfare, and fiscal well-being of Pennsylvania's citizens, without sacrificing public safety. The fact that outdoor lighting controls do not endanger public security is proved by the many "safe States" that already have strong Responsible Outdoor Lighting legislation in place (e.g., Arizona, Arkansas, Connecticut, Florida, Maine, New Hampshire, Rhode Island, Texas, Wyoming, etc.).

In recent years, the use of excessive outdoor lighting has increased significantly in Pennsylvania. All across our Commonwealth, citizens have overly bright, unshielded, "blue-white" outdoor lights glaring in their eyes, invading their homes and yards, spoiling the beauty of their hometowns, and obscuring their night-time skies. Collectively, this glare, light-trespass, and sky-glow is called "light pollution," and we must act to curb its increasingly rapid growth, and prevent its many serious consequences. Specifically, among other effects, light pollution:

- Wastes a substantial amount of energy and money;
- Contributes to sleep disruption, and related health problems (e.g., Jefferson Health, "How Does Nighttime Light Affect My Health?"; American Medical Association, "AMA Adopts Guidance to Reduce Harm from High Intensity Street Lights");
- Disrupts the feeding and migration patterns of wildlife;
- Blights tourism and leisure industries built around hunting, stargazing, bird-watching, and historical locations;
- Jeopardizes scientific and educational programs that rely on astronomical observatories; and
- Creates public safety issues (e.g., temporary blindness from glare can cause vehicle accidents and make pedestrians vulnerable to unanticipated dangers).

HB1803 will help to address State-produced light-pollution problems like these; and, crucially, it will do so without sacrificing our public safety. As you are a committed public servant of our District, I know you will want to ensure the future health, welfare, and safety of citizens in our Commonwealth. Therefore, I respectfully urge your co-sponsorship of HB1803.

Methacton
SCHOOL DISTRICT

PRESENTS:

Mallon Planetarium Community Shows

Wednesday, January 17th

5:30-Celestial Highlights & Two Small Pieces of Glass (4th Grade through Adult)

7:00-Celestial Highlights & 2012: Ancient Skies, Ancient Mysteries (5th Grade through Adult)

Wednesday, February 21st

5:30-Celestial Highlights & Molecularium (Great for young audiences: Pre-k to 3rd Grade)

7:00-Celestial Highlights & Leap Years: How Our Calendar Works (Lecture: 6th Grade through Adult)

Wednesday,, March 20th

5:30-Celestial Highlights & Preparing for April 8th Solar Eclipse (Same as 7:00 Show)

7:00-Celestial Highlights & Preparing for April 8th Solar Eclipse (Same as 5:30 Show)

Saturday, April 6th

Free Community Star Party. Details at: www.methacton.org/planetarium

Wednesday, April 17th

5:30-Celestial Highlights & The Little Star That Could(Great for young audiences: Pre-k to 3rd Grade)

7:00-Celestial Highlights & Dynamic Earth (4th Grade through Adult)

Wednesday, May29th

5:30-Celestial Highlights & Violent Universe 4th Grade through Adult)

7:00-8:00 p.m.: Celestial Highlights & Faster Than Light (4th Grade through Adult)

WWW.methacton.org/Planettix **for Tickets**

Adults: $8 Children/Students/Seniors: $6

Arcola Intermediate School
4001 Eagleville Road
Eagleville, PA 19403

DVAA Telescope Rentals

Celestron NexStar 5SE

Orion 6” Dosonian

DayStar 60mm Solar Scope

Ioptron Tracker

Orion 6” StarBlast Dobsonian

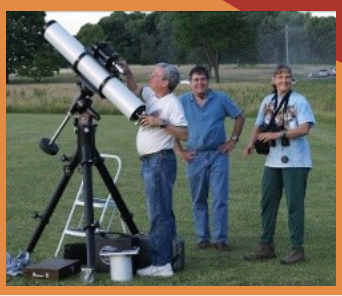
All scopes include tripod/base, eyepieces, manuals, power, etc. Rental is $10/month with $20 deposit. More info at www.dvaa.org under the OBSERVING tab. To rent one of these scopes, contact Joe Lamb at rentals@dvaa.org.

The Delaware Valley Amateur Astronomers

Since 1976, the **DVAA**, a nonprofit 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**, and available on YouTube.

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: Scott Vanaman 327 Laurel Drive, Collegeville, PA 19426 or for more information contact treasurer@dvaa.org.