The Bays Mountain Astronomy Club Newsletter

Table of Contents

	선생님, 병이 이렇게 지난 것을 가지 않는 것을 만들었다. 이렇게 집에 있는 것은 것은 것은 것은 것은 것을 하는 것을 알았다. 이렇게 방송한 것을 것을 것을 것을 하는 것을 수 있다. 것을 하는 것을 하는 것을 하는 것을 하는 것을 하는 것을 하는 것을 수 있다. 것을 하는 것을 하는 것을 하는 것을 하는 것을 수 있다. 것을 하는 것을 수 있다. 것을 하는 것을 수 있다. 것을 수 있는 것을 수 있다. 것을 하는 것을 수 있다. 것을 수 있는 것을 수 있다. 것을 하는 것을 수 있다. 것을 수 있는 것을 수 있다. 것을 수 있다. 것을 수 있는 것을 수 있다. 것을 수 있다. 것을 것을 수 있는 것을 수 있다. 것을 것을 수 있다. 것을 것을 것을 것을 것을 수 있다. 것을	
Table	of Contents	2
Cosmi	c Reflections	3
вмас	Notes	6
A	stro Photos	
Stella	r Observations1	0
"]	o's" in the Beehive Cluster1	
The Q	ueen Speaks1	7.
Н	appy Birthday Leroy Gordon Cooper1	8
The Sp	oace Place - NASA Night Sky Network3	5
·. ·E	mbracing the Equinox	6
вмас	Calendar & More4	1
	alendar:	
R	egular Contributors:4	
	onnection:4	6
	hapter Background Image Credits:4	

Cosmic Reflections

William Troxel - BMAC Chair



reetings Fellow BMACer's. Here we are at February, 2022. Time seems to be flying by. Spring will be here again and I hope my letter finds you well. I want to

invite any of you to share about your private viewings during our meeting via Zoom. Also, if you have any images that you want to share in the newsletter, Adam will welcome them.

Remember, we will have a Show and Tell session, so if you received a new or new to you equipment or started working on a project of the night sky, we would love to hear about your project!

The March meeting will highlight BMACer Brandon Stroupe as our speaker. His presentation will be "My Astrophotography Process." He will take everyone through how he plans, images, and processes astrophotos from the beginning to the end. I hope you will join us and learn from this very experienced member of our club! As usual, the Zoom link will be sent out to the membership the week of the meeting. I wanted to ask each of you what you would like to see the club do over the next few months. I always ask and every year I hope you, the club members, will share your thoughts. Please share what you would like to learn information about for upcoming meetings.

Until future notice, we will be meeting via Zoom. As of current writing, there is no plan to have any public StarWatch or SunWatch in the near future. Keep on the lookout for any updates.

Until next time... Clear skies!

BMAC Notes

Astro Photos

his issue includes some images from an astro friend that has been a consistent attender to StarFest. Jim Williams says:

Tonight's moon pictures (2/8/22) turned out pretty well. I'm learning to use my new ZWO lunar and planetary camera along with three freeware programs, FireCapture, Autostakkert, and Registax6. They produce incredible results! My pictures aren't as good as some I've seen but they are far better than anything I've ever done with just a DSLR or iPhone.







Stellar Observations

Greg Penner

"b's" in the Beehive Cluster



he Beehive Cluster is an astronomical object that I have somewhat taken for granted over the years. Perhaps because it is not a challenge to locate (it is an easy naked-eye "cloud-like" object from rural skies). I have only given it a cursory look through my telescope and then moved on to hunt down other "faint fuzzies." However, the Beehive certainly has some interesting history behind it as well as some recent discoveries of importance to astronomers.



A Stellarium image showing the Praesepe relative to Regulus and Castor/Pollux.

The open star cluster commonly referred to as the Beehive is known by a few other names such as Praesepe (Latin for "manger"), M44, NGC 2632 and Cr189. The Beehive is located in the constellation Cancer, which is nicely located for viewing in March. It can be found about halfway between the bright stars Regulus (brightest star in Leo) and the twins Castor and Pollux (in Gemini). Prior to the telescopic era, it was known as the "little cloud" because of its appearance to the naked eye. The first person to view it through a telescope in 1609 was none other than Galileo himself, who was able to count 40 stars. Charles Messier added it to his catalog in 1769, thus the M44 designation. Astronomers have found that it contains over 1,000 stars of which dozens are visible through amateur telescopes. M44 is populated with red giant, blue giant, and white dwarf type stars. One characteristic that stands out in this star cluster is "mass segregation" in which the heavier stars have sunk toward the center of the gravity well while the lighter stars have remained at the outer zone.



