

The ECLIPSE

July
2020

The Newsletter of the Barnard-Seyfert Astronomical Society

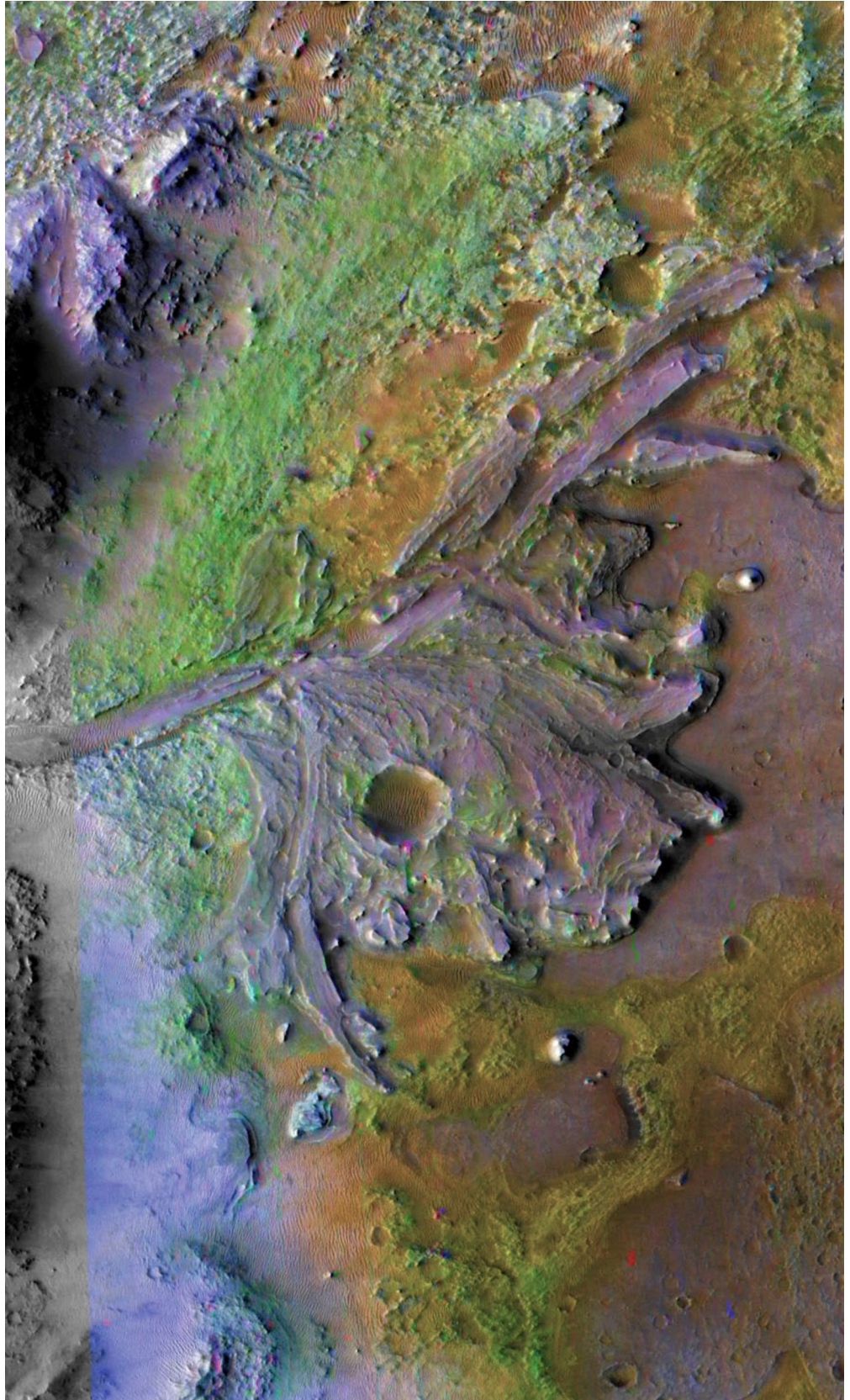
Next Membership Meeting:

July 15, 7:30 pm
Online meeting:
"You Can Almost Touch the Stars"

Details on page 9.

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From the President

As things start opening up, we are getting more and more questions about when we will start back up with star parties and meetings. I thought I would use this time to address those questions. Let me start with the meetings. The Adventure Science Center has opened up slowly but as of this print time, they are not allowing after hours events, per city and county guidelines. So that means no meetings for now. I think as they open up according to their safety plan and city guidelines, we may be able to meet in the next couple of months. I can't promise anything, and I can't speak for the ASC, this is just my feeling. We have planned our August meeting to be available in-person or online so we will have some sort of August meeting.

