



# Roanoke Valley Astronomical Society

Amateur Astronomy News and Views  
In Southwestern Virginia



Volume 40—Number 4

April 2023

*RVAS March Meeting Notes*

## Accretion Disks, Black Holes, and Fusion

By Sasha Mintz, RVAS Secretary & Mike Hutkin, RVAS President

The Celestial Café was opened at 7:00 pm by **President Mike Hutkin**. The Celestial Café is always a fun and engaging time where members and officers can catch up and tonight was no different. Members and officers spoke about various topics within astronomy, astrophotography, and big updates in their personal lives. Among the topics that were discussed included:

- Motorized Celestron inner-workings
- **Haley Gonter's** guest attendance
- **John Sheffey's** house and family updates and his greatly appreciated attendance at tonight's meeting.
- Waiting for the warmer weather to start observing again.
- **Mike Hutkin's** troubles finding the Crab Nebula



*In-Person meeting attendees - Mike Hutkin photo*

- How to truly determine if you actually found the celestial object you're looking for in binoculars?
- Referencing the southern horn of Taurus to find the Crab Nebula
- Holding a contest amongst various clubs as to who knows the most stars
- **Frank Baratta** recognizing our guests to the meeting
- **Alijah Adkins'** introduction
- A request of northern Virginians and southern Marylanders to view a high magnitude star around an asteroid.

To view the recording of the Celestial Café, click [here](#).

*(Continued on page 2)*



*Mike Hutkin conducts the meeting - John Goss's photo*

(Continued from page 1)

At 7:30, the Café closed and Mike, along with our Membership Coordinator, **Frank Baratta**, welcomed members and guests to the March meeting. To begin, Mike presented the evening's agenda and introduced the other club officers: **John Wenskovitch**, Vice President; **Sasha Mintz**, Secretary; **Frank Baratta**, Treasurer; **Nancy Vogelaar**, Member-At-Large; and our other Executive Committee members, **John Goss**, Immediate Past President; and **Michael Martin**, Past President, also recognizing **Dave Thomas** as our Newsletter and Webmaster.

**Attendance:** There were 42 members and 3 guests in attendance at this month's meeting. 21 were in person and 24 attended virtually. As membership coordinator, **Frank Baratta** mentioned members attending that we had not seen recently, and we look forward to their future participation.



Using wire ties - Ed Dixon photo



3D Printed Part (Red) - Ed Dixon photo

#### **Astrophotography:**

We thank **Ed Dixon**, **Michael Good**, **Bert Herald**, **Harry Kessler**, **Michael Martin**, **Greg Shaffer**, and **Dave Thomas** for providing their work this month. We had a variety of images focusing on the Orion Nebulae, the sun, the moon, and a variety of deep-sky objects.

To provide each image with the focus it deserves, we are sharing the submissions in a separate article in this newsletter. Don't miss checking out the rest of these images.



NGC 2175/2174 the Monkey Head Nebula- **Harry Kessler** photo

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The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of observational and photographic astronomical activities. **Meetings are held at 7:30 p.m. on the third Monday of each month. See calendar on last page of newsletter for location. Meetings are open to the public.** Observing sessions are held one or two weekends a month at a dark-sky site. For information regarding joining RVAS, including annual dues, [click here](#). Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

#### **Officers/Executive Committee/Editor/Webmaster**

**Mike Hutkin**, President ([president@rvasclub.org](mailto:president@rvasclub.org))  
**John Wenskovitch**, Vice President ([vicepresident@rvasclub.org](mailto:vicepresident@rvasclub.org))  
**Sasha Mintz**, Secretary ([secretary@rvasclub.org](mailto:secretary@rvasclub.org))  
**Frank Baratta**, Treasurer ([treasurer@rvasclub.org](mailto:treasurer@rvasclub.org))  
**Nancy Vogelaar**, Member at Large ([memberatlarge@rvasclub.org](mailto:memberatlarge@rvasclub.org))  
**John Goss**, Immediate Past President ([immediatepastpresident@rvasclub.org](mailto:immediatepastpresident@rvasclub.org))  
**Michael Martin**, Past President ([pastpresident@rvasclub.org](mailto:pastpresident@rvasclub.org))  
**David E. Thomas**, RVAS Newsletter Editor ([editor@rvasclub.org](mailto:editor@rvasclub.org))

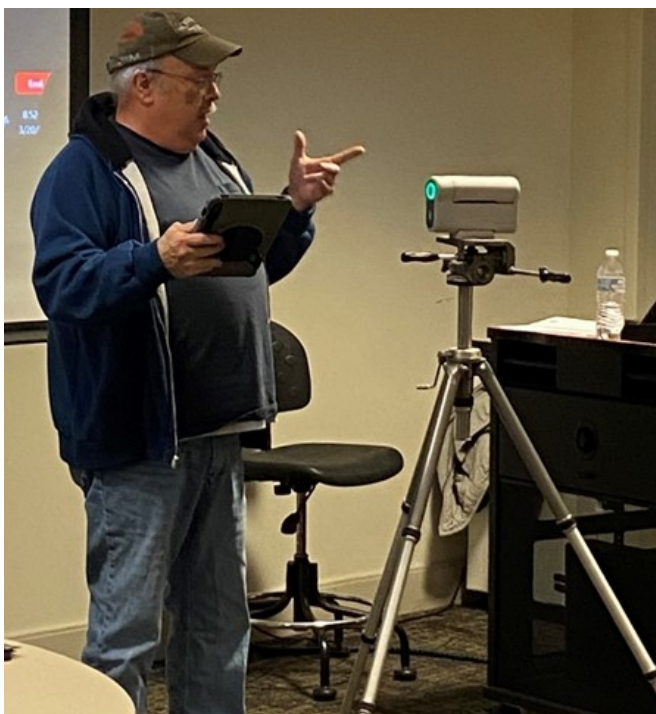


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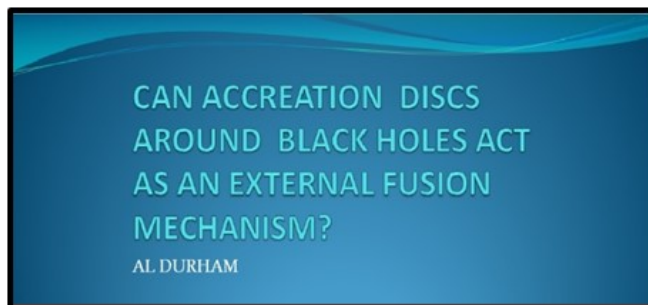
**What's New:** Ed Dixon, provided us with a "How to" 3D print using a process available at our local library. Ed, a skilled "tinkerer", explained how he was able to produce a mounting part for his equipment by using 3D printing and eliminating the somewhat crude wire ties and bracket he had in place. More information can be found at this [link](#).

**Mark Hodges** demonstrated his new DwarfLab smart telescope. Coming in at a price of \$395, it is far less cost than the high-end Stellina or eVscope2 which are priced in the \$4,000 range. Mark demonstrated the use of his new purchase and more information can be found [Here](#)

**What's Up?:** Before getting to the meeting's main program, President Hutkin asked **Frank Baratta** to present our "What's Up?" for April. Frank shared the Moon phases and other basic information and turned to a selection of celestial events. Among these was Venus' close passage to the Pleiades, opportunities for viewing Mercury, and the annual Lyrid meteor shower. Frank also gave a final update on comet C/2022 E3 (ZTF), which will be in Eridanus, probably at 12<sup>th</sup> magnitude, for any astro-imagers interested in trying to capture the outward-heading body. See the What's Up? Highlights in this issue for additional information, and the entire PowerPoint under "Observing" on the RVAS website.



