The Bays Mountain Astronomy Club Newsletter

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Cosmic Reflections

William Troxel - BMAC Chair



reetings fellow BMACers!

May is upon us again. Before I talk about May, I want

to do a big shout out to our guest speaker and her team from ETSU for their wonderful presentation. I have included a picture of them in this issue. If you missed them, you missed a very nice presentation. I am hopeful that they will come back in the future with another presentation as they continue their research. I also want to send out congrats to the winners of the April challenge question winners. See their picture in this issue as well. I also want to thank and welcome all of our visitors from this last meeting. I hope you were able to meet them.

I opened with saying that May is upon us and it is. Of course, May is our Annual Student Project month meeting when we welcome the students from the area to come share their projects. It is always a wonderful meeting for me because I think they are all so good. I think each of you enjoy the May meeting



Dr. Erba and her research students, Grace Anderson and Trevor Cox. Image by William Troxel. as well because your comments are always so positive after the students complete their presentations. This year, we will be welcoming students from North Greene County High School and King University. Our plan is to have some tables out in the lobby for the students to set up after the meeting where they will present their project and then we can look at them in the lobby. I hope you can come out and support the students and make them feel welcome.

The annual Astronomy Jeopardy Challenge will be in June along with the election of the Chairman of the club for the 2023/2024 club year. If you were considering putting your name in the running, you'll need to be a club member for a few years and part of the City's Volunteer Program for astronomy outreach. If you have any questions I will be happy to answer them if I can.



The winners of the April Challenge Question. Greg Penner, Robin Byrne and Tom Rutherford. Image by William Troxel. I also wanted to remind you about the changes to the Challenge Questions' ongoing program. Each month, there will point assigned to the question and if you get the correct response you will be awarded the points. Then, at the annual club game, we will be split up into three teams. Each of the winning team members will get the points. At the annual dinner, the club member with the highest number of points will get a certificate. I would like to ask your opinion. Should we have second and third place winners as well? Be thinking about this and share them with me.

Thank you again, Dr. Erba and her students for coming and sharing their work!

Again, thank you and I look forward to seeing you at the MAY BMAC meeting!

Until then... Clear Skies!

BMAC Notes

Passing of Longtime BMAC Member



MACer John Hay recently passed away after an extended illness.

His obituary states that John grew up in Kingsport and graduated from Dobyns-Bennett High School in 1976. After earning a Bachelor's Degree in Biology at King College he completed Master's degrees in Zoology and City and Regional Planning at Clemson University.

He later returned to live in Kingsport and was active in First Presbyterian Church, serving as a Deacon and playing in the Bell Choir. John loved spending time outdoors and studying nature in all its forms, but he was, above all, an avid birder. John traveled widely to spot and observe as many species as possible. Often seen with his binoculars, he was extremely knowledgeable and was excited to share his knowledge with anyone who was interested.



John Hay helping with the 2012 Venus Transit public viewing on the ETSU campus.

Stellar Observations

Greg Penner

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Happy Star Wars Day!



s the month of May is upon us, we have arrived at a fun, unofficial holiday on May the 4th... Star Wars Day! To celebrate this auspicious occasion, let's take a look at how some of the recent exciting discoveries in

astronomy might bring the fantasy worlds of the Star Wars universe closer to reality. [Ed.: Fantasy?...:)]

Many discoveries of exoplanets in our Milky Way galaxy have similarities to planets or moons imagined in Star Wars. Let's take a look at some of the planets that have been discovered using instruments such as NASA's Kepler Space Telescope.

Kepler-16b was the Kepler telescope's first discovery of a planet in a "circumbinary" orbit, circling two stars, as opposed to one star in a double-star system. This means that if someone was on the surface of Kepler-16b, they would see 2 suns in the sky, just as on Luke Skywalker's home planet, Tatooine. Unfortunately, scientists say the planet is at the very outer edge of the host star's habitable zone, meaning Kepler-16b is likely a gaseous surface. However, researchers say the gaseous planet possibly could have a rocky moon from which a Tatooine-like double sunset could be observed.



Kepler-16b (Tatooine) - Credit: NASA

OGLE-2005-BLG-390 is a planet discovered in 2005 that NASA has nicknamed "Hoth," after the icy world in the opening scenes of "The Empire Strikes Back." This planet, located near the center of the Milky Way, was discovered using the microlensing technique in which backlighting from a distant star is used to reveal planets around a star closer to us. The "Hoth" nickname comes about because the surface temperature is estimated to be -364 degrees Fahrenheit. Orbiting a red star 5 times less massive than our Sun, the planet is about 5 times as massive as Earth with a rocky surface buried underneath a frozen ocean. OGLE could be described as a massive version of Pluto.



