The Bays Mountain Astronomy Club Newsletter

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Cosmic Reflections Greg Penner - BMAC Interim Chair



reetings fellow astronomy enthusiasts! I hope everyone is having a great year so far in 2024. We have certainly had some roller-coaster weather with

cold and snowy conditions one week and warmish and rainy the next. We had a really nice time at our annual club dinner in January. About a dozen of us met up at Cootie Brown's for some great food and conversation. We were joined by Dr. Gary Henson from ETSU's astronomy department. After dinner we all went over to ETSU's Harry D. Powell Observatory for a tour led by Dr. Henson. Seeing the variety of equipment they use for astronomical research was quite educational! We learned how they use the 14 inch telescope to do spectroscopic analysis of astronomical objects and saw a spectrograph of Saturn and its rings. If you've never been to the observatory, I encourage you to attend one of their free star parties. You can see a schedule of events HERE.

Our meeting on February 2nd will feature a presentation by another ETSU astronomer. Dr. Richard Ignace will join us for a presentation entitled "Discovery Through Collaboration: How Astronomical Research Really Gets Done as Lead, Partner, or Tagalong." Dr. Ignace will share about the human drama of modern astronomy including some humorous anecdotes of his own and colleagues.

After Dr. Ignace's presentation, I would like to give time to anyone who has a "show and tell" item or topic. Did you get some new astronomy "toys" over the holidays that you would like to share with the club? Is there an astronomy project you are planning for the new year? Are you planning a field trip or excursion that includes an astronomy focus? Please share with the club so we can all get inspiration!

Looking forward to seeing everyone!

BMAC Notes

BMAC Outing



bout 10 BMACers and family gathered for the January dinner and then a tour of the ETSU Observatory. The tour was led by ETSU Physics and Astronomy Professor, Gary Henson. Prior to that, Jason, Robin and Adam made a visit to William's house to see how he was doing. He is doing better, though he still has some mobility issues. We wish him well and hope to see him at a future meeting.



Robin, Adam, Jason & William. Photo by Robin Byrne.



Tom, Adam & Rob at the ETSU Observatory. Photo by Robin Byrne.



Gary at the ETSU Observatory. Photo by Robin Byrne.



Adam, Rob, Olivia, Robin & Greg at the ETSU Observatory. Photo by Tom Rutherford.

Sky News from the Astronomical League

Τ

he Astronomical League has a plethora of educational content to help you learn and enjoy the night sky more. The following inserts are just a tiny

bit of what they provide.

Navigating the mid February Night Sky



Binocular Highlights

A: Examine the stars of two naked eye star clusters, the Pleiades and the Hyades.

B: Between the "W" of Cassiopeia and Perseus lies the Double Cluster.

C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval. **D:** M42 in Orion is a star forming nebula. **E:** Look south of Sirius for the star cluster M41. **F:** M44, a star cluster barely visible to the naked eye, lies southeast of Pollux.



Astronomical League www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.



ASTRONOMICAL LEAGUE Double Star Activity





NASA Power to Explore Challenge



he following is from Future Engineers. They partner with organizations like NASA to provide STEM challenges for students. All of their challenges and resources are totally free for educators and students. Their goal is just to get students interested in STEM education and astronomy! They are writing to let you know about some wonderful opportunities for students. They would love to see more entries from Tennessee. They would like our help in spreading the word.

Here's an overview of our NASA Power to Explore Challenge:

For the Power to Explore Challenge, NASA is calling on K-12 students in the United States to research Radioisotope Power Systems (RPS), a type of nuclear "battery" used in space exploration, and dream up a new RPS-powered space mission to a destination with limited or obstructed access to light. Grand prize winners from each grade category (3 total) will receive a

trip for two to NASA's Glenn Research Center to learn about the people and technologies that enable NASA missions. Every student who submits an entry will receive a digital certificate and an invitation to a virtual event with NASA experts where they'll learn about what powers the NASA workforce to dream big and explore.

Please share this flyer and information with anyone you think may be interested. Entries for this contest are due 02/09/24.