Blue-white and orange-red stars visible in M44. Image by Kurt Zeppetello, 7/14/21.

M44 is one of the nearest open star clusters to our Solar System at an estimated distance of 520 - 610 light years. In 2012, two stars in M44 that had been observed by the Kepler Space Telescope were found to have planets orbiting them. This was the first time planets were found to be orbiting stars that were part of a star cluster. Most of the time we hear of exoplanet discoveries based on the "transit method" in which a star is observed to slightly dim in brightness, which indicates a planet has transited in front of the star. In the case of these planets discovered around the stars in M44, the "radial velocity" method" was used to confirm the presence of planets. The exoplanets orbit two different stars (called Pr0201 and Pr0211) and have been designated Pr0201b and Pr0211b. The "b" designation is typical nomenclature for the first exoplanet found around a star (thus the b's in the Beehive). The discovery of these planets (as well as the concept of "mass segregation") is wonderfully explained in a video by Dr. Becky Smethurst if you follow this <u>link</u>. In the video, she illustrates the location of the stars Pr0201 and Pr0211. Using Stellarium, I have found the

locations of these stars and included an image in this article illustrating their location within M44. Pr201 has an apparent magnitude of +10.5, and Pr211 has an apparent magnitude of +12.0. Using the brighter stars in the cluster as a starting point, a 4"-6" scope should be able to star-hop over to these stars.



Praesepe exoplanet locations - Greg Penner labeled two stars on a Stellarium image. Even though in Stellarium these stars do not carry the names Pr0201 and Pr0211, they were found on a website called **openexoplanetcatalogue.com** which cross references them to the star names found on Stellarium.

The type of planets discovered are "hot Jupiters" as she explains in the video, so they are not the rocky Earth-type planets that you could stand on. Just imagine if Earth-type planets do exist in addition to the Jupiter-type planets around these stars. What an amazing view of the stars of the Beehive cluster would there be if one were standing on the surface of such a planet! Since their discovery, Kepler has discovered four more exoplanets orbiting stars in the Beehive (one of which is Pr0211c, the second planet discovered orbiting Pr0211). With new instruments like the Webb Space Telescope and the Extremely Large Telescope under construction in Chile, maybe it won't be too long before Earth-like planets are discovered in places like the Beehive. So take your telescope or binoculars out under the March sky and take a look toward the Beehive and imagine the future discoveries that await in this star cluster!

The Queen Speaks

Robin Byrne

-

Happy Birthday Leroy Gordon Cooper



his month, we celebrate the life of one of America's first astronauts. Leroy Gordon Cooper, Jr., "Gordo" to his friends, was born March 6, 1927 in Shawnee,

Oklahoma. His mother, Hattie, was a school teacher. His father, Leroy, Sr., began his military career during World War I in the Navy, which delayed his chance to finish high school. After the war, he returned to school, where Hattie was his teacher. Leroy, Sr. went on to college, eventually graduating from law school, while also maintaining his military connections, serving in World War II in the Judge Advocate General's Corps, and then transferring to the Air Force after the war. So Gordo came from a long history of military service.

Growing up in Shawnee, Gordo was active in sports, running on the track team and playing halfback on the high school football team. He also was a member of the Boy Scouts, rising up to Life Scout. His father's love of flying was passed down to Gordo, learning to fly his father's biplane at an early age, soloing at the age of 12, and getting his pilot's license at 16.

Gordo graduated high school in 1945, and enlisted in the U.S. Marine Corps, planning to serve in World War II, but the war ended before he got an assignment. He served with the Presidential Honor Guard until his discharge in 1946.

At this time, Gordo's parents were stationed in Hawaii, so he joined them and began attending the University of Hawaii. As a member of a local flying club, Gordo met Trudy Olsen, who was an active flyer herself. They married August 29, 1947, and would eventually have two daughters.