Mark Hodges presents the DwarfLab scope operation -  
Zoom photo



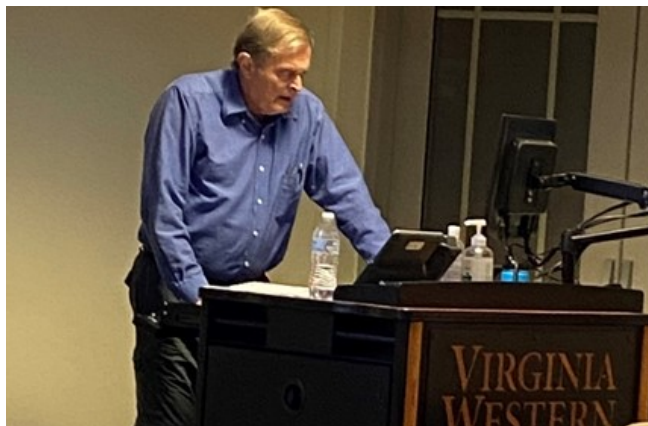
Presentation - Al Durham slide

**Program:** It was now time for our monthly program to be presented by member, **Dr. Al Durham**.

Al is one of the club's members who can be counted on to delve into the deep mysteries of the universe's origins and he didn't disappoint tonight. His discussion, which focused on accretion disk theory, led us through:

- The basics of element formation and the requirements for fusion.
- Fusion on earth
- Stellar fusion
- Nested fusion
- Elements - up to iron
- How heavier elements are produced
- Black hole accretion discs
- Neutron stars
- What other science people are thinking
- Quasar light
- The ubiquitous distribution of elements
- And finally, some "Far Out" thinking

Al's thoughts on the origins of the universe led to several questions from other club deep thinkers and everyone was left with something to ponder. The presentation can be viewed [here](#)



Al Durham begins - Mike Hutkin Photo

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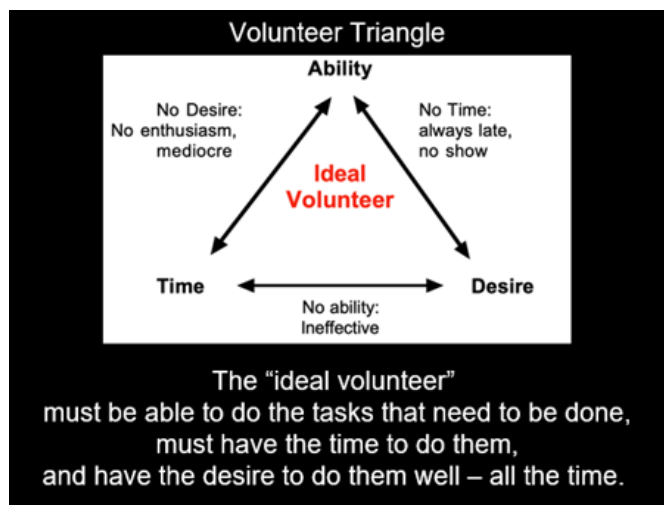
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**Volunteering - Part 3:** John Goss next provided a concluding look at volunteering. He began with a recap of what had been covered in Parts 1 and 2. The Zoom attendees and the in-person attendees were then divided into "Breakout Rooms" for a 5-minute group discussion.



*Volunteerism - John Goss presentation slide*

In these groups, the individuals discussed their ideas to address 2 questions. "What have we missed?" and "What are some good ways to persuade people to volunteer?" They were asked to email their comments to the president for consolidation.



*Volunteerism - John Goss presentation slide*

**Next month:** We will have another RVAS member presentation event as detailed elsewhere in this newsletter. **Michael Good** will give us his take on astrophotography and **John Wenskovitch** will talk about open clusters including the Astronomical League programs available on the subject.

The meeting was adjourned at 9:03 pm

## RVAS Member Anniversaries

Congratulations to the following members who reach the indicated number of consecutive years with the RVAS since joining during the month of April:

Kevin and Emily Hamilton (1991) - 32 years

Clem and Uche Elechi (2008) - 15 years

Matthew and Lottie Schottmiller (2019) - 4 years

Thomas Cerul (2020) - 3 years

Jenna Bramlett (2022) - 1 year

Erin Elliott (2022) - 1 year

**Thanks to all of you for being RVAS members!**



# \*Tri\*Star\* 2023 Report

By Clark M. Thomas

On March 4th the annual TriStar Starfest at the Guilford Technical Community College (in Jamestown, NC), in association with the Greensboro Astronomy Club, was attended by several RVASers. All of us Virginians fully enjoyed this FREE annual late winter event filled with friendly people who also love everything about astronomy.

Our RVASers included carpooling John Goss (driver), with Michael Good, and Clark Thomas. Other attendees included Mr. and Mrs. Ray Bradley, and new member, Erica Reed. Additional RVASers most likely were mixing in the crowd of nearly 100 happy attendees.

This unique event featured four expert speakers and, between the talks, opportunities for solar observing graced by a clear day. The impressive Cline Observatory was open at night. There are always tables for vendors who sell and barter various tools of our trade. An amateur CCD photo contest, open to all, was included within the finale. A separate drawing was held for nice door prizes at the end of the day. This reporter, for example, has won in the recent past superb large binoculars for \$5 spent on tickets.



*Since it was a sunny day, local amateurs brought out the solar scopes to view the very active sun. Sunspots, prominences, and filaments were all easily seen on the face of the nearest star.*

[1] The featured speaker was Dr. Anne Verbiſcer (University of Virginia), presenting "Stellar Occultations in the Gaia Era: Ground-based Support for NASA's Small Body Missions." Her talk was in two parts, the first portion was the night before, and the second part was our initial talk Saturday morning. Her dual, but singular, topic was also: "Uncovering the Origin of the Solar System with NASA's Discovery Lucy Mission On Oct. 16, 2021."

NASA's Lucy spacecraft was launched from Cape Canaveral on a twelve-year journey to visit eight Jupiter Trojan asteroids and two main-belt asteroids. Jupiter Trojan asteroids share Jupiter's orbit around the Sun in swarms of thousands of objects both ahead of and behind the giant planet. The Trojan asteroids are thought to be objects that were captured during migration of the giant planets, and thus can be regarded as "fossils" of our early Solar System.

The name Lucy was chosen for the mission in honor of the Lucy hominid fossil, because the mission's findings could potentially reveal keys to understanding the origins of our Solar System, just as the Lucy fossil provided key information for understanding human evolution. Her talks presented the Lucy payload and targets, including its recent addition of main-belt asteroid Dinkinesh for its first asteroid flyby on Nov. 1, 2023.

She went into great detail how ground-based observers tracking patterns of occultation from one



Anne Verbiſcer discusses how occultation timing by amateur astronomers can help precisely located distant solar system bodies and help determine their shapes.