As far as star parties, we are at the mercy of the parks that host us and most of them are still not up to star parties. Just like with the ASC, they are opening slowly. We are in contact with the parks as our scheduled dates come up and we will see what happens. Like the meetings, I think August will be the month we get at least one star party. They may be sporadic for a while, but they will pick up as the year moves on.

Look for email announcements and/or Facebook posts about meetings and star parties. Those methods remain the best and quickest way for us to get information to you and to the public. It has been a long time since we had the opportunity for fellowship at a meeting or star party and I know a few of you are looking forward to the time we can get back to normal. Let's hope that things keep opening up safely.

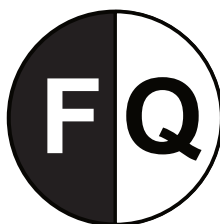
Keep staying safe.

Clear skies,

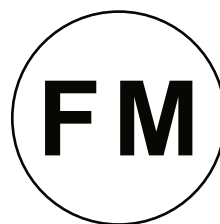
Keith Rainey



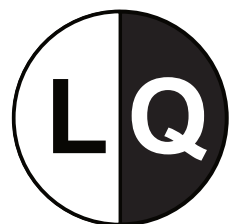
July 20
Aug 18



July 27
Aug 25



July 4
Aug 3



July 12
Aug 11

Happy Birthday Harrison Schmitt by Robin Byrne

This month, we celebrate the life of a man whose varied careers have taken him many places, including the Moon! Harrison Hagan Schmitt (Jack to his friends) was born July 3, 1935 in Santa Rita, New Mexico, and grew up in Silver City, NM, where he went to Western High School.

After graduating high school in 1953, Jack went to the California Institute of Technology, where he majored in geology. He graduated in 1957 with a Bachelors of Science degree. For the next year, Jack lived in Oslo, Norway, working for the Norwegian Geological Society, studying the geology of Norway's west coast, while attending the University of Oslo. He then returned to the United States to attend Harvard University, where, while working on his doctorate, he taught a course on ore deposits. Dr. Schmitt received his PhD in geology in 1964, with a dissertation based on the work he conducted in Norway.



Upon graduation, Jack, in the hopes of getting a job, wrote to Eugene Shoemaker, the lead geologist training astronauts for the upcoming lunar missions. Shoemaker was actually going to contact Jack to offer him a position because of Jack's superb U. S. Geological Survey exam results. So it was that Dr. Harrison Schmitt went to work for the U. S. Geological Survey's Astrogeology Center in Flagstaff, Arizona. With the space program now focused on going to the Moon, Jack helped develop geological field techniques the astronauts could use on the lunar surface. Part of the job included mapping of the Moon, as well as, training the astronauts while on geological field trips. That same year, Jack heard that the National Academy of Sciences was looking for people to volunteer to be scientist-astronauts. Jack said in an interview, "I thought about 10 seconds and raised my hand and volunteered. Primarily because I felt—I can remember feeling, at the time, that if I didn't volunteer, no matter what happened to my application, that I'd almost certainly regret it when human beings actually went to the moon."

In June of 1965, Dr. Schmitt was selected by NASA as part of a group of scientist-astronauts. This was the first time astronauts were chosen who weren't test pilots, so that meant they needed to learn to fly. For the next year, Jack and his fellow scientist-

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Harrison Schmitt, continued

astronauts trained at Williams Air Force Base in Arizona. There they learned to be jet pilots. Dr. Schmitt ultimately logged over 2100 hours of flight time, with 1600 hours in jets.

Once the pilot training was complete, Dr. Schmitt returned to NASA, again performing duties related to training the other astronauts in geologic techniques to use on the Moon. Once the lunar landing missions began, Jack helped in the study of the lunar rock samples that were brought back and participated in debriefing the crews about their observations of the Moon's surface.