OGLE-2005-BLG-390 (Hoth) - Credit: European Southern Observatory

HIP 11915 is a particularly interesting star to scientists because it is virtually a twin to our own Sun. A G-type main-sequence star located about 190 light years from Earth, the star's name comes from its entry number 11915 in the Hipparcos Catalogue. This star is only 500 million years younger than the Sun and contains a Jupiter-like planet called HIP 11915b at about the same distance as Jupiter is from the Sun. Research also indicates there could be one or more terrestrial planets in the inner parts of the system, making this solar system the most similar to our own that has yet been discovered. Perhaps the Jupiter-like planet HIP 11915b resembles the planet Bespin from "The Empire Strikes Back," in which a cloud city is mining elements from the atmosphere.



HIP 11915b (Bespin) - Credit: European Southern Observatory

Kepler-10b was the first rocky exoplanet discovered by the Kepler telescope and is 20 times closer to its Sun than Mercury is to our Sun and takes less than one Earth day to orbit. The daytime temperature is expected to be about 2,500 degrees Fahrenheit, hotter than lava flows on Earth. Of course this conjures up images of the light saber fight between Obi-Wan and Anakin on the planet Mustafar!



Kepler-10b (Mustafar) - Credit: NASA/Kepler Mission/Dana Berry

Kepler-22b was the first transiting planet to be discovered within the habitable zone of a Sun-like star, where liquid water could exist on the surface. One of the scientists on the Kepler Space Telescope Project has speculated that if the planet has a small, rocky core covered by an ocean, it is not beyond the realm of possibility that life could exist in such an ocean. This possibility has caused SETI to focus on this world and other similar planets to search for alien life. This ocean-covered world recalls the planet Kamino from "Attack of the Clones," in which Obi-Wan Kenobi is searching for answers to an assassination plot.



Kepler-22b (Kamino) - Credit: NASA

May the 4th is a fun intersection of science fiction and science reality as we see the imaginative worlds of Star Wars potentially begin to take shape right here in our own galaxy instead of a galaxy far, far away! Our household gets into the Star Wars spirit by dressing up our dogs with some fun costumes. May the 4th be with you!



Darth Vader and Yoda - Credit: Greg Penner

The Queen Speaks

Robin Byrne

Happy Birthday Ruby Payne-Scott



his month we celebrate the life of a trailblazer, in more ways than one. Ruby Payne-Scott was born in <u>Grafton, New South Wales, Au</u>stralia on May 28,

1912. When she was 9 years old, Ruby moved to Sydney to stay with her aunt while attending the Penrith Public Primary School, Cleveland-Street Intermediate Girls' High School, and, finally, Sydney Girls High School. She finished these endeavors with honors in botany and mathematics.

Thanks to being awarded two scholarships, in 1928, at the age of 16, Ruby entered Sydney University to major in Physics. She became only the third woman to earn a physics degree from the university, graduating yet again with honors, this time in physics and mathematics. Ruby stayed on to study medical physics, doing research at the Cancer Research Institute, located at the university. She received her Masters of Science Degree in 1936.

After graduation, Ruby continued with her research, studying the effects of Earth's magnetic field on living organisms. Working with William H. Love at the Cancer Institute, they subjected chicken embryos to magnetic fields of varying strengths, up to 5000 times the strength of Earth's magnetic field. No differences in the development of the chickens occurred. This disproved various myths concerning the benefits or harm caused by Earth's magnetism. When the cancer research project shut down, Ruby had trouble finding any other place willing to hire a female physicist, so she returned to school, earning an Education degree in 1938. For the next year, Ruby worked as a secondary school teacher.

With the start of World War II in 1939, job opportunities for anyone with degrees in science opened up. Amalgamated Wireless Australasia ran all two-way radio communications in Australia, manufactured the equipment used, and they were a major employer of physicists. Ruby was the first female physicist they ever hired, though her initial job there was as a librarian. Ruby quickly changed her "librarian" position into much more. She became the editor of the journal they published, then started doing some research in the standards lab, ultimately becoming a full-time physicist for the company. Ruby performed research in electrical engineering and was placed in charge of the measurements lab. By 1941, though, she became unsatisfied and left.

