# The Bays Mountain Astronomy Club Newsletter

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# **Cosmic Reflections**

# William Troxel - BMAC Chair



reetings fellow BMACers!

Adam here again. William is not able to be at next

month's meeting, so we're going to have member participation fun! We'll meet in the planetarium theater and it would be great if each of you attending were able to share a nugget of knowledge for that special celestial object of yours.

We'll be looking at the September night sky about an hour after sunset. If each of us can share one to five minutes, we'll have a really nice program! You can point out a constellation, asterism, deep sky object, star, etc. of your choice. You can share a sky story, a scientific fact, a humorous anecdote, a.... It's up to you what you'd like to share!

We can also have Show & Tell again. Please bring something you'd like to share.

Last month's program was fun. We saw the planetarium program "Mars: The Ultimate Voyage" and had an extended Show & Tell session where a few of you shared!

# **BMAC** Notes

# StarFest 2023 Registration Open



earn all about this year's annual StarFest event <u>here</u>. This year's theme is: "Sky Tales - Telling the Stories of the Sky Through the World's Cultures." We've got

a great lineup of speakers, food and more!



This year's great T-shirt art!

# Sky News from the Astronomical League



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 September Night Sky



- **2** Follow the arc of the Dipper's handle. It intersects Arcturus, the brightest star in the September evening sky.
- 3 Nearly overhead shines a star of similar brightness as Arcturus, Vega. Draw a line from Arcturus to Vega. It first meets "The Northern Crown," then the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.
- **4** The stars of the summer triangle, Vega, Altair, and Deneb, shine overhead.
- 5 The westernmost two stars of the Great Square, which lies high in the east, point south to Fomalhaut. The southernmost two stars point west to Altair.

#### Binocular Highlights

- A: On the western side of the Keystone glows the Great Hercules Cluster.
- B: Between the bright stars Antares and Altair, hides an area containing many star clusters and nebulae.
- C: 40% of the way between Altair and Vega, twinkles the "Coathanger," a group of stars outlining a coathanger.
- D: Sweep along the Milky Way for an astounding number of faint glows and dark bays, including the Great Rift.
- E: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

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

### Navegando por el cielo nocturno de Septiembre



- **4** Las estrellas del Triángulo de verano, Vega, Altair y Deneb, brillan en el Cenit.
- 5 Las dos estrellas más al oeste del Gran Cuadro, que se encuentra en el este, apuntan al sur hacia Fomalhaut. Las dos estrellas más al sur apuntan al oeste hacia Altair.

#### Puntos destacados con binoculares

A: En el lado occidental de la Piedra Angular brilla el Gran Cúmulo de Hércules.
B: Entre las brillantes estrellas Antares y Altair, se esconde un área que contiene muchos cúmulos de estrellas y nebulosas.
C: Casi a la mitad de la distancia entre Altair y Vega, Brilla la "Percha," un grupo de estrellas que describe un perchero.
D: Recorre la Vía Láctea en busca de un número asombroso de destellos tenues y bahías oscuras, incluido La Gran Grieta.
E:

Las tres estrellas más occidentales de las "W" de Casiopea apuntan hacia el sur hasta M31, la Galaxia de Andromeda, un óvalo "borroso." **F.** Entre la "W" de Casiopea y Perseo se encuentra el Doble Cúmulo.





#### **ASTRONOMICAL LEAGUE Double Star Activity**





### **Otros Soles: Delta Cephei**

#### Cómo encontrar Delta Cephei en una tarde de Septiembre

Mire hacia el noreste y encuentre a la brillante Deneb, la estrella más al norte de Cisne. Está casi arriba. Entre Deneb y Casiopea en forma de "W" se encuentra la constelación de Cefeo en forma de casa. Encuentra a

Zeta, la estrella inferior izquierda de la "casa". La Delta con brillo debil, esta justo debajo de ella.

A-B separación: 41 sec

amarilla, azul

**Delta Cephei** 

PA: 191° A & B color:

A magnitud: 4.2 B magnitud: 6.1 Ampliación sugerida: >20x, Apertura sugerida: >50 mm



# Stellar Observations

Greg Penner

# Fun Times in our Solar System!



eptember will be a fun time to direct our attention to objects and events in our own Solar System. Saturn has returned to the evening sky, Jupiter rises late-

evening preparing to dominate the night sky in October, Venus achieves maximum brightness, and Mercury has its best dawn appearance of the year. Other than the major planets, some smaller Solar System bodies will also be visible. Periodic comet 103P/Hartley comes into view and begins to brighten enough to be visible in a telescope. Also, while making observations of Saturn, just a star hop away will be an asteroid visible with binoculars or small telescopes.