FUTURE ENGINEERS PRESENTS

STUDENT CHALLENGE

ENTRY DEADLINE: FEBRUARY 9, 2024

K-12 STUDENTS! SUBMIT AN ENTRY AND YOU COULD



WIN A TRIP TO NASA



WER TO

RADIOISOTOPE POWER SYSTEMS

EVERYONE WHO SUBMITS!

Sign up for the challenge (it's free!), learn about nuclear "batteries" that power space exploration, and dream up a new space mission.

https://rps.nasa.gov/stem/power-to-explore

(TEACHERS CAN SIGN UP AN ENTIRE CLASS!)



IN SUPPORT OF NASA'S RADIOISOTOPE POWER SYSTEMS PROGRAM



Green Bank Star Quest 2024

ear Fellow Astronomers:

We would like to invite you and your club members to attend the upcoming annual four-day Green Bank Star Quest XIX, being held July 3 through July 6, 2024. It is the largest star party in the nation that combines both optical and radio astronomy. Held at the Green Bank Observatory, located in Green Bank, West Virginia, the rural location provides the dark skies so envied by many other astronomers.

Green Bank Observatory graciously allows us to host this star party at their facility, where the infrastructure allows events and lectures to continue, even if there is inclement weather. Large campsites are available in the observing field with nearby hot showers. Bunkhouses are also available for a small fee of \$15 per night to help accommodate astronomers.

Each year we strive to have the highest quality speakers available, covering a wide variety of topics that would interest both optical and radio astronomers. Additional information is available at this <u>link</u>.

There will be a 10% group discount for groups of ten or more (pre-paid and non-refundable, unless the event would get cancelled again due to circumstances out of our control. The discount is off of the registration fee only, and does not include bunkhouse, RV sites, meals or any other special fees.)

For anyone who is interested in attending, a registration form is available on our website. The option to use PayPal is also available on our website.

Our club can also be contacted by mail: Central Appalachian Astronomy Club, PO Box 211, Grafton, WV 26354, or via our club's <u>website</u>, or you can contact the coordinator of the event, our club's vice president, John Taylor at (304) 265-5514.

Sincerely, Central Appalachian Astronomy Club, WV

Note, all the info can be found on their <u>website</u>. Early registration has opened with a \$10 discount up through March 31, 2024. Registration is per person and includes all activities, a campsite and access to bath houses. Meals, T-shirts, etc. are all extra. No generators are allowed due to it being a radio-free zone. Cell service is either extremely poor or non-existent.

Stellar Observations

Greg Penner

Space Exploration News



or this month's article, we will take a look at some recent news from the front lines of space exploration. The JWST continues to make some remarkable discoveries in distant galaxies while, closer to home, attempts to explore our own Moon are making headlines. We will start by diving in to some amazing findings from everyone's favorite space telescopes.

Gravitational lensing is an effect most of us have heard about by now. We see this effect (originally predicted by Albert Einstein), when a massive galaxy cluster is situated between a more distant galaxy and us. Light from the more distant galaxy is bent around the massive galaxy cluster (because of its extreme gravitational influence), which results in our observation of a warped, and sometimes multiplied image of the more distant galaxy. In 2016 the Hubble Space Telescope spotted a multiply-imaged supernova, nicknamed Supernova Requiem, in a galaxy 10 billion light years away called MRG-

M0138, which was lensed by the intervening galaxy cluster MACS J0138.0-2155 (who names these things?). Fast forward to November 2023, and now we have the JWST available to image the same galaxy. Lo and behold, they have found another gravitationally lensed, multiply-imaged supernova in galaxy MRG-M0138! The astronomers doing this research say that fewer than a dozen have ever been found, so finding two in one galaxy was quite astonishing for them. The second supernova has appropriately been nicknamed "Encore." Using the astronomers' own words, they tell us the significance of this discovery:

Encore was discovered serendipitously, and we are now actively following the ongoing supernova with a timecritical director's discretionary program. Using these Webb images, we will measure and confirm the Hubble constant based on this multiply-imaged supernova. Encore is confirmed to be a standard candle or type la supernova, making Encore and Requiem by far the most distant pair of standard-candle supernova 'siblings' ever discovered. Supernovae are normally unpredictable, but in this case we know when and where to look to see the final appearances of Requiem and Encore. Infrared observations around 2035 will catch their last hurrah and deliver a new and precise measurement of the Hubble constant.