In college, Gordo was a member of the ROTC, which led to a commission in the U.S. Army in 1949. He had this transferred to the U.S. Air Force. This was the beginning of Gordo's official military pilot training. When his training ended in 1950, Gordo was posted in West Germany. While there, he continued his college education, attending classes through an extension campus of the University of Maryland. After returning to the U.S. in 1954, Gordo attended classes at the U.S. Air Force Institute of Technology (AFIT), completing his Bachelor of Science degree in Aerospace Engineering in 1956. It was at AFIT that Gordo first met Gus Grissom.

After graduation, Gordo and Gus moved on to the the USAF Experimental Flight Test Pilot School at Edwards Air Force Base in California. When his training was complete, Gordo remained at Edwards as a test pilot and project manager. Over the next two years, Gordo logged over 2,000 hours of flight time, the majority of it being in jet aircraft.

In January 1959, Gordo got a new set of orders - report to Washington, D.C. No details were included. His commanding officer had heard about a space capsule being developed, and he warned Gordo to not become an astronaut. February 2 of that year, Gordo attended a briefing about Project Mercury and the role of the first astronauts. Gordo became one of 110 pilots who went through the selection process. During this process, the candidates were asked about their home life. At the time, Gordo and Trudy were separated, but Gordo lied and said his home life was just fine. He immediately drove out to San Diego to convince Trudy to back up his story. She agreed, and moved back with Gordo to be a part of the big adventure.

On April 9, 1959, NASA introduced America to the Mercury Seven Astronauts, including Gordo Cooper, the youngest of the seven. Each astronaut had a particular area in which they were involved. Cooper was assigned to work on the Redstone rocket, to be used for the first two manned launches. He also was in charge of the committee that worked out the protocols for emergency escape procedures on the launch pad.



On April 9, 1959, NASA's first administrator, Dr. Keith Glennan, announced the names of the agency's first group of astronauts at a news conference in Washington, D.C. Now known as the "Original Seven," they included three Naval aviators, M. Scott Carpenter, Walter M. Schirra Jr., and Alan B. Shepard Jr.; three Air Force pilots, L. Gordon Cooper Jr., Virgil I. (Gus) Grissom, and Donald K. (Deke) Slayton; along with Marine Corps aviator John H. Glenn Jr. This group photo of the original Mercury astronauts was taken in June 1963 at the Manned Spacecraft Center (MSC), now Johnson Space Center, in Houston, Texas. The astronauts are, left-to-right: Cooper, Schirra, Shepard, Grissom, Glenn, Slayton and Carpenter. Project Mercury became NASA's first major undertaking. The objectives of the program were to place a human-rated spacecraft into orbit around Earth, observe the astronaut's performance in such conditions and safely recover the astronaut and the spacecraft. The Mercury flights proved that humans could live and work in space, and paved the way for the Gemini and Apollo programs as well as for all further human spaceflight. Image Credit: NASA

Because the astronauts were still active members of the military, which paid their salaries, the astronauts were motivated to fly as often as possible in order to receive their additional flight pay. But NASA didn't provide them with airplanes to fly. When Gordo told this to a reporter, the reporter wrote about it. That article led to Gordo meeting with a Congressman. Eventually the House Committee on Science and Astronautics got involved, leading to the astronauts having access to USAF F-102's to get in their flight time. However, NASA management was not happy with Gordo "going behind their backs" and talking to the press. This would not be the last time Gordo and the NASA brass were at odds.

A marketing campaign by a local Corvette dealer led to the astronauts having the opportunity to lease brand-new Corvettes for a dollar a year. John Glenn was the only one of the astronauts who didn't participate in the deal. The other six were known to race wildly around Cape Canaveral, while the local police looked the other way. Cooper took it a step further, becoming a member of the Sports Car Club of America and NASCAR. Racing speedboats was another of his passions.

Anything that moved fast - Gordo was there.



Some of NASA's sixteen astronauts participate in tropic survival training from June 3, through June 6, 1963, at Albrook Air Force Base, Canal Zone. From left to right are unidentified trainer, Neil Armstrong, John H. Glenn, Jr., L. Gordon Cooper and Pete Conrad. Image Credit: NASA Before Cooper went to space himself, he worked in a variety of capacities. He was capsule communicator (CAPCOM) for Alan Shepard's flight, taking America's first man into space in 1961. Cooper also served as CAPCOM for Scott Carpenter's orbital flight in 1962. In the same year, Cooper served as back-up pilot for Wally Schirra for his orbital flight.