For observers at our latitude in East Tennessee, Saturn has been frustratingly low in the sky for the last few years, making it difficult to observe over tree-covered hills. During that time, it has been in the range of 30-35 degrees above the horizon at its highest. This year Saturn is positioned in the constellation Aquarius, and it gets as high as 41 degrees above the horizon, continuing to get higher every year through the early 2030s.



Saturn's position over 10 years from 2019-2028 - Stellarium image annotated by author

As was mentioned in the August article, the tilt of Saturn's rings is currently diminishing every year until March 2025, when they will appear edge -on. This year we see the north face of the rings tilted toward us by just 9 degrees. The dark Cassini Division between the A and B rings should be visible at the extreme left and right ends (ansae) of the rings in a telescope under good seeing conditions.



Saturn - Cassini Division - Stellarium image annotated by author

While observing in the vicinity of Saturn, just 7-8 degrees due south you can find the asteroid 8 Flora. Two stars of magnitude +5.5 and two other stars of magnitude +8 and +9 will make it possible to find 8 Flora rather easily. 53 Aquarii and 41 Aquarii are south of Saturn as shown on the accompanying chart. Over the two nights of September 8th and 9th, Flora's location will be about half way between those two stars. During these two nights, Flora will pass very near two stars of 9th and 8th magnitude as shown on the accompanying zoomed in charts. Flora itself will be magnitude 8.5, so it will look just like the two stars it moves past, but you'll know which one is Flora due to its motion over the two nights against the fixed stars. Flora is the seventh brightest asteroid and the innermost large asteroid.



Asteroid 8 Flora's position relative to Saturn - Stellarium image annotated by author

![](_page_16_Picture_0.jpeg)

8 Flora's position on 9/8/23 - Stellarium image annotated by author

![](_page_16_Figure_2.jpeg)

8 Flora's position on 9/9/23 - Stellarium image annotated by author

![](_page_17_Figure_0.jpeg)

8 Flora Orbit - from Wikipedia public domain

Another of the smaller members of the Solar System to look for in September is periodic Comet 103P/Hartley. In September, Hartley will brighten from magnitude +9 to +8. A 4" to 6" telescope should be able to make out the fuzzy comet and perhaps see a tail pointing westward. During the first half of the month, Hartley will pass through the constellation Perseus (best viewed after 11p), and the second half of the month through Auriga (best viewed after midnight or before dawn). Comet Hartley was visited by NASA's Deep Impact spacecraft in 2010, which was able to determine that the comet is 1.4 miles long, "peanut shaped," and spins around one axis while tumbling around a different axis. The comet is also described as "hyperactive" with many jets of carbon dioxide ejecting large particles.

![](_page_19_Picture_0.jpeg)

Comet Hartley location on 9/6/23 - Stellarium image annotated by author

![](_page_20_Picture_0.jpeg)

Comet Hartley location on 9/23/23 -- Stellarium image annotated by author

While on the subject of our Solar System's smaller bodies, an exciting event will be happening in September related to asteroid research! The NASA OSIRIS-REx mission previously gathered samples from the surface of asteroid Bennu in 2020. The spacecraft has been traveling back to Earth with the samples, and on September 24th will enter Earth's atmosphere and parachute down to the Utah desert, where the NASA team will recover it and send it to a clean room at NASA's Johnson Space Center in Houston. Scientists will unpack the samples and distribute to science team members around the world for analysis. Visit this website to see an excellent video illustrating the sample collection and return mission.

![](_page_22_Picture_0.jpeg)

Comet Hartley - image by NASA EPOXI mission, NASA/JPL - CalTech/UMD

Turning our attention to the pre-dawn hours, we will see the two planets inside Earth's orbit show off in the latter half of September. On September 19th, Venus will reach the point of its greatest illuminated extent. Venus' magnitude on that morning will be a brilliant -4.8! The maximum brightness is a result of the combination of the planet's nearness to Earth (about 40 million miles) AND the 27% waxing crescent phase. In the previous weeks it was nearer to Earth (but a thinner crescent), and in the following weeks, it will have more of the surface illuminated (but farther away). On September 19th, it is just the right combination of nearness and illuminated surface area to produce the maximum illumination. Three days later, on the morning of September 22nd, Mercury will reach the point of its greatest morning elongation from the Sun. Mercury will be 18 degrees west of the Sun shining at -0.3 magnitude. Try to get a view of it around 30 minutes before sunrise due east about 10 to 15 degrees above the horizon.

![](_page_24_Figure_0.jpeg)

Mercury and Venus in late September pre-dawn sky - Stellarium image

September will be a great month to appreciate the variety of our Solar System bodies. From huge, majestic gas giant planets to peanut-shaped spinning and wobbling rocks, our Solar System is a remarkable place to call home!