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general location could “outline” the shape of an incredibly tiny and distant object. The primary Kuiper Belt target was thereby precisely located and imaged in motion, so that the Lucy payload mission could reach it and image this tiny object during its very brief flyby. Yes, one of modern astronomy’s greatest Kuiper Belt science achievements required amateur ground observers.

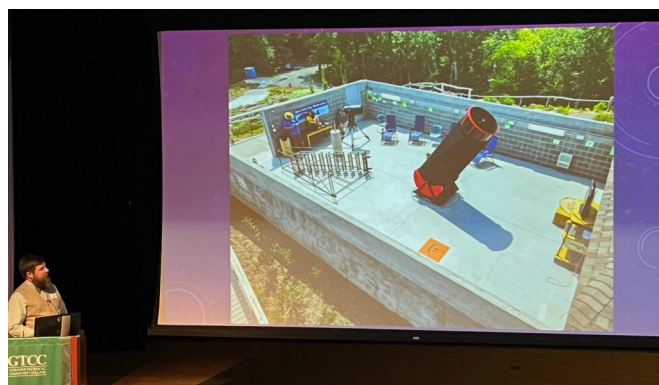
[2] The second featured speaker was Erik Peterson, a Ph.D. student at Duke University. His main cosmological interest is in better using Type 1a supernova explosions as measuring tools for red shifting regions of our local universe. His presentation focused on the near-infrared supernova survey he leads, DEHVILS.

[3] The third speaker was Hank Corbett, who is an astronomer associated with the University of North Carolina. He currently serves as the software and technical lead for both the Argus Optical Array project, and its smaller predecessor, the Everyscopes. His arrays are designed to see the whole available sky every second. Using such an array, one can better understand how active our skies really are.

[4] The fourth speaker was Kyle Lanning, who is one of the observatory and planetarium managers at the Bare Dark Sky Observatory, part of Mayland



Hank Corbett’s team at UNC are gearing up to image the whole sky in great detail.



Mayland Community College’s Bare Dark Sky Observatory.

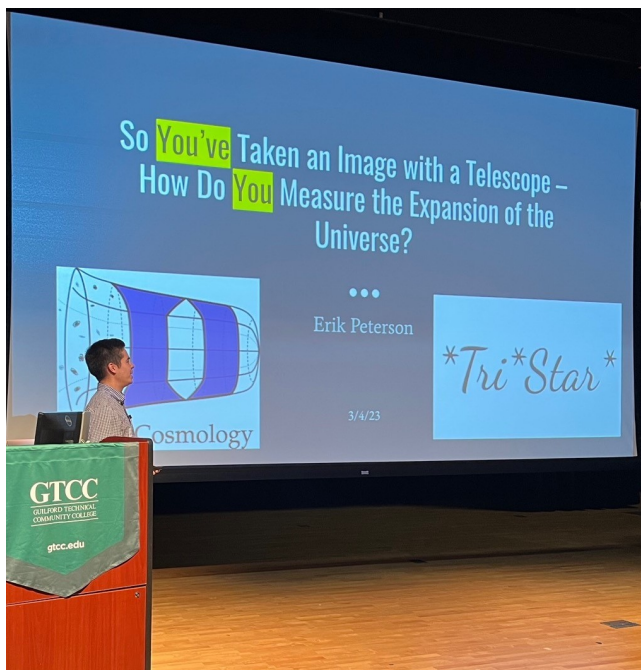
Named the “Sam Scope”, the telescope is an f/3.6 Star-Structure Newtonian telescope, with a 34 inch (0.86 meters) mirror. It is the largest telescope in the South-east US dedicated to public use.

Community College’s Earth to Sky Park. His passion for this western Carolina jewel under dark skies showed clearly to all in attendance.

**In sum:** The drive to TriStar from Roanoke is about 2 hours 15 minutes. I wish even more of us had attended this time; but the next TriStar will come around next March. Carpooling is a great idea. Please put the next date on your must-do calendar. Our club president will notify us by email, as he did this year. Also, our club newsletter will publicize it.

This event is always G-rated and “little people” friendly. All of your children (maybe age 10+) who are into science will really enjoy the next event in 2024. I began my astronomy journey when I was ten, when my dad gave me a 6-inch Newtonian on a German equatorial mount. It was a special gift that lifted my mind for several years. TriStar will help your kids explore some of what 21st-century science offers.

(Continued on page 7)



Erik Peterson explains how astronomers measure the distances to the most distant objects.



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## What these talks offered and meant to RVAS attendees

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What I liked best about the Tri-Star Event in Greensboro was that it made me think deeply and that I wanted to understand more of why there is something rather than nothing, from the smallest pieces of matter and energy to the largest complicated galaxies and black holes. And to know that I am just a bag of atoms and molecules that have been put together in such a way that I am alive with conscious awareness enough to be able to think and wonder why and what it all means. Just the tiny glimmer I have of it so far is fascinating.

The Astronomy Club meetings (in Greensboro or Roanoke) offer an opportunity to learn more and to chase the mystery of where it all came from and where it is going and to chase the question of why.

Erica Reed

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René and I enjoyed our daytrip to the TriStar Starfest. The four speakers were very informative across a wide field of topics. I was a little disappointed that the "Meteorite Man" didn't have a booth this year as in years past. But we were happy to discover the Blue Zucchini restaurant and the High Point Museum nearby during the lunch break. You can't do that from a virtual conference!

It's really nice to attend these events in person once again!

Ray Bradley

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TriStar has always been, and continues to be, an extremely energizing series of talks well worth the time to head down from Roanoke to Greensboro. This year was no different.

**Anne Verbiscer** explained the importance of accurate stellar positions when calculating asteroid orbits as used by NASA for fly-bys. She talked about using ground-based amateur class stellar occultations as a means to refine these orbits, as well as using multiple shadow chords to determine the size and shapes of distant objects, and indeed revealing unknown satellite asteroids.

**Erik Peterson** discussed measuring distances using supernovae, and his work in Hawaii which showed that concentrating on near infrared studies of the spectra of these exploding stars yields more refined quality results.

**Hank Corbett** gave a fascinating talk on how his team is using optical arrays to capture science in the time domain, catching events that have been missed by our traditional telescopic work, and the challenges in analyzing this data on the fly given the monstrous data storage sizes that prevent storing everything.

Finally **Kyle Lanning** had us yearning to experience the extremely dark skies of his dark sky public observatory with planetarium near Mayland Community College.

And the kicker? I found a man selling a nice used C14 which I am using to replace my current imaging scope in Poages Mill Observatory.

Michael Good

\*\*\*\*\*

Every year, the organizers of TriStar try (and succeed) at offering something of interest to people at all expertise levels. This is a great opportunity to rub shoulders with folks who are experts in their field, to meet other members of the amateur astronomy community, and to learn more about astronomy. See you at TriStar, March 2, 2024!

## Wanted

Astro photos for publication on the RVAS Web page, or in the RVAS Newsletter. Send the photos to [editor@rvasclub.org](mailto:editor@rvasclub.org). Observing reports and articles are also welcome.