On August 18, 1941, Payne-Scott became one of only two women working at the Commonwealth Scientific and Industrial Research Organization (CSIRO). Her position was in the radiophysics lab. Here, she performed research on top-secret projects related to radar technology. It turns out that the tropical weather of the region made radar systems that worked well in Europe, ineffective in Australia. Ruby developed techniques to distinguish between aircraft and other sources of signals in the radar static. Payne-Scott became an expert in detecting aircraft, in particular, Japanese fighter planes, allowing early detection of enemy aircraft from larger distances. Ruby accomplished all of this despite the early reservations of her supervisor, who wrote in an evaluation, "Well, she's a bit

loud and we don't think she's quite what we want and she may be a bit unstable, but we'll let her continue and see how she works out."

In 1944, Ruby married William Hall. They shared much in common, including some radical views. They were environmentalists, feminists, atheists, and socialists (Payne-Scott had already been nicknamed "Red Ruby" by her colleagues, and unbeknownst to her, was under investigation for several years in an attempt to prove she had communist ties - she didn't). Their marriage posed a problem, though - women working for the government were required to guit their jobs when they married. Because the work Payne-Scott did was so vital to the country, her colleagues helped to keep her marriage secret, while she wore her wedding band on a chain around her neck.



Ruby Payne-Scott, Australian radio astronomer. Image from Peter Hall.

In 1944, with the war showing signs of ending, Payne-Scott and others began looking into possible applications of their work outside of the war effort. An article suggesting that some radio noise was produced by the Sun inspired Payne-Scott, Joe Pawley, and Lindsay McCready to perform the first radio astronomy observations of the Sun. They published an article in 1945 showing a connection between sunspots and increased radio signals from the Sun. Over the next two years, Payne-Scott discovered what are now known as Type I and Type III solar outbursts from the corona. Payne-Scott also developed the first radio interferometer, which was used to pinpoint the sources of the radio outbursts.

By 1950, Payne-Scott's secret marriage became an issue. At first, to circumvent the law, Payne-Scott had told people that she and William Hall were living together but not married (pretty scandalous for the time). Eventually, she told her employers the truth about being married as part of a series of correspondences concerning her push for equal pay for women and to change the policy that demotes married women to a "temporary" job status. Sadly, her arguments had no effect, other than to lose her pension and full-time employment.

On July 20, 1951, Payne-Scott gave 2-days notice that she was quitting to have a baby. Maternity leave didn't exist at the time, so this was her only option. On November 20, her son, Peter, was born. This was when Ruby also changed her name to Ruby Hall, since she no longer had to hide her marriage. Two years later, their daughter, Fiona, was born. When Fiona was 10, Ruby returned to her earlier teaching career, taking a job teaching math and science at Danebank School. She remained at the school for eleven years before retiring in 1974.

Sadly, Ruby developed Alzheimer's rather early in life, and passed away just 3 days prior to her 69th birthday, on May 25, 1981. However, Ruby's legacy lives on in many ways. The CSIRO created the Payne-Scott Awards "for researchers returning from family-related career breaks" to help them reconnect to colleagues and become reestablished in their area of research. Danebank School hosts an annual event, called the Ruby Payne-Scott Lecture, with presentations by female scientists. The University of Sydney established the Payne-Scott Professorial Distinctions award to honor professors for their contributions to leadership, teaching, and research.

Pioneer in radio astronomy, trailblazer for women in science, early advocate for women's rights, Ruby Payne-Scott was at the forefront of so many endeavors, yet her name is not well known. That needs to change. As we approach solar maximum, enjoy the sunspots and prominences, but also take a moment to salute the woman who first studied their radio properties: Ruby Payne-Scott.

References:

Ruby Payne-Scott - Wikipedia

Ruby Payne-Scott [1912-1981] By Colin Ward; March 23rd, 2011

Overlooked No More: Ruby Payne-Scott, Who Explored Space With Radio Waves By Rebecca Halleck - New York Times, August 29, 2018

The Space Place MASA Nights

Metwork

David Prosper

The Bays Mountain Astronomy Club Newsletter

Note: No Article This Month



orry, there isn't an article this month from the <u>Network. There should be one next month.</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:

- Friday, May 5, 2023 7p Students from North Greene County High School and King University will present their science projects. The monthly challenge question follows.
- Friday, June 2, 2023 7p Astronomy Jeopardy. This will be a full game. There will be 3 rounds and winners will receive an additional 4,000 points!
- Friday, August 4, 2023 7p Topic TBA.
- Friday, September 1, 2023 7p Topic TBA.
- Friday, October 6, 2023 7p Topic TBA.
- Friday, December 1, 2023 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:

- April 1, 8, 15, 22 & 29, 2023 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 - April 29, 2023 - 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 2023 - Day & Time TBD

 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.

• 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.

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:

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.