Just this past week, the JWST team was taking additional images of this galaxy in support of these astronomers' ongoing research, adjusting their imaging schedule to take advantage of the recent appearance of Encore.



MACS J0138 Hubble and Webb Side-by-Side

Left: In 2016 NASA's Hubble Space Telescope spotted a multiply imaged supernova, nicknamed Supernova Requiem, in a distant galaxy lensed by the intervening galaxy cluster MACS J0138. Three images of the supernova are visible, and a fourth image is expected to arrive in 2035. In this near-infrared image, light at 1.05 microns is represented in blue and 1.60 microns is orange. Right: In November 2023 NASA's James Webb Space Telescope identified a second multiply imaged supernova in the same galaxy using its NIRCam (Near-Infrared Camera) instrument. This is the first known system to produce more than one multiply-imaged supernova.

Credits: NASA, ESA, CSA, STScI, Justin Pierel (STScI), Drew Newman (CIS)

Supernova Encore in MACS J0138 (NIRCam Image)



NASA's James Webb Space Telescope has spotted a multiply imaged supernova in a distant galaxy designated MRG-M0138. Two images of the supernova (circled) are seen in the Webb NIRCam (Near-Infrared Camera) image above, but an additional supernova image is expected to become visible around 2035. In this image blue represents light at 1.15 and 1.5 microns (F115W+F150), green is 2.0 and 2.77 microns (F200W+277W), and red is 3.56 and 4.44 microns (F356W + F444W).

Credits: NASA, ESA, CSA, STScI, Justin Pierel (STScI), Drew Newman (CIS)

Closer to home, missions related to lunar exploration have been in the news to start the new year. On a disappointing note, the private company Astrobotics launched its Peregrine moon lander, which suffered a fuel leak and will not be able to land on the Moon. As of this writing, Peregrine is on a trajectory to burn up in Earth's atmosphere on January 18th. The other private company leading the effort to land payloads on the Moon is Intuitive Machines. Their Nova-C Lander was originally scheduled to launch in mid-January but now is targeting mid-February. The mission objective is to place the lander at crater Malapert A near the south pole of the Moon. The commerciallybuilt lander will carry five NASA payloads and commercial cargo. The scientific objectives of the mission include studies of plume-surface interactions, radio astronomy and space weather interactions with the lunar surface. It will also be demonstrating precision landing technologies and communication and navigation node capabilities. These commercial missions to the Moon are in support of NASA's Artemis program, which recently announced updates to its schedule. NASA will now target

September 2025 for Artemis II, the first crewed Artemis mission around the Moon, and September 2026 for Artemis III, which is planned to land the first astronauts near the lunar South Pole. Artemis IV, the first mission to the Gateway lunar space station, remains on track for 2028. NASA states the reasons for the schedule changes as follows:

Ensuring crew safety is the primary driver for the Artemis II schedule changes. As the first Artemis flight test with crew aboard the Orion spacecraft, the mission will test critical environmental control and life support systems required to support astronauts. NASA's testing to qualify components to keep the crew safe and ensure mission success has uncovered issues that require additional time to resolve. Teams are troubleshooting a battery issue and addressing challenges with a circuitry component responsible for air ventilation and temperature control. NASA's investigation into unexpected loss of char layer pieces from the spacecraft's heat shield during Artemis I is expected to conclude this spring. Teams have taken a methodical approach to understand the issue,

including extensive sampling of the heat shield, testing and review of data from sensors and imagery.



Artemis 2 Mission Map (see attached) - Artemis 2 mission currently targeted for September 2025.

Space exploration is an exciting and difficult endeavor. The scientific discoveries being made by the teams working with the HST and JWST continue to amaze. The work that the astronomers and astrophysicists do behind the scenes to make sense of the data from the telescopes is remarkable. The work being done by engineers to develop and build vehicles to make the harsh journey through space, in addition to keeping astronauts safe, is truly mind-boggling. We will continue following developments in all of these areas and look forward to seeing results of all the effort!