# The RVAS Astrophotographers

## March 2023

*There is a table with pertinent information after the pictures*

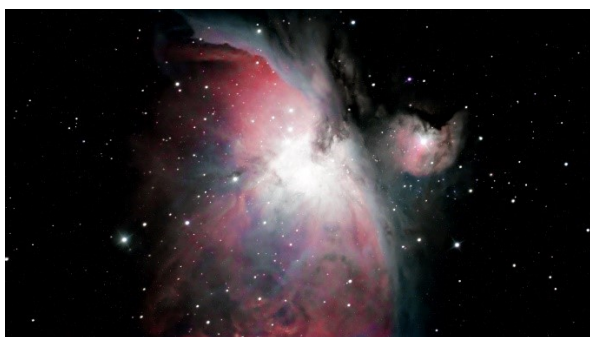
BERT HERALD - 1



HARRY KESSLER -2



ED DIXON – 3



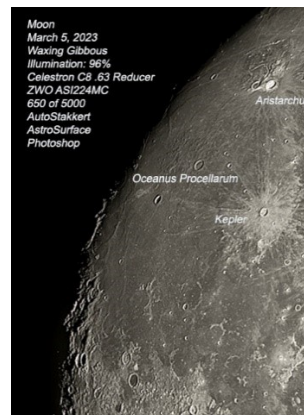
HARRY KESSLER – 4



MICHAEL GOOD – 5

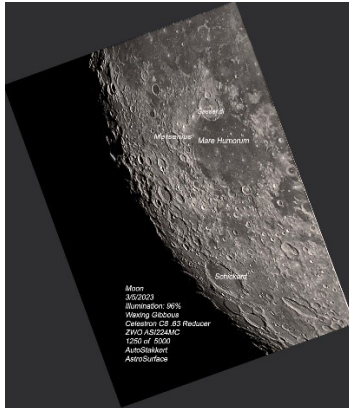


HARRY KESSLER – 6





**HARRY KESSLER – 7**



ED DIXON - 8



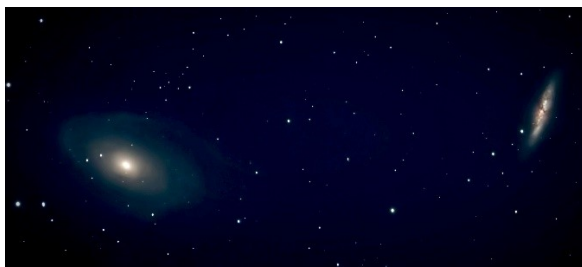
MICHAEL MARTIN – 9



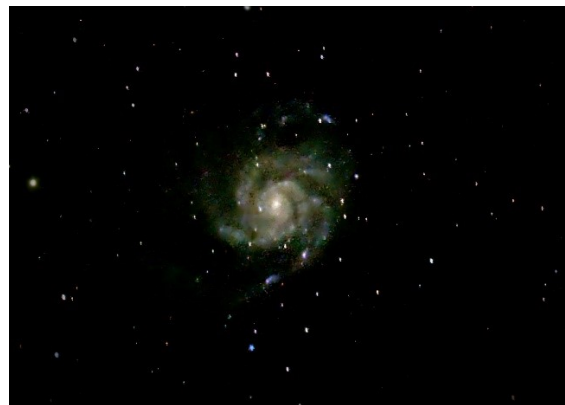
**DAVE THOMAS – 10**



ED DIXON – 11



ED DIXON – 12



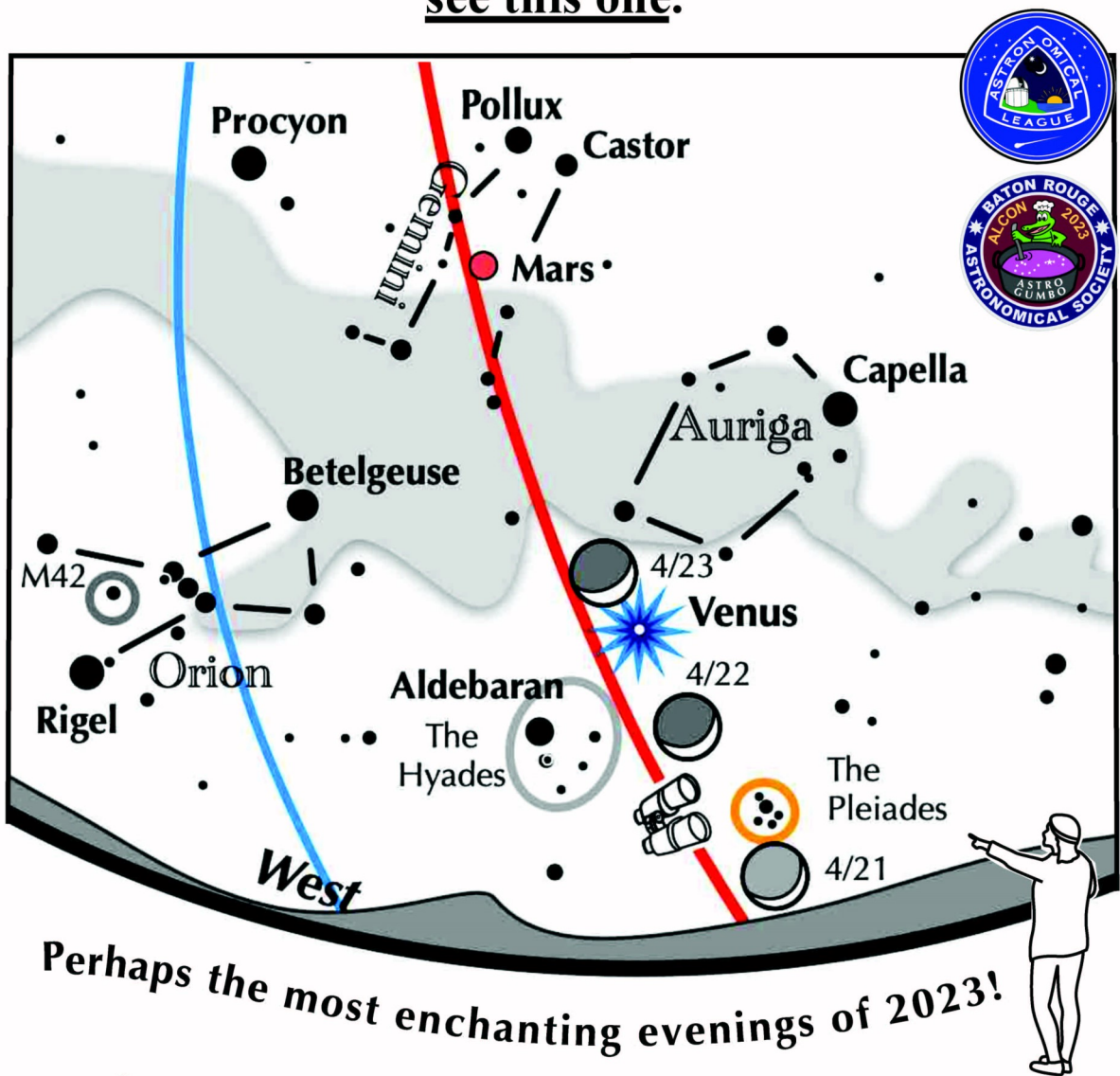
## LEGEND

- |   |                                                                                                                                                                                                                                                                                                                                                                                               |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <b>BERT HERALD</b> This is my final stacked and processed image of the Orion Nebula area using my new Red-Cat 51 II, first light for this new "scope". This image was shot on Feb 26th from my deck as a test of the RedCat. No guiding. 30 second exposures, ASI 294 cooled to 0C, an hour of total data. Processed using PixInsight. Multiscale Linear Transform to reduce some pixelation. |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