# The Queen Speaks

### Robin Byrne

-

## Book Review: Beyond

n my never-ending quest to read every book about the early space program era, I recently enjoyed Beyond: The Astonishing Story of the First Human to Leave Our Planet and Journey into Space by Stephen Walker. Wordy title? Yes. Worth reading the book? Also, yes.

Unlike some authors I've read recently, Stephen Walker has a degree in the History of Science, and you can tell he understands what he's writing about. And unlike some other authors I've read recently, Walker writes clearly and at a level allowing the reader to also understand.

While the focus of the book is Yuri Gagarin, we are given his story in a much bigger context. We begin with some of the test flights, both Soviet and U.S., that occurred between the first few Sputniks and Gagarin's flight. There were several dog flights that I had never heard about, and many more problems with the Vostok spacecraft that are not usually mentioned.

![](_page_28_Picture_0.jpeg)

#### Cover to Beyond

We also meet several people involved with the Soviet space program, from engineers to those who handled the dogs, as well as the medical staff. Walker interviewed many of the individuals involved to get their firsthand story, and that greatly enhances the narrative.

We also see what's happening simultaneously in America, with Kennedy just recently elected president and more focused on Cuba and Castro then on NASA and astronauts. We also learn about some of the politics behind America's slow progress, with excessive caution being recommended, ultimately leading to a long enough delay in Alan Shepard's flight that he would not be the first man in space.

Meanwhile, on the Soviet side, if anything, we see a total lack of caution. While the spacecraft repeatedly had serious issues that could have resulted in the death of the cosmonaut, Khrushchev and Korolev set a very definite time frame for their first manned flight, no matter what. Having the advantage of secrecy surrounding every flight, if something did go wrong, they would simply not make that information public. NASA, meanwhile, was very aware that if Shepard's flight had a problem, it would be broadcast live on television for all to see, effectively killing the U.S. space program.

We also explore the parallels and differences between the American and Soviet men chosen to go into space, how they were treated, and how they were trained. America's Mercury 7 astronauts were experienced test pilots, treated like celebrities, showered with luxuries, while undergoing extremely rigorous training to make sure they knew every detail of their spacecraft and were prepared for every possible problem. In contrast, the original group of cosmonauts were much younger and less experienced pilots. Their identities were kept a secret - even their wives were not supposed to know what they were training for. And how they were trained was very different, too. They were not expected to fly their spacecraft, just to be passengers of the totally automated system, no different from the dogs that flew into space. So their training was almost exclusively focused on being physically fit, with very minimal information about the

spacecraft - what few instruments were even available for the cosmonaut to use. Even the training for what to do in case of a system failure was literally done last minute. The day before Gagarin's flight, he and his two backups got 1 hour of training on the procedure.

Once launch day arrives, we follow not only Gagarin throughout the day, but also various members of his family (who knew nothing about what was going to happen) and the people on the ground who were involved in the flight. This section of the book went into more details about his flight than I had seen before, making for interesting reading. Once Gagarin lands, we see, thanks to more interviews by the author, the reactions of the people who were near where his spacecraft landed and the field where he parachuted down separately. We also experience the rapid shift in Gagarin's status. At first, he is this unknown, strangely-dressed person trudging through a field, asking for a horse and cart to take him to the nearest telephone to notify the authorities of his location. In a matter of a few hours, he finds

himself surrounded by adoring crowds, as the news of his success and identity became public.

Then the American reaction is explored, especially that of President Kennedy. Between being beaten again by the Soviets, plus the Bay of Pigs fiasco, Kennedy was desperate for something positive and a way to get ahead of the Soviets. It was at this point that he became a supporter of the plan to send a man to the Moon.

The book closes with brief summaries of the lives of the key players in the story over the years after Gagarin's flight. Sadly, many of them ended too soon.

If you enjoy reading about the exploits of the people involved in the early stages of sending men into space, then you will want to read Beyond: The Astonishing Story of the First Human to Leave Our Planet and Journey into Space by Stephen Walker. You won't regret it.

### References:

Beyond: The Astonishing Story of the First Human to Leave Our

Planet and Journey into Space by Stephen Walker;

HarperCollins Publishers, 2021

# The Space Place MASA Night Network

Brian Kruse

# Looking Beyond the Stars

![](_page_35_Picture_1.jpeg)

ooking up in awe at the night sky, the stars and planets pop out as bright points against a dark background. All of the stars that we see are nearby, within our own Milky Way Galaxy. And while the amount of stars visible from a dark sky location seems immense, the actual number is measurable only in the thousands. But what lies between the stars and why can't we see it? Both the Hubble Space Telescope and the James Webb Space Telescope (Webb) have revealed that what appears as a dark background, even in our backyard telescopes, is populated with as many galaxies as there are stars in the Milky Way.