The Queen Speaks

Robin Byrne

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Happy Birthday Scott and Mark Kelly



his month we celebrate twin brothers who have both contributed to the space program, and so much more. Mark and Scott Kelly were born in Orange, New Jersey on February 21, 1964. Both of their parents were police officers. The brothers attended public school together, graduating from Mountain High School in 1982.

After high school, Mark went to the United States Merchant Marine Academy, where he graduated in 1986 with his Bachelor's Degree in Marine Engineering and Nautical Science. He later went on to earn a Master of Science Degree in Aeronautical Engineering from the U.S. Naval Postgraduate School.

Meanwhile, Scott first attended the University of Maryland, but reading "The Right Stuff" inspired him to pursue naval aviation. He transferred to the State University of New York Maritime College to study electrical engineering, with a Navy ROTC

scholarship paying his way. Scott spent his summers aboard the training ship, Empire State V, traveling to such places as Hamburg, Mallorca, and London. Scott graduated in 1987, and later earned a Master of Science Degree in Aviation Systems.

After college, Mark joined the Navy, becoming a naval aviator. During his time in service, he flew 39 combat missions as part of Operation Desert Storm. In 1989, Mark married Amelia Babis, with whom he had two daughters. They would eventually divorce in 2004. In 1993, Mark entered the U.S. Naval Test Pilot School, graduating the following year.

When Scott left college, he also joined the Navy, beginning at the NAS Pensacola flight school. By 1989 he was an official naval aviator. After training on a myriad of aircraft, Scott was deployed to the Persian Gulf in 1990. In 1992, Scott married Leslie Yandell. They had two children, but eventually divorced in 2010. In 1993, Scott joined his brother in the U.S.Naval Test Pilot School.



Astronaut Mark E. Kelly. Image taken 5 January 2005. Credit: NASA/JSC



Retired Astronaut Scott Kelly. Image taken 8 July 2019. Credit: NASA, Johnson Space Center, Bill Ingalls With their two paths repeatedly crossing, it shouldn't be too surprising that the brothers both applied to become NASA astronauts in 1995, and both were accepted into the program the following year. This was the first time NASA had astronaut candidates who were related. Training began in July of 1996, and both brothers began their individual journeys to space.

Mark's first trip to space would begin on December 5, 2001 as the pilot aboard the Space Shuttle Endeavor. This mission delivered supplies and crew members to the International Space Station, and brought home returning ISS crew members. Mark returned to space in 2006 as the pilot of Discovery. In the wake of the Columbia disaster, the primary mission was to test various safety and repair procedures, as well as delivering supplies to the ISS. Meanwhile, in 2007, Mark began a different type of journey when he married U.S. Representative Gabby Giffords. But Mark's space adventures weren't over yet. His first mission as a shuttle commander was in 2008 aboard Discovery. This mission delivered parts of the Japanese Kibo module to ISS. In 2011, Giffords was shot in an attempted assassination.

Mark was scheduled to fly another mission, but NASA wasn't sure if he should go because of Gifford's condition. Thankfully, she was showing tremendous improvements, so Mark ultimately did fly as commander aboard Endeavor, launching in May of 2011, with Giffords present to watch the launch. Once again, they delivered equipment to ISS. The following month, Mark announced his retirement from NASA and the Navy to be able to help his wife in her recovery. Over the next five years, Mark co-authored several books about space, about Gabby's injury and recovery, and about the issue of gun violence in America. Mark and Gabby became strong advocates for gun control, establishing a political action committee in 2013 called Americans for Responsible Solutions.