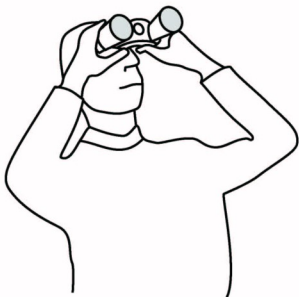
2	<b>HARRY KESSLER</b> Orion 2-13-2023. I used my Canon 60D DSLR like a lucky imager; 320X10sec images at 800 ISO. This was through a .63 reducer, C8 Celestron on an AVX mount and tracked with a guide scope using PHD2 dithered every 10 images. APT captured the images. SIRIL stacked the images using the default script (I don't know how many to the 320 SIRIL deemed worthy of stacking). I then extracted the RGB channels, did some noise and gradient clean-up on each channel in SIRIL and recombined the the channels in a new image in Photoshop. Postprocessing using StarTools8, a free to try program that is quite different from SIRIL and other postprocessing software. Final image processing was with Photoshop and DenoiseAI.
3	<b>ED DIXON</b> Second cut at an image of M42 with my iOptron RC6 scope. I used a 0.5 GSO focal reducer that spreads things out a bit. The RC6 has a normal focal length of 1370mm. I did not try to rotate the camera to get a better placement as I just wanted to see what I could get with the recent changes, ZWO EAF focuser, and 50mm guide scope. This was taken on 3/7/23 at about 8:45 PM using a ZWO 485MC camera and iOptron HEM27 mount. Taken as a series of 11 images at a gain of 78 and 80 second exposure. Stacked, processed, and cropped with Pixinsight, and Windows and Apple Edit.
4	<b>HARRY KESSLER</b> NGC 2175/2174 the Monkey Head Nebula Just above the upraised right hand of Orion the Hunter is NGC 2175/2174. It is an open star cluster imbedded in an H II emission nebula. I captured this image March 15, 2023. Here are the bullet points: Dark rural sky, clear, low humidity, no moon, Celestron C8 with .63 reducer lens, Canon 60D DSLR, 39 x 240sec images (2 Hrs 36 Min), No calibration frames, APT capture software, Tracked using 50mm guide scope with ZWO ASI224MC camera and PHD2 software on Celestron AVX GEM mount, images stacked in Siril, post-processed using StarTools, Photoshop with plug-ins Astronomy Tools, and DeNoiseAI.
5	<b>MICHAEL GOOD</b> - Messier 95, also known as M95 or NGC 3351, is a barred spiral galaxy about 33 million light-years away in the zodiac constellation Leo. Captured using his re-worked scope tube and robo focuser. Captured March 16
6	<b>HARRY KESSLER</b> - Moon
7	<b>HARRY KESSLER</b> - Moon
8	<b>ED DIXON</b> - Moon
9	<b>MICHAEL MARTIN</b> I took this 3 second exposure with my iPhone a few days ago of the ISS flying under
10	<b>DAVE THOMAS</b> - Sunspots
11	<b>ED DIXON</b> First cut at a couple of images from last night using a ZWO ASI2600MC pro camera and a ZWO ASIAIR Plus controller. These were taken about midnight using a HEM27 mount and WO GT71 scope. With this scope, both targets are pretty small, so zooming in has to be used to get size at the cost of lower resolution. These two include M81 and M82 and M101.  These are from about a dozen 2-3 minute images each stacked inside of the ASIAIR unit and then post processed with Pixinsight, Windows and Apple edit.
12	<b>ED DIXON</b> M101.



**If you can see only one celestial event this April,  
see this one.**



**Perhaps the most enchanting evenings of 2023!**



**Enhance the scene –  
use binoculars!**

On April 21, 22, and 23, look low in the west-northwest 60 minutes after sunset.

- The crescent moon, glowing full with earthshine, floats just above the horizon in the bright twilight on April 21. Above it, lies the pretty Pleiades star cluster.
- On April 22, the slightly thicker, but more pronounced crescent moon moves between brilliant Venus and the Pleiades, and right of the Hyades star cluster.
- On the third night, the crescent moon stands commandingly above the scene.

# Welcome Mat

The Society bids a warm welcome to Warren Thompson, of Roanoke, who joined last month with an Individual membership. Warren was born and raised here in Roanoke and graduated from William Byrd H.S. Though they haven't set the date yet, he's engaged to be married to Kayla Lawson, also a Roanoke native and a Patrick Henry H.S. grad. Warren quickly recalls being in 3<sup>rd</sup> grade when he first became interested in astronomy, and it was a star of a different sort that played a role—the Roanoke star! His father was among those whose job it was to install its lights. Ever since, he's enjoyed looking up and marveling at the day- and night-time beauty of the sky. Usually, it's from around home, but he has been up to the Parkway. His favorites are Orion and Betelgeuse and Gemini. The RVAS is his first experience with being in an astronomy club, and here, again, it was facilitated by RVAS member Todd Atkins. Warren participated in the observing session conducted by Todd that included Kyle Mitchell (who's also joined) and his 6-year-old daughter, Lillian. Now that he's a member, Warren is looking forward to learning more, enjoying belonging to a group with this common interest and building friendships with other members. He attended the March RVAS meeting with Todd and Kyle and notes that it sparked a desire to study physics. Warren is also a deeply spiritual person for whom faith and his church life play pivotal roles. Among his other interests are chess and video games.

Warren, we're glad to have you as a fellow club member. You'll find your new RVAS friends ready to share their knowledge and experience with you, and eager to help you develop your interest in astronomy. A good place to start is with the Astronomical League's "Constellation Hunter" program, which is tailored to observing with just your unaided eyes!

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# Welcome Mat

The Society bids a warm welcome to Kyle Mitchell, of Roanoke, who joined in March with an Individual membership. Kyle's a native of Dublin, in Pulaski County, while his wife, Jamie, is a native Roanoker. He moved here after high school, in search of job opportunities. Not only did he find employment, but he and Jamie met when both worked at Walmart at Valley View Mall. For the past six years he's been a delivery driver for Grand Home Furnishings. Jamie is a homemaker and home schools their 6-year-old, Lillian. Kyle's interest in astronomy began when he was a child; he was always fascinated by astronauts and wondered what it would be like to be in their place. But he hadn't had opportunities to view the stars and planets up close until recently. Jamie and Kyle's aunt attend Belmont Presbyterian Church, where RVAS member Todd Atkins is the pastor. Todd invited both Kyle and Warren Thompson (who's also become a member) to do some stargazing from his home in Roanoke's Southeast neighborhood. Kyle, Warren and Lillian came out and thoroughly enjoyed Todd's sharing about the constellations and seeing the brighter stars and planets with Todd's binoculars. As Kyle says, "It was all good." The RVAS is his first experience at being a member of an astronomy club and he's looking forward to learning more about the subject and sharing with a group having a common interest in the subject. These days, work and family keep him busy, but Kyle is an outdoor person at heart, who grew up enjoying hunting and fishing.

Kyle, thanks for joining the RVAS. We're glad that you and Warren accompanied Todd to our March meeting. We hope you'll become a regular at these monthly gatherings and that you'll be able to connect with other members heading to the Blue Ridge Parkway or elsewhere for stargazing.