In March 1970, Jack Schmitt became the first of the scientist-astronauts to be assigned to a crew. Along with Richard Gordon and Vance Brand, Schmitt was assigned to the back-up crew for Apollo 15. During this time, Schmitt, as the back-up Lunar Module Pilot, learned all he could about both the Command Module and the Lunar Module. The way crews were assigned, the back-up crews would then be the prime crew 3 missions later, meaning that Schmitt would be flying on Apollo 18. However, due to budget cuts, Apollo's 18 and 19 were cancelled. The scientific community pressured NASA to include a scientist-astronaut on at least one mission before the program ended. Although Deke Slayton, head of the Astronaut Office, had already assigned Eugene Cernan, Joe Engle, and Ron Evans as the crew for Apollo 17, he was pressed to make a switch. So Harrison Schmitt replaced Joe Engle as the Lunar Module Pilot for Apollo 17.

On December 7, 1972, Apollo 17 launched from the Kennedy Space Center and began their journey to the Moon. Four days later, Eugene Cernan and Harrison Schmitt became the last two people to land and walk on the Moon. During their three days on the lunar surface, Schmitt collected one of the most interesting lunar samples, Troctolite 76535, which is the oldest, unaltered lunar rock brought back from the missions. It also holds evidence that the Moon once had a magnetic field. The region where they landed, Taurus-Littrow, was thought to have once been a region of volcanic activity. Proof of volcanism was found by Schmitt when he discovered "orange glass" in the soil, which was likely caused by volcanic activity. Describing what it looked like on the Moon, Schmitt said in an interview, "The orange soil never looks as orange to you in a picture as it did to us while we were on the moon." In addition to achieving scientific breakthroughs, Schmitt and Cernan also had moments of levity while on the Moon, including singing "While Strolling Through the Park One Day," but changing "park" in the lyrics to "moon." On December 19, the Apollo 17 crew returned safely to Earth and brought the Apollo program to an end. As the last, and most ambitious of the Apollo missions, Apollo 17 set many records: Longest lunar mission flight (301 hours), longest time spent walking on the Moon (a total of 22

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Harrison Schmitt, continued

hours over the course of 3 excursions), and most lunar samples returned (250 pounds).

After the conclusion of his mission, Jack continued to work for NASA, documenting the returned samples and geologic discoveries. He continued on in a variety of administrative positions, too, including organizing the Energy Program Office, Chief of Scientist-Astronauts, and Assistant Administrator for Energy Programs. That last position included coordinating support from NASA to other agencies that were applying aeronautics and other space technologies to various aspects of the energy industry on Earth.

In August, 1975, Dr. Schmitt retired from NASA to pursue something he had always felt compelled to do: run for political office. Harrison Schmitt ran for the U. S. Senate, representing New Mexico, and was elected in 1976. For the next 6 years, Schmitt represented his home state, and served on a variety of committees, including: Chairman of the Science, Technology, and Space Subcommittee, as well as a member of the Commerce, Banking, Appropriations, Intelligence, and Ethics Committees. Despite his successful time as a senator, he was criticized for not focusing enough on local issues, and was defeated in his run for reelection in 1982.

After leaving politics, Schmitt remained active in a wide variety of ways. He has worked as a consultant in areas related to business, geology, space, and public policy. He has held a teaching position at the University of Wisconsin, teaching a course about resources from space. In 1997, Schmitt proposed an initiative titled Interlune InterMars, in support of mining the Moon for helium-3 to be used in fusion reactors.

In 2005, Schmitt was named chair of the NASA Advisory Council, providing technical advice to the NASA Administrator. He was also a member of the Planetary Society. In 2008, he resigned from both. In the case of the Planetary Society, he cited a difference of opinion regarding their push for manned exploration of Mars (Schmitt prefers a return to the Moon) and their stance on global warming. Schmitt has been a vocal proponent of the idea that climate change is due to natural, rather than man-made, factors, believing that the issue has been manufactured for political purposes.

Currently, Dr. Schmitt splits his time between his homes in New Mexico and Minnesota. In 2006, he wrote a book titled "Return to the Moon: Exploration, Enterprise, and Energy in the Human Settlement of Space." He is involved in local civic projects, and enjoys a variety of outdoor activities, including skiing, fishing, and hiking.