Scott was actually the first of the two to go to space, aboard the Space Shuttle Discovery as the mission pilot, launching December 19, 1999. This was a Hubble Space Telescope repair and upgrade mission. It was also the only shuttle mission to celebrate Christmas from orbit. After this flight, Scott was sent to Star City, Russia to serve as NASA's director of operations. In The Bays Mountain Astronomy Club Newsletter

2002, Scott ventured in a different direction, spending 5 days as commander of the NEEMO 4 underwater laboratory, analyzing similarities between working in the extreme environment in the ocean to working in space. In 2005, he participated in a similar assignment for 3 days as part of the NEEMO 8 mission. Scott returned to space in 2007 aboard the Space Shuttle Endeavor, delivering parts to construct more components of the ISS. Scott once again flew to ISS in 2010, but this time his mission was to stay there. After his first two months on ISS, he moved into the position of Commander. During his five months in space, Scott participated in various scientific experiments. While in orbit, Scott received the horrible new that his sister-in-law, Gabby Giffords, had been shot. After returning to Earth, his first stop was to the hospital where she was still being treated. In 2012, Scott officially retired from the Navy. That same year, he was chosen for a landmark NASA mission - to spend one year in space aboard ISS. Riding a Soyuz spacecraft, Scott launched in March of 2015, and returned to Earth aboard another Soyuz spacecraft in March of 2016. During his year in space, Scott

performed a variety of scientific experiments, as well as being a scientific test study himself. About halfway through his mission, the role of Commander was passed on to him, so Scott also performed command duties. Shortly after his return, Scott announced that he would be retiring from NASA. A month later, he was named by the United Nations Office for Outer Space Affairs (UNOOSA) to be the United Nations Champion for Space. His role was to raise awareness of UNOOSA activities and outreach. Scott also followed in Mark's literary footsteps, writing his own book about the year he spent in space. In 2018, Scott married Amiko Kauderer, who worked for NASA as a public relations officer.

Scott's year in space, coupled with both of the identical twin brothers having been employed by NASA for several years, provided a unique opportunity to perform a scientific study of the effects of space on the human body. NASA had many years of medical records for both brothers to establish a baseline, and then could look at changes in Scott's body compared to Mark's. Overall, they found that the human body recovers from extended weightlessness very well. One study looked at the ends of DNA strands, which tend to get depleted as people age, with each round of replicating DNA showing more depletion. Surprisingly, Scott's DNA, after a year in space, not only had LESS degradation than his brother's, but the strand had actually increased in length. However, after returning to Earth, the strands first reduced back to where they were before the flight, but then degraded at an even faster rate. That could be a point of concern if it is a regular occurrence. For now, they don't understand why the changes progressed in this way.

Another area of research was looking at gene expression, which is how the information in a gene is used to construct a protein molecule. Stress was already known to affect this process, so they wanted to see if spaceflight created a different situation. They found that Scott's gene expression varied the most during his last 6 months in space, which was not expected, thinking he would get more accustomed to the environment over time. Once back on Earth, Scott's gene expression returned to within 90% of Mark's, which is considered normal levels.

In a test of cognitive skills, they did find concerning decreases in Scott's cognition after his return to Earth, despite being stable while in space. The decrease lasted for roughly 6 months. That raises the question of whether this would affect the performance of astronauts on even longer missions, such as a flight to Mars. On a positive note, they found that the flu vaccine worked the same in weightlessness as it does on Earth. And, overall, Scott's condition returned to a level similar to Mark's in all areas measured after being on Earth for a few months. Obviously, this was a study of only two people, so it would be difficult to make any generalizations about how these results may apply to others.

After NASA, both brothers have remained active. In addition to public appearances, Scott has become active in a program called the UNITED24 project, which has been raising funds to help replace medical equipment in Ukraine.

Meanwhile, Mark has followed in his wife's political footsteps, becoming a U.S. Senator, representing Arizona. He first ran in the 2020 special election, after the death of John McCain opened a seat, and in 2022, he was reelected.

Scott's year in space study is not over, either. He will have tests done annually to monitor long term changes, with Mark always present for a comparison.

The Kelly Brothers have led amazing lives, and continue to contribute to the betterment of mankind. From political and charitable activities, to increasing our understanding of how weightlessness affects the human body, Mark and Scott are two inspiring individuals who will, undoubtedly, add more remarkable achievements to their life stories before it is all said and done.