The next, and final, flight of a Mercury capsule would be Cooper's. Though, for a time, it looked like he might be replaced with his back-up, Alan Shepard. First, Cooper got into an argument over changes to the pressure suit with the Deputy Administrator. That was followed by Cooper flying in low over the Cape while lighting his afterburners, startling and infuriating the NASA administrators. According to one report, it was President Kennedy who intervened and prevented Cooper from being replaced.

The goal of the mission was to fly 22 orbits in a spacecraft designed to last for 18 orbits. This was an attempt to get closer to the record set by the Soviet Union of 64 orbits. The spacecraft was originally built for Wally Schirra's flight, but hadn't passed inspection, so was sent back to the factory for repairs before being used for Cooper's flight. Because of all of these potential hurdles, Cooper decided to name the vehicle "Faith 7." NASA dreaded the potential headlines about "losing Faith" if anything were to go wrong.

On May 15, 1963, Gordo Cooper became the sixth American to enter space. His flight lasted for 34 hours 19 minutes, over 24 hours longer than any of the previous Mercury flights. This gave him the opportunity to be the first American to sleep in space. Though not part of the plan, he was also the first to sleep on the launch pad during countdown!

Because the spacecraft was being pushed well beyond its design limits, it's not surprising that Cooper encountered several problems during his flight: a power failure, rising carbon dioxide levels, temperatures in the cabin reaching over 130 °F, and failing clocks and gyroscopes. In the end, about all that did work was the radio and the manual controls. Despite being designed to have all components of the flight taken care of automatically, Gordo instead had to bring the capsule down completely manually. This was why pilots were needed in the first place. As Cooper later wrote in his autobiography, "My electronics were shot and a pilot had the stick." Using navigation by stars, lines drawn on the capsule window for reference points, and his wrist watch, Cooper not only brought the capsule down safely, but also managed to land within a mere four miles of the aircraft carrier that was waiting to retrieve him.

With the end of Project Mercury, Cooper remained at NASA to be part of the next era - Project Gemini. Cooper flew on Gemini 5 with one of the new rookies, Pete Conrad. This would be the first mission to not have a name for the capsule, which Cooper and Conrad were planning to name "Lady Bird" after the First Lady. However, NASA decided to "depersonalize" the space program. So, instead, it's the first mission to have a special mission patch. Cooper and Conrad incorporated into the patch design their names, a covered wagon, and a slogan of "8 Days or Bust," a reference to the 8-day mission that was planned.

On August 21, 1965, Cooper and Conrad launched into space. Due to some problems with a fuel cell, the astronauts had to contend with a cold capsule. Some of the maneuvering thrusters were also not working properly. The original plan was to rendezvous with an Aegena target vehicle, but due to problems with the Aegena, this goal was postponed to another mission. Instead, Cooper used the flight to test out the maneuvering procedures, even if there was no rocket with which to align. He proved that the capsule could be maneuvered to a predetermined location in space. Almost all other on-board experiments, mostly related to photography from orbit, were performed successfully, as well. With the appearance of Hurricane Betsy in the planned recovery area, the mission was cut short by a few orbits, just shy of the eight day goal. While Gus Grissom was the first American to go to space twice, only one of his flights was orbital, so this Gemini mission made Gordo Cooper the first American to twice go into orbit.



Gemini V command pilot Gordon Cooper (right) and Charles "Pete" Conrad, pilot, walk across the deck of the aircraft carrier USS Lake Champlain following their spacecraft's recovery from the ocean on Aug. 29, 1965.
The eight-day Gemini V endurance mission doubled America's spaceflight record set two months earlier. It also tested technology that would help make longer missions possible, allowing astronauts to meet the challenges for landing on the Moon and laying the groundwork for long-duration missions aboard the International Space Station. Image Credit: NASA

After the Gemini missions ended, Cooper remained with NASA for Project Apollo. His first assignment was as backup Commander for Apollo 10. If the rotation stayed on track, this would put him in line for Commander of Apollo 13. However, when Alan Shepard, who had been grounded for years due to an inner ear problem, was returned to active flight status, he was named to command that mission. That crew was eventually delayed to Apollo 14 to allow Shepard more time to train. Seeing his chances of flying an Apollo mission becoming less likely, Gordo Cooper retired from NASA and the U.S. Air Force on July 31, 1970, with 222 hours of time in space.