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Harrison Schmitt, continued

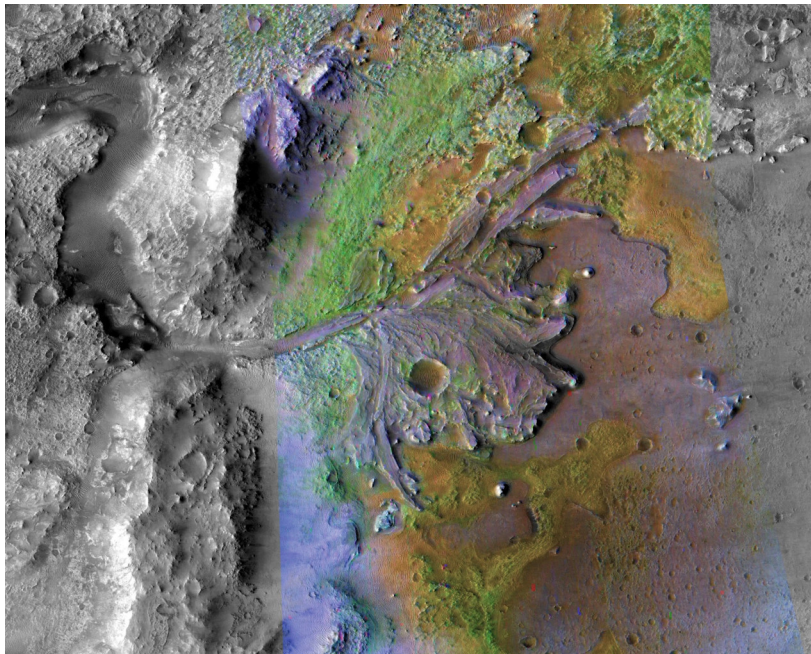
I had the great fortune to meet Dr. Schmitt at a planetarium conference in 2015, where he was the keynote speaker. I was most impressed with how generous he was with his time, talking with everyone after the presentation, and happily posing for pictures with anyone who asked. We all avoided discussing climate change, but, instead, focused on his astronaut career. Whether you agree with his views or not, Harrison “Jack” Schmitt has led a life full of noteworthy accomplishments, and for that we can wish him the happiest of birthdays.

References:

[Harrison Schmitt - Wikipedia](#)

[Biographical Data Lyndon B. Johnson Space Center Harrison H. Schmitt](#)

[Harrison Schmitt: Geologist on the Moon by Elizabeth Howell, April 23, 2013](#)



On the cover: This image is of Jezero Crater on Mars, the landing site for NASA's Mars 2020 mission. It was taken by instruments on NASA's Mars Reconnaissance Orbiter (MRO), which regularly takes images of potential landing sites for future missions.

On ancient Mars, water carved channels and transported sediments to form fans and deltas within lake basins. Examination of spectral data acquired from orbit show that some of these sediments have minerals that indicate chemical alteration by water. Here in Jezero Crater delta, sediments contain clays and carbonates.

The image combines information from two instruments on MRO: the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) and the Context Camera (CTX). The Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland, led the work to build the CRISM instrument and operates CRISM in coordination with an international team of researchers from universities, government and the private sector. Malin Space Science Systems in San Diego built and operates CTX.

NASA's Jet Propulsion Laboratory, a division of Caltech in Pasadena, California, manages the Mars Reconnaissance Orbiter Project for NASA's Science Mission Directorate, Washington. Lockheed Martin Space Systems, Denver, built the orbiter and collaborates with JPL to operate it.

Credit: [NASA/JPL-Caltech/MSSS/JHU-APL](#)

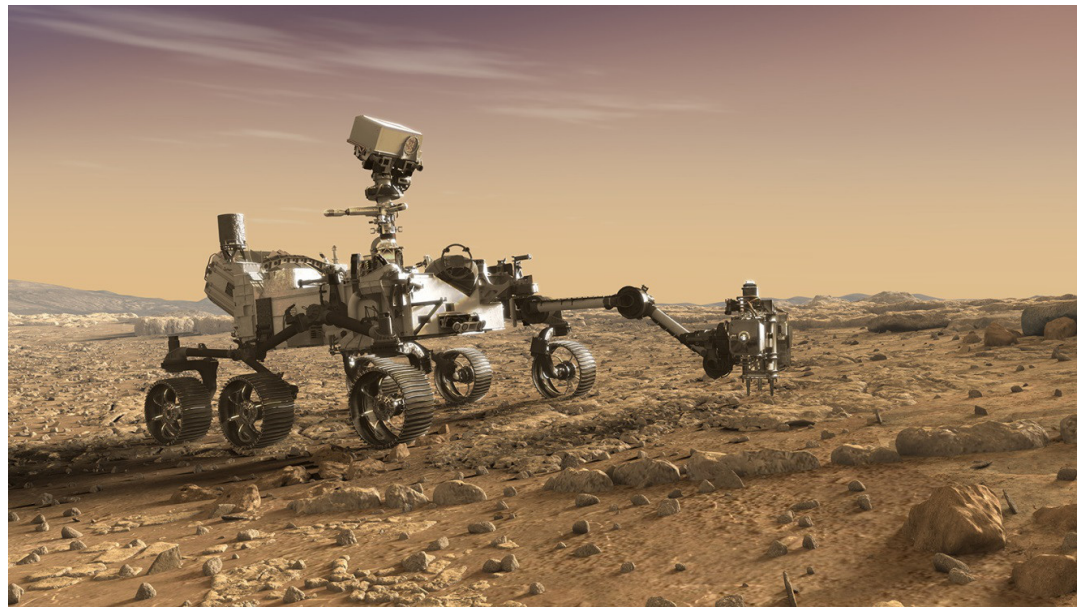
Mars's Latest Visitor: NASA's Perseverance Rover by David Prosper