References:

Scott Kelly - Wikipedia

Mark Kelly - Wikipedia

Twins Study - NASA

NASA's Study of Astronaut Twins Creates a Portrait of What a Year in Space Does to the Human Body: Wide-ranging research compares astronaut Scott Kelly to his earthbound twin brother, Mark; <u>Smithsonian Magazine</u>; Maddie Burakoff; April 11, 2019

The Space Place MASA Nigh Network

Kat Troche

The Bays Mountain Astronomy Club Newsletter :

Constant Companions: Circumpolar Constellations, Part I

W

inter in the northern hemisphere offers crisp, clear (<u>and cold!</u>) nights to stargazers, along with better views of several circumpolar constellations. What

does circumpolar mean when referring to constellations? This word refers to constellations that surround the north and south celestial poles without ever falling below the horizon.

Depending on your latitude, you will be able to see up to nine circumpolar constellations in the northern hemisphere. Today, we'll focus on three that have gems within: Auriga, Cassiopeia and Ursa Minor. These objects can all be spotted with a pair of binoculars or a small to medium-sized telescope.



The counterclockwise circumpolar constellations Auriga, Cassiopeia, and Ursa Minor in the night sky, with four objects circled in yellow labeled: Pinwheel Cluster, Starfish Cluster, Owl Cluster, and Polaris. <u>Credit: Stellarium Web</u>

- The Pinwheel Cluster: Located near the edge of Auriga, this open star cluster is easy to spot with a pair of binoculars or small telescope. At just 25 million years old, it contains no red giant stars and looks similar to the Pleiades. To find this, draw a line between the stars Elnath in Taurus and Menkalinan in Auriga. You will also find the Starfish Cluster nearby.
- The Owl Cluster: Located in the 'W' or 'M' shaped constellation Cassiopeia, is the open star cluster known as the Owl Cluster. Sometimes referred to as the E.T. Cluster or Dragonfly Cluster, this group of stars never sets below the horizon and can be spotted with binoculars or a small telescope.



NASA, ESA, N. Evans (Harvard-Smithsonian CfA), and H. Bond (STScI)

STScI-PRC06-02a

A black and white image from the Hubble Telescope of the Polaris star system, showing three stars: Polaris A, Ab, and Polaris B. Credit: NASA, ESA, N. Evans (Harvard-Smithsonian CfA), and H. Bond (STScI) Polaris: Did you know that <u>Polaris is a triple star system</u>? Look for the North Star on the edge of Ursa Minor, and with a medium-sized telescope, you should be able to separate two of the three stars. This star is also known as a <u>Cepheid variable star</u>, meaning that it varies in brightness, temperature and diameter. It's the closest one of its kind to Earth, making it a great target for study and <u>conceptual art</u>.



Artist's Concept of Polaris System, Annotated. <u>Credit: NASA, ESA, G. Bacon (STScI)</u> Up next, catch the King of the Planets before its gone for the season with our upcoming mid-month article on the Night Sky Network page through NASA's website!

This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit <u>nightsky</u> to find local clubs, events, and more!

BMAC Calendar & More

Calendar:



MAC Meetings:

- Friday, February 2, 2024 7p, Planetarium Theater Dr. Richard Ignace, Astrophysicist, Researcher & Professor from the ETSU Department of Physics & Astronomy will present "Discovery Through Collaboration: How Astronomical Research Really Gets Done as Lead, Partner, or Tagalong."
- Friday, March 1, 2024 7p Topic TBA.
- No April meeting due to eclipse.
- Friday, May 3, 2024 7p Student presentations.
- Friday, June 7, 2024 7p Eclipse stories.
- Friday, August 2, 2024 7p Topic TBA.
- Friday, September 6, 2024 7p Topic TBA.
- Friday, October 3, 2024 7p Topic TBA.
- Friday, December 6, 2024 7p Topic TBA.
- Friday, February 7, 2025 7p Topic TBA.