![](_page_36_Picture_0.jpeg)

NASA's James Webb Space Telescope has produced the deepest and sharpest infrared image of the distant Universe to date. Known as Webb's First Deep Field, this image of galaxy cluster SMACS 0723 is overflowing with detail. This slice of the vast Universe is approximately the size of a grain of sand held at arm's length by someone on the ground. (**Image Credit: NASA**, **ESA, CSA, STScI**). [Ed: the bright stars with the starburst effect are stars in our own galaxy. Everything else in the image are very distant galaxies.]

So, why is the night sky dark and not blazing with the light of all those distant galaxies? Much like looking into a dense forest where every line of sight has a tree, every direction we look in the sky has billions of stars with no vacant spots. Many philosophers and astronomers have considered this paradox. However, it has taken the name of Heinrich Wilhelm Olbers, an early 19th century German astronomer. Basically, Olbers' Paradox asks why the night sky is dark if the Universe is infinitely old and static - there should be stars everywhere. The observable phenomenon of a dark sky leads us directly into the debate about the very nature of the Universe - is it eternal and static, or is it dynamic and evolving?

It was not until the 1960s with the discovery of the Cosmic Microwave Background that the debate was finally settled, though various lines of evidence for an evolving Universe had built up over the previous half century. The equations of Einstein's General Theory of Relativity suggested a dynamic Universe, not eternal and unchanging as previously thought. Edwin Hubble used the cosmic distance ladder discovered by Henrietta Swan Leavitt to show that distant galaxies are moving away from us - and the greater the distance, the faster they're moving away. Along with other evidence, this lead to the recognition of an evolving Universe.

The paradox has since been resolved, now that we understand that the Universe has a finite age and size, with the speed of light having a definite value. Here's what's happening - due to the expansion of the Universe, the light from the oldest, most distant galaxies is shifted towards the longer wavelengths of the electromagnetic spectrum. So the farther an object is from us, the redder it appears. The Webb telescope is designed to detect light from distant objects in infrared light, beyond the visible spectrum. Other telescopes detect light at still longer wavelengths, where it is stretched into the radio and microwave portions of the spectrum. The farther back we look, the more things are shifted out of the visible, past the infrared, and all the way into the microwave wavelengths. If our eyes could see microwaves, we would behold a sky blazing with the light of the hot, young Universe - the Cosmic Microwave Background.

![](_page_39_Figure_0.jpeg)

The oldest light in the Universe, called the cosmic microwave background, as observed by the Planck space telescope is shown in the oval sky map. The cosmic microwave background was imprinted on the sky when the Universe was just 380,000 years old. It shows tiny temperature fluctuations that correspond to regions of slightly different densities, representing the seeds of all future structure: the stars and galaxies of today. (Image credit: ESA and <u>the Planck Collaboration - D. Ducros</u>) The next time you look up at the stars at night, turn your attention to the darkness between the stars, and ponder how you are seeing the result of a dynamic, evolving Universe.

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:

![](_page_42_Picture_1.jpeg)

### MAC Meetings:

- Friday, September 1, 2023 7p "Sharing the Night Sky" and Show & Tell.
- Friday, October 6, 2023 7p BMACer Robin Byrne will present "Vera Rubin: The Woman and the Observatory."
- Friday, December 1, 2023 7p Topic TBA.
- Friday, February 2, 2024 7p Topic TBA.
- Friday, March 1, 2024 7p Topic TBA.
- Friday, April 5, 2024 7p Topic TBA.
- Friday, May 3, 2024 7p Topic TBA.
- Friday, June 7, 2024 7p Topic TBA.
- Friday, August 2, 2024 7p Topic TBA.

![](_page_43_Picture_0.jpeg)

- 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.

![](_page_43_Picture_4.jpeg)

#### tarWatch:

- October 7 & 14, 2023 7:30p
- October 21, 28 & November 4, 2023 7p
- November 11, 18 & 25, 2023 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.

![](_page_44_Picture_0.jpeg)

![](_page_44_Picture_1.jpeg)

#### • StarFest 2023 - November 3, 4 & 5, 2023

- Our 38th annual astronomy convention / star gathering for the Southeast United States. Three days of astronomy fun, 5 meals, 3 keynote speakers, unique T-shirt and more!
- Pre-registration by Oct. 13, 2023 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 2024 - Day & Time TBD

• Look for an e-mail with the latest information.

### • 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.

# **Regular Contributors:**

![](_page_45_Picture_1.jpeg)

William Troxel

![](_page_45_Picture_3.jpeg)

Greg Penner

![](_page_45_Picture_5.jpeg)

Robin Byrne

![](_page_45_Picture_7.jpeg)

Adam Thanz

![](_page_45_Picture_9.jpeg)

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.

![](_page_45_Picture_12.jpeg)

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

![](_page_46_Picture_5.jpeg)

- 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.