Not long after leaving NASA, Gordo and Trudy divorced. In 1972, Gordo married Suzan Taylor, who was a school teacher. They would eventually have two daughters.

Over the following years, Cooper worked for a variety of corporations, many of them related to flying, sports cars and speed boats. From 1973 to 1975, Cooper worked as vice president of research and development for the EPCOT Center at Walt Disney World.

In 1983, the film "The Right Stuff," about the Mercury astronauts, was made. Before being cast for the role portraying Cooper, Dennis Quaid met with him to learn his mannerisms, and even had his hair cut and dyed to match how Gordo's looked during the 1950's and 60's. He got the role. Cooper assisted in the making of the film, and many of his memories of events were used in the dialogue.

One of Cooper's more controversial legacies is his insistence that he had seen UFO's at various times (though not in space) and that the U.S. government was involved in a large conspiracy to cover up all reports of UFO sightings.

On October 4, 2004, Leroy Gordon Cooper passed away at his home in Ventura, California due to heart failure. He was 77 years old. Fellow Mercury astronaut, John Glenn, remembered him with, "Gordo was one of the most straightforward people I have ever known. What you saw was what you got." In 2007, some of his ashes were flown on a private sub-orbital flight. Another sampling of his ashes were flown on the SpaceX COTS Demo Flight 2 on May 22, 2012, which was an unmanned mission to the International Space Station. A month later, the capsule burned up, according to plan, as it reentered Earth's atmosphere.



October 4, 2004. NASA mourns the loss of Mercury astronaut Gordon Cooper, who rocketed into space in his Faith 7 capsule on May 15, 1963. Cooper, the youngest of the Original Seven Mercury astronauts, died at his California home on Oct. 4, 2004 at the age of 77.

Cooper's Mercury flight set a U.S. endurance record at the time, and he became the first astronaut to sleep in space during his 34 hour, 22 orbit mission. In 1965, Cooper commanded the Gemini 5 mission alongside Pete Conrad, establishing a new space endurance record at the time, traveling 3,312,993 miles in 190 hours and 56 minutes.

Norris Gray, the NASA Fire Chief and Emergency Preparedness Officer during the Mercury days echoes what many are saying about the space pioneer: "He never said 'you can't do it.' He was gung ho on everything." Photo Credit: NASA Gordo Cooper was a remarkable, though far from perfect, man. Reckless and daring, unafraid to offend and speak his mind, Gordo always remained true to who he was. He was a pilot, astronaut, businessman, husband, father, and believer in UFO's. And throughout his life, he always had the right stuff.

References:

Gordon Cooper - Wikipedia

Remembering 'Gordo" by Amiko Nevills NASA Johnson Space Center, October 6, 2004

2060 Minutes: Gordo Cooper and the Last American Solo Flight in Space by Megan Garber, The Atlantic, May 17, 2013

The Space Place MASA Nights

Metwork

David Prosper

The Bays Mountain Astronomy Club Newsletter

Embracing the Equinox

epending on your locale, equinoxes can be seen as harbingers of longer nights and gloomy weather, or promising beacons of nicer temperatures and more sunlight. Observing and predicting equinoxes is one of the earliest skills in humanity's astronomical toolkit. Many ancient observatories around the world observed equinoxes along with the more pronounced solstices. These days, you don't need your own observatory to know when an equinox occurs, since you'll see it marked on your calendar twice a year! The word "equinox" originates from Latin, and translates to equal (equi-) night (-nox). But what exactly is an equinox?

An equinox occurs twice every year, in March and September. In 2022, the equinoxes will occur on March 20, at exactly 15:33 UTC (or 11:33 a.m. EDT), and again on September 23, at 01:04 UTC (or September 22 at 9:04 p.m. EDT). The equinox marks the exact moment when the center of the Sun crosses the plane of our planet's equator. On the day of an equinox, observers at the equator will see the Sun directly overhead at noon. After the March equinox, observers anywhere on Earth will see the Sun's path in the sky continue its movement further north every day until the June solstice, after which it begins traveling south. The Sun crosses the equatorial plane again during the September equinox, and continues traveling south until the December solstice, when it heads back north once again. This movement is why some refer to the March equinox as the northward equinox, and the September equinox as the southward equinox.