# Welcome Mat

The Society bids a warm welcome to Andy Dupree, of Roanoke, who joined at the end of February with a Student membership. Though both his parents are from Roanoke, he was born in New York City, where his family had moved after his dad's 4-year tour of duty with the Navy. They returned to Roanoke in 2018. Andy's now studying computer science at Virginia Western Community College as part of a program for transferring to Virginia Tech. His interest in astronomy goes back to when he was 10 years old and his older brother (then 12) shared his own interest with him. Andy was taken with "how much stuff is out there!" But a summer sailing trip in the Caribbean during his early high school years in NYC truly revealed what could be seen under a dark sky. Back home, he used his brother's old telescope to see the planets and moon and whatever else that could penetrate NYC's limited skies. These days, he's moved on to a 5.1" equatorially-mounted Orion reflector—a Christmas present received two years ago—and binoculars. But he mostly watches the sky with unaided eyes when he's out at night, keeping track of the planets and constellations; he's yet to try viewing on the Blue Ridge Parkway. Jupiter is his favorite object, though he can't wait to see the Andromeda galaxy away from Roanoke's glow. Andy's very interested in astrophysics and follows multiple online sources, his favorite being PBS Spacetime. He found the RVAS on the RoanokeOutside.com website, and we're his first experience being a member of an astronomy club. He's looking forward to club meetings, connecting with others to talk about astronomy and opportunities to observe with club members. Among his other interests, Andy enjoys learning computer languages, playing the bass guitar and, when called upon, acting as caretaker for his mother's cats.

Thanks for joining the RVAS, Andy. We're glad to have you with us! And we're looking forward to your participation in meetings, events and activities. And you'll find many among your new RVAS friends who also share your interest in astrophysics.

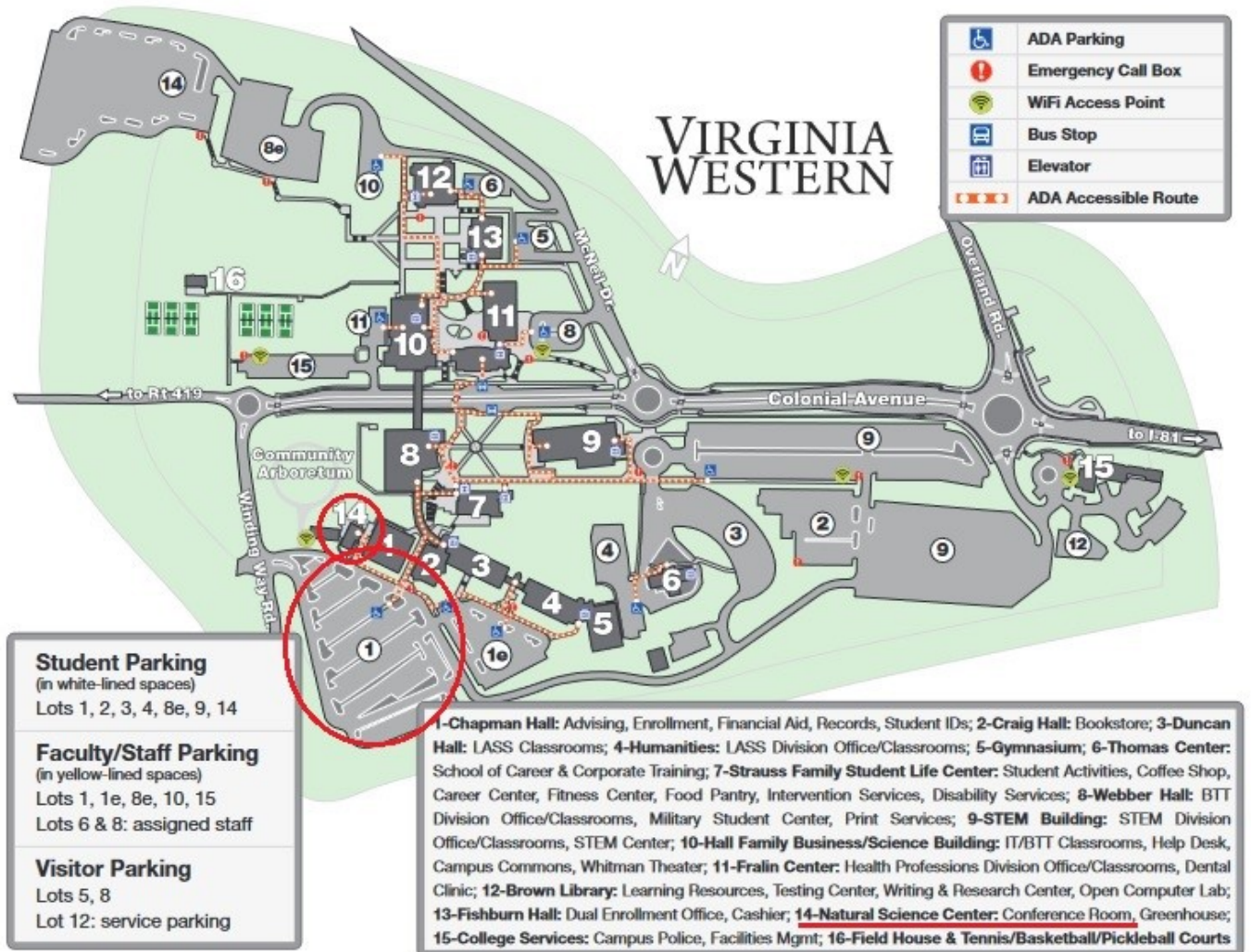
## Use Our Message Line!

Want to check whether anyone is getting out on a scheduled observing session night or share that you're planning to do so? Have questions about the club or need its assistance? Call the RVAS Message Line, 540-774-5651, and leave a message or listen for any information available.

# RVAS April 17<sup>th</sup> Monthly Meeting In-Person and Zoom

The hybrid in-person and Zoom format continues for the RVAS' April 17<sup>th</sup> meeting. Our informal "Celestial Café" chat session begins at 7:00 p.m., with the regular meeting to follow at 7:30 p.m. Mask wearing is optional for both in-person gatherings. We'll have two featured programs this evening, one on astrophotography by former President Michael Good and the other on open star clusters by current Vice-President John Wenskovitch. (See also the Calendar on the last page of this issue.)

Our meeting place is again Virginia Western Community College's Natural Science Center. It's located on the southern side of Colonial Avenue, above the Community Arboretum, and is accessed via the roundabout at Winding Way. The Center and adjacent parking are indicated on the map below. Our thanks to VWCC and RVAS member Dr. Mallory White, Assistant Professor at VWCC, for the use of these facilities.