NASA's latest Mars rover, Perseverance, is launching later this month! This amazing robot explorer will scout the surface of Mars for possible signs of ancient life and collect soil samples for return to Earth by future missions. It will even carry the first off-planet helicopter: Ingenuity. Not coincidentally, Perseverance will be on its way to the red planet just as Mars dramatically increases in brightness and visibility to eager stargazers as our planets race towards their closest approach in October of this year.

Perseverance's engineers built upon the success of its engineering cousin, Curiosity, and its design features many unique upgrades for a new science mission! In February of 2021, Perseverance will land at the site of an ancient river delta inside of Jezero Crater and ready its suite of seven primary scientific instruments.

The rover will search for traces of past life, including possible

Martian fossils, with WATSON and SHERLOC, two advanced cameras capable of seeing tiny details. The rover also carries an amazing instrument, SuperCam, to blast rocks and soil outside of the rover's reach with lasers to determine their chemical makeup with its onboard suite of cameras and spectrometers. Perseverance will also take core samples of some of the most promising rocks and soil, storing them for later study with its unique caching system. Future missions will retrieve these samples from the rover and return them for detailed study by scientists on Earth. Perseverance also carries two microphones so we can hear the sounds of Mars and the noises of its instruments at work. It will even launch a small helicopter - Ingenuity - into the Martian atmosphere as a trial for future aerial exploration!

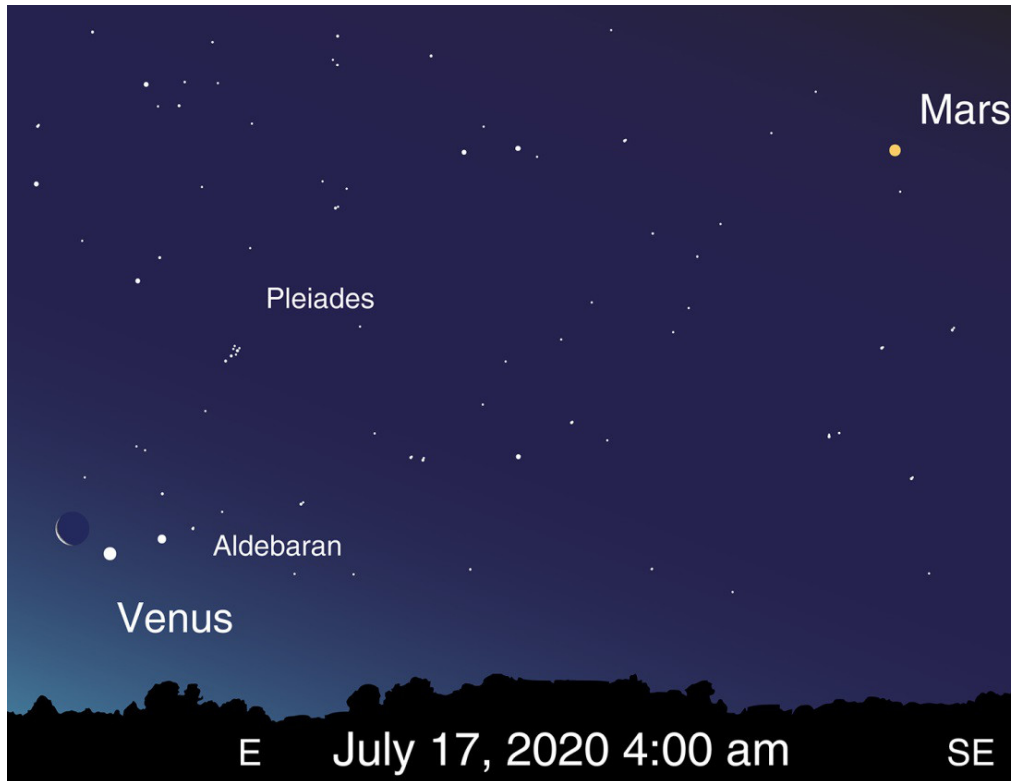


Perseverance inspects a cluster of interesting Martian rocks with its instruments in this artist rendering by NASA JPL/Caltech