- Every clear Saturday & Sunday 3p-3:30p March-October By the Dam
 - View the Sun safely with a white-light view if clear.; Free.
 - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.



tarWatch:

- March 2 & 9, 2024 7p
- March 16, 23 & 30, 2024 8p
- April 6, 13, 20 & 27, 2024 8:30p
 - View the night sky with large telescopes at the observatories. If poor weather, an alternate live tour of the night sky will be held in the planetarium theater. Free.
 - You must have completed the Park Volunteer Program in order to help with the public program. If you have, and have been trained, please show up at least 30 minutes prior to the official start time.



• Astronomy Day - May 18, 2024 - 1p-4p; 8:30p-9:30p

 Come help share the fun of astronomy with the public. There will be tables with different themed topics plus solar and night viewing.

• Annual Club Picnic - July 2024

 Date and site location will be sent directly to full BMAC members.
BMACers and their families are welcome to enjoy an evening of astronomy-themed games and activities along with a potluck dinner and observing.

• StarFest 2024 - November 1-3, 2024

- Our 39th annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 4 keynote speakers, unique T-shirt and more!
- Pre-registration by Oct. 2024 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."
- Link for all the StarFest info including registration and hotel reservation links.

• BMAC Dinner - January 2025

• This event is for members and their families. Look for an e-mail in January with all the information.

Regular Contributors:



Greg Penner



Robin Byrne



Adam Thanz

G reg Penner is a semi-retired architect living in the Tri-Cities area since 2018. He has enjoyed astronomy since childhood when he received a "department store telescope" and viewed Saturn for the first time. He has been a member since 2018.

obin Byrne has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

dam Thanz has been the BMAC Newsletter Editor for all but a small number of issues since 1992. He is the Planetarium Director at Bays Mountain Park and an astronomy adjunct instructor at NSCC since 2000.

Connection:

B ays Mountain Astronomy Club:

- 853 Bays Mountain Park Road; Kingsport, TN 37650
- (423) 229-9447 Park Site Club Site
- Newsletter edited by Adam Thanz



- Dues are highly supplemented by the Bays Mountain Park Association and volunteerism by the club. As such, our dues are kept at an extremely low cost.
- \$16 / person / year
- \$6 / each additional family member
- Note: if you are a Park Member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. The easiest way is to pay via the CivicRec online portal. If you are a current member, please log in with your e-mail address and reset your password if you have not already done so. You can then update your membership. Here's the direct <u>link</u>. If you want to add family members, then add them via the internal link. You can also pay at the gift shop, by mail or over the phone.

Chapter Background Image Credits:

- Cover image of Southern Milky Way by Adam Thanz.
 - Sony A7ii with Zeiss Batis 2.8/18 lens, f/2.8, 8 sec., ISO 6,400, August 9, 2020.
- Table of Contents image of Comet NEOWISE (C/2020 F3) by Adam Thanz
 - Sony A7ii with Sony FE 2.8/90 Macro G OSS lens, f/2.8, 8 sec., ISO 4,000, July 15, 2020.
- Cosmic Reflections image of the Summer Triangle area of the Milky Way by William Troxel.
 - Image captured July 23, 2016.
- BMAC Notes painting of the Moon with moon glow by Christa Cartwright.
 - Painting based on a photograph of the Moon Christa captured July 2020.
- Stellar Observations image of Crescent Nebula by David Reagan.
 - This image was taken with a 140mm refractor in his suburban backyard using an AstroPhysics 900 mount, 8.7 hours of 5 minute Ha and OIII subexposures, combined in AstroPixelProcessor as an HOO image and processed in Lightroom and Photoshop. Image captured in 2022.
- The Queen Speaks image of a solar halo by Robin Byrne.
 - iPhone 7, June 8, 2020.
- The Space Place NASA Night Sky Network image of the Rho Ophiuchi cloud complex by Brandon Stroupe.
 - Canon 6D with Canon 2.8/70-200mm lens, f/2.8 @200mm, 20 x 120 sec. exposures, ISO 1,000, stacked in Deepsky Stacker, processed in Adobe Photoshop CC, Skywatcher Star Adventure mount, September 19, 2015.
- BMAC Calendar & More image of the Moon by Greg Penner.
 - *iPhone shooting through a 9mm eyepiece and 12.5*" Truss Tube Dobsonian @212x.
- All background images used with permission by their authors.