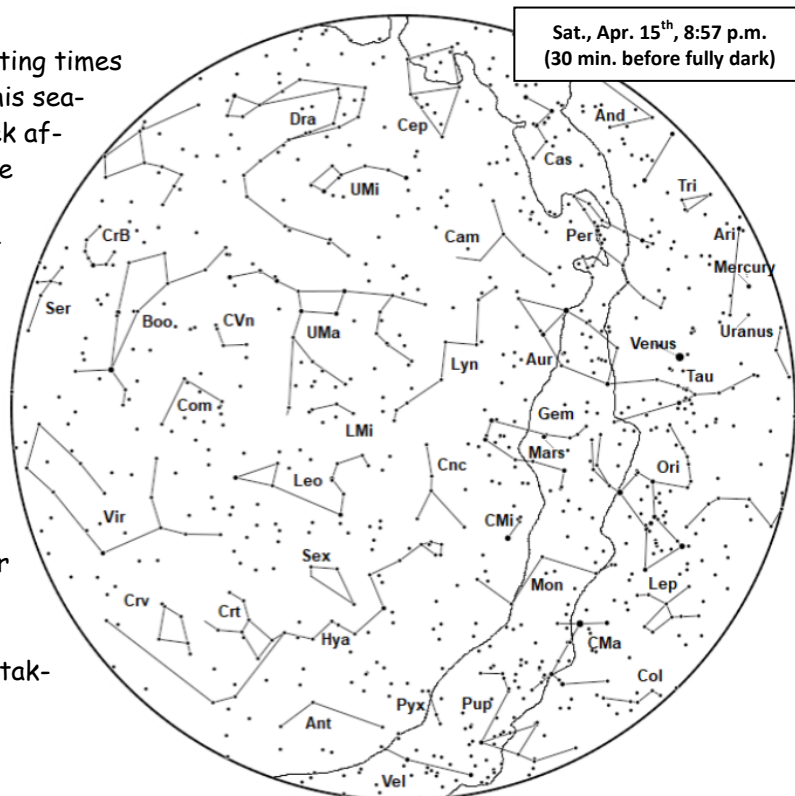
# What's Up? Highlights

April 1 to 30, 2023

(As presented at the March 20<sup>th</sup> meeting. For the entire PowerPoint, click [here](#).)

## This Month:

Spring is charging ahead and, with it, our starting times for nighttime observing keep getting later. This seasonal effect will continue for more than a week after the summer solstice on June 21<sup>st</sup>, when the times will begin slowly to get earlier. (Not on the solstice, due to Earth's axial tilt and elliptical orbit.) For April, early in the month, find a clear western horizon and look for Mercury as dusk deepens. Shift your gaze 20° higher and catch Venus as it visits the Pleiades, a pleasing sight best viewed in binoculars. Other planets in the night sky include Uranus, below naked eye visibility 7° above left of Mercury, and Mars, in Gemini and close to the star Mebsuta. Later in the month, it's time for the annual Lyrid meteors, a modest shower whose radiant is highest before dawn. Meanwhile, the constellations of spring are rapidly taking over center stage from those of winter.



## Celestial Events:

- Mon.-Wed., 10<sup>th</sup>-12<sup>th</sup> - Get your binoculars out and over these nights catch Venus as it slides past the Pleiades. Closest (~2.67°) on the 11<sup>th</sup>.
- Tue., 11<sup>th</sup> - Mercury at greatest eastern elongation; good time for spotting it from a clear western view around 8:20 p.m. (Sunset is at 7:51 p.m.)
- Sat., 15<sup>th</sup> - Waning crescent Moon (25.2 days old) at perigee; 228,646 miles from Earth; diameter 32'28".
- Sat., 15<sup>th</sup> - The "Equation of Time" is 0. Solar and clock time agree temporarily.
- Sat./Sun., 22<sup>nd</sup>/23<sup>rd</sup> - Annual Lyrid Meteors. Best seen before dawn on 23<sup>rd</sup>, when Lyra constellation is highest. Moon sets 11:06 p.m. on 22<sup>nd</sup>. Usually 15 to 18 meteors per hour.
- Fri., 28<sup>th</sup> - Waxing gibbous Moon (8.5 days old) at apogee; 251,220 miles from Earth; diameter 29'34" (8.9% narrower than on 15<sup>th</sup>).

## Sunset and Twilight:

Sunset Range: 7:42 p.m. (Apr. 1<sup>st</sup>) to 8:08 p.m. (Apr. 30<sup>th</sup>)  
Twilight Ends: 9:11 p.m. (Apr. 1<sup>st</sup>) to 9:46 p.m. (Apr. 30<sup>th</sup>)

## Weekend Observing Opportunities:

(Dark of the Moon Weekends)

Apr. 14<sup>th</sup>/15<sup>th</sup>  
Apr. 21<sup>st</sup>/22<sup>nd</sup>

## Moon Phases:

Thu., 6<sup>th</sup> - Full Moon  
Thu., 13<sup>th</sup> - Last Quarter  
Thu., 20<sup>th</sup> - New Moon  
Thu., 27<sup>th</sup> - First Quarter

**This article is distributed by NASA Night Sky Network**

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**Solar Eclipses Are Coming!**

David Prosper

Have you ever witnessed a total solar eclipse? What about an annular solar eclipse? If not, then you are in luck if you live in North America: the next twelve months will see two solar eclipses darken the skies for observers in the continental United States, Mexico, and Canada!

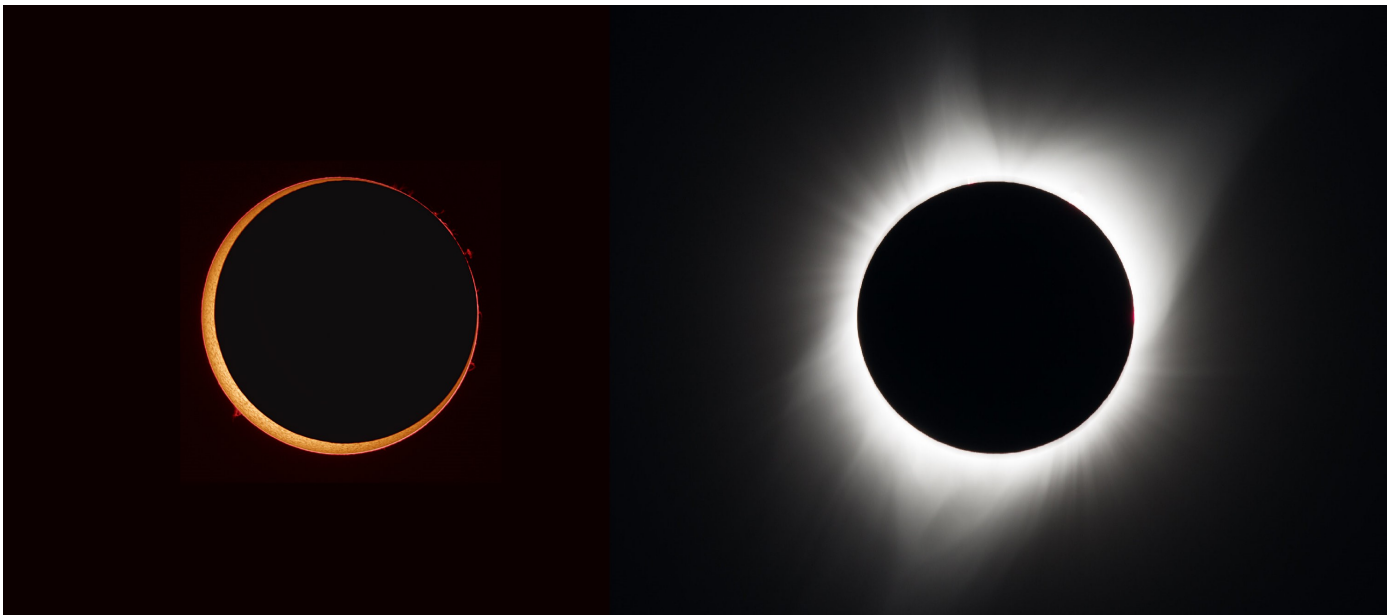
Solar eclipse fans get a chance to witness an **annular eclipse** this fall. On **Saturday, October 14, 2023**, the Moon will move exactly in front of the Sun from the point of view of observers along a narrow strip of land stretching across the United States from Oregon to Texas and continuing on to Central and South America. Since the Moon will be at its furthest point in its orbit from Earth at that time (known as *apogee*), it won't completely block the Sun; instead, a dramatic "ring" effect will be seen as the bright edge of the Sun will be visible around the black silhouette of the Moon. The distinct appearance of this style of eclipse is why it's called an annular eclipse, as *annular* means *ring-like*. If you are standing under a tree or behind a screen you will see thousands of ring-like shadows projected everywhere during maximum eclipse, and the light may take on a wan note, but it won't actually get dark outside; it will be similar to the brightness of a cloudy day. This eclipse must only be observed with properly certified eclipse glasses, or other safe observation methods like pinhole projection or shielded solar telescopes. Even during the peak of the eclipse, the tiny bit of the Sun seen via the "ring" can damage your retinas and even blind you.