Earth's Equinox Lighting

This image (not to scale) shows how our planet receives equal amounts of sunlight during equinoxes. Credit: NASA/GSFC/Genna Duberstein

Our Sun shines equally on both the Northern and Southern Hemispheres during equinoxes, which is why they are the only times of the year when the Earth's North and South Poles are simultaneously lit by sunlight. Notably, the length of day and night on the equinox aren't precisely equal; the date for that split depends on your latitude, and may occur a few days earlier or later than the equinox itself. The complicating factors? Our Sun and atmosphere! The Sun itself is a sphere and not a point light source, so its edge is refracted by our atmosphere as it rises and sets, which adds several minutes of light to every day. The Sun doesn't neatly wink on and off at sunrise and sunset like a light bulb, and so there isn't a perfect split of day and night on the equinox - but it's very close.

Earth Viewed During Equinox and Solstice



Scenes of Earth from orbit from season to season, as viewed by EUMETSAT. Notice how the terminator - the line between day and night - touches both the North and South Poles in the equinox images. See how the shadow is lopsided for each solstice, too: sunlight pours over the Northern Hemisphere for the June solstice, while the sunlight dramatically favors the Southern Hemisphere for the December solstice. Images: **NASA/Robert Simmon** Equinoxes are associated with the changing seasons. In March, Northern Hemisphere observers welcome the longer, warmer days heralded by their vernal, or spring, equinox, but Southern Hemisphere observers note the shorter days – and longer, cooler nights - signaled by their autumnal, or fall, equinox. Come September, the reverse is true. Discover the reasons for the seasons, and much more, with <u>NASA</u>.

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:

- BMAC meetings will be held on Zoom until further notice.
- Friday, March 4, 2022 7p Via Zoom Social time 30m before and after meeting. BMACer Brandon Stroupe will be our presenter. His presentation will be "My Astrophotography Process." He will take everyone through how he plans, images, and processes astrophotos from the beginning to the end.
- Friday, April 1, 2022 7p Via Zoom? Social time 30m before and after meeting. Topic TBA.
- ? Friday, May 6, 2022 7p Via Zoom? Social time 30m before and after meeting. Topic TBA. May be cancelled if we have Astronomy Day 2022.
- Friday, June 3, 2022 7p Via Zoom? Social time 30m before and after meeting. Topic TBA.
- Friday, August 5, 2022 7p Via Zoom? Social time 30m before and after meeting. Topic TBA.



- Cancelled until further notice.
- Every clear Saturday & Sunday 3p-3:30p March-October On the Dam
 - View the Sun safely with a white-light & Ha 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:

•Cancelled until further notice.

- April 2, 9, 16, 23 & 30, 2022 8:30p
- October 1 & 8, 2022 7:30p
- October 15, 22, 29 & November 5, 2022 7p
- November 12, 19 & 26, 2022 6p
 - 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.



• All special events are cancelled until further notice.

• Astronomy Day - May 7, 2022 - 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 2022 - Day TBD - 6p?

- Site location will be sent directly to full BMAC members. BMACers and their families are welcome to enjoy an evening of astronomythemed games and activities along with a potluck dinner and observing.
- Please bring a dish to share and bring your own chair.

• StarFest 2022 - November 4, 5 & 6, 2022

- Our 37th 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. 14, 2022 with full payment is mandatory for attendance. Sorry, no walk-ins nor "visits."
- MeadowView Marriott special hotel rate.
- <u>StarFest Link</u>

Regular Contributors:



William Troxel



Greg Penner



Robin Byrne



Adam Thanz



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).

reg Penner is a semi-retired architect living in the Tri-Cities area since 2018. He G 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.



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:



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



- Dues are 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 Association member (which incurs a separate, additional fee), then a 50% reduction in BMAC dues are applied.
- Dues can be paid in many ways. For renewals, you will be sent an email with an invoice and a direct link to pay online. You can also pay by mail, over the phone or in person at the gift shop.

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.