Just six months later, a dramatic **total solar eclipse** will darken the skies from Mexico to northeast Canada, casting its shadow across the USA in a strip approximately 124 miles (200 km) wide, on **Monday, April 8, 2024**. While protection must be worn to safely observe most of this eclipse, it's not needed to witness totality itself, the brief amount of time when the Moon blocks the entire surface of the Sun from view. And if you try to view totality through your eclipse viewer, you won't actually be able to see anything! The Moon's shadow will dramatically darken the skies into something resembling early evening, confusing animals and delighting human observers. You will even be able to see bright stars and planets - provided you are able to take your eyes off the majesty of the total eclipse! While the darkness and accompanying chilly breeze will be a thrill, the most spectacular observation of all will be the Sun's magnificent *corona*! Totality is the only time you can observe the corona, which is actually the beautiful outer fringes of the Sun's atmosphere. For observers in the middle of the path, they will get to experience the deepest portion of the eclipse, which will last over four minutes - twice as long as 2017's total solar eclipse over North America.

While some folks may be lucky enough to witness both eclipses in full – especially the residents of San Antonio, Texas, whose city lies at the crossroads of both paths – everyone off the paths of maximum eclipse can still catch sight of beautiful partial eclipses if the skies are clear. The Eclipse Ambassadors program is recruiting volunteers across the USA to prepare communities off the central paths in advance of this amazing cosmic ballet. Find more information and apply to share the excitement at [eclipseambassadors.org](https://eclipseambassadors.org). NASA has published a fantastic Solar Eclipse Safety Guide which can help you plan your viewing at [bit.ly/nasaclipsesafety](https://bit.ly/nasaclipsesafety). And you can find a large collection of solar eclipse resources, activities, visualizations, photos, and more from NASA at [solarsystem.nasa.gov/eclipses](https://solarsystem.nasa.gov/eclipses)



This detailed solar eclipse map shows the paths of where and when the Moon's shadow will cross the USA for the upcoming 2023 annular solar eclipse and 2024 total solar eclipse, made using data compiled from multiple NASA missions. Where will you be? This map is very detailed, so if you would like to download a larger copy of the image, you can do so and find out more about its features at: <https://svs.gsfc.nasa.gov/5073> Credits: NASA/Scientific Visualization Studio/Michala Garrison; eclipse calculations by Ernie Wright, NASA Goddard Space Flight Center.



Photos of an annular total solar eclipse (left) and a total solar eclipse (right). Note that the annular eclipse is shown with a dark background, as it is only safe to view with protection – you can see how a small portion of the Sun is still visible as the ring around the Moon. On the right, you can see the Sun's wispy corona, visible only during totality itself, when the Moon completely – or totally - hides the Sun from view. A total solar eclipse is only safe to view without protection during totality itself; it is absolutely necessary to protect your eyes throughout the rest of the eclipse! Credits: Left, Annular Eclipse: Stefan Seip (Oct 3, 2005). Right, Total Eclipse, NASA/Aubrey Gemignani (August 21, 2017)



# Monthly Calendar

**RVAS Monthly Meeting: Monday, April 17<sup>th</sup>, 7:30 p.m.** (Informal “Celestial Café” chat session begins at 7:00 p.m.) Natural Science Center, Virginia Western Community College, Colonial Avenue, Roanoke, VA. Our April meeting features two programs by two members on separate subjects. Michael Good, a past RVAS president and long-time member, will be sharing his knowledge and experiences as an astrophotographer. John Wenskovitch, our current Vice-President, will discuss observing open clusters including the Astronomical League programs available on the subject through which RVAS members can earn recognition for their observing efforts. We'll also view have our regular astrophotography, observing reports, “in the news” and “What's Up?” segments. Mark your calendar for the April 17<sup>th</sup> meeting, which will again offer both in-person and Zoom options for attending. See the map and information for the in-person meeting location elsewhere in this issue. And watch for the Zoom invitation by the weekend prior to the meeting.

**WEEKEND OBSERVING OPPORTUNITIES:** The following information on Fridays and Saturdays that may be suitable for observing is provided as a courtesy to RVAS members and other readers. The RVAS assumes no responsibility for the health and safety of anyone venturing out to stargaze, and cautions all who may do so to observe appropriate COVID-19 health and safety precautions.

**Friday and Saturday, April 14<sup>th</sup> & 15<sup>th</sup>.** Sunset is at 7:55 p.m. Astronomical twilight ends at 7:49 p.m. The Moon sets at 1:42 and 2:56 p.m., respectively.

**Friday and Saturday, April 21<sup>st</sup> & 22<sup>nd</sup>.** Sunset is at 8:01 p.m. Astronomical twilight ends at 9:36 p.m. The Moon sets at 9:59 and 11:06 p.m., respectively.

**Future Weekend Observing Opportunities: May 12<sup>th</sup> & 13<sup>th</sup> and 19<sup>th</sup> & 20<sup>th</sup>.**

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## Astro-Quiz

We only see the near side face of the Moon (ignoring effects such as libration and nutation). What is the technical term for this phenomenon and why does it occur?

**Answer to Last Month's Quiz:** Last month we asked for your thoughts about Fritz's looking forward to Mars' next opposition, “since its oppositions bring it closest to Earth.” Mars is at opposition when Earth passes between it and the Sun. Oppositions take place about every 26 months, the last being December 8, 2022, and the next, January 16, 2025. Mars has one of the more eccentric orbits (second only to Mercury's) of the 8 planets, and its orbit is tilted to that of Earth by a bit less than 2°, a value that can vary due to precession and other factors. Consequently, the Earth-Mars distance at opposition varies. Moreover, the interval between a Mars opposition and its least distance from Earth do not normally fall on the same day. The interval can be as long as 8.5 days (1969) or as little as 10 minutes (2208 and 2232). So, strictly speaking, Fritz was close, but not quite correct. For a great graphic of recent and future Mars oppositions, see <https://earthsky.org/space/mars-oppositions-from-2018-2033/>. Have an answer to this month's quiz (or a future quiz question and answer to suggest)? E-mail it to [astroquiz@rvasclub.org](mailto:astroquiz@rvasclub.org)!