Would you like to contribute to Mars mission science? You can help NASA's rover drivers safely navigate the Martian surface by contributing to the AI4Mars project! Use this tool to label terrain features on photos taken of the Martian surface by NASA missions to help train an artificial intelligence algorithm to better read their surrounding landscape: bit.ly/AI4Mars

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Perseverance, continued



The launch of Mars Perseverance is, as of this writing, scheduled for July 20, 2020 at 9:15am EDT. [Editor's note: as of publication the launch will be no earlier than July 30]. More details, updates, and livestreams of the event are available on NASA's official launch page at bit.ly/Mars2020Launch.

Dig deep into the science of the Mars 2020 mission and the Perseverance rover at mars.nasa.gov/mars2020/. Find out even more about past, present, and future Mars missions at nasa.gov.

Observe Mars yourself over the next few months! Mars can be found in early morning skies throughout July, and by the end of the month will rise before midnight. Mars gradually brightens every night until the close approach of Mars in October. The pre-dawn skies of July 17 present an especially nice view, as the waning crescent Moon will appear near Venus and Aldebaran.

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 nightsky.jpl.nasa.gov to find local clubs, events, and more! You can catch up on all of NASA's current and future missions at nasa.gov. With articles, activities and games NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

There was no BSAS member meeting in June.

Next Membership Meeting:

Wednesday July 15, 7:30 pm Central
online on Zoom

Tom Field: *"You Can Almost Touch the Stars"*

Even if you wanted to touch a star, they're all impossibly distant. Despite these great distances, astronomers have learned an enormous amount about stars. How? The most common method to study the stars is called spectroscopy, which is the science of analyzing the colorful rainbow spectrum produced by a prism-like device.

Until recently, spectroscopy was too expensive and too complicated for all but a handful of amateurs. Today, though, new tools make spectroscopy accessible to almost all of us. You no longer need a PhD, dark skies, long exposures, enormous aperture ... or a big budget! With your current telescope and FITS camera (or a simple web cam or even a DSLR without a telescope) you can now easily study the stars yourself. Wouldn't you like to detect the atmosphere on Neptune or the red shift of a quasar right from your own backyard?!

This talk, with lots of interesting examples, will show you what it's all about and help you understand how spectroscopy is used in research. Even if you are an armchair astronomer, understanding this field will enhance your understanding of the things you read and the night sky. We'll do a live Q&A after Tom's 45-minute presentation.

Zoom link: <https://bit.ly/31WOI7p>

If you're new to Zoom, try to get started a little early to make sure your computer is ready.

Barnard-Seyfert Astronomical Society Minutes of a Regular Meeting of the Board of Directors Held On Wednesday, June 18, 2020

The regular meeting of the Board of Directors of the Barnard-Seyfert Astronomical Society was held June 18, 2020, online by means of Google Meeting. Logged in were Tom Beckermann, Chip Crossman, Gary Eaton, Drew Gilmore, Bud Hamblen, Keith Rainey and Theo Wellington. A quorum being present, Keith called the meeting to order at 7:10 PM and asked for a motion to adopt the minutes as printed in the June issue of the Eclipse. Theo so moved, Chip seconded and the minutes were adopted by unanimous voice vote. Theo reported that there was \$11,371.97 in the bank account and \$736.44 in the PayPal account. Poster sales have reached 31. Dustin Cain needed to contact Theo to make arrangements to pick up his poster. Theo needed from Keith the membership count for the Astronomical League dues. Keith reported that there were 157 members.

General Meeting programs:

July – What’s Up.

August – Comets.

September – Astronomical League presentation.

November – All I Want for Christmas are Astronomy Toys

December – Annual dinner (catered)

January, 2021 – Telescope Workshop

The Adventure Science Center is reopening at 50% capacity.

Equipment Report: Tom reported no updates.

Social Media: The Facebook page has 1,815 likes and 1,936 followers. Twitter has 218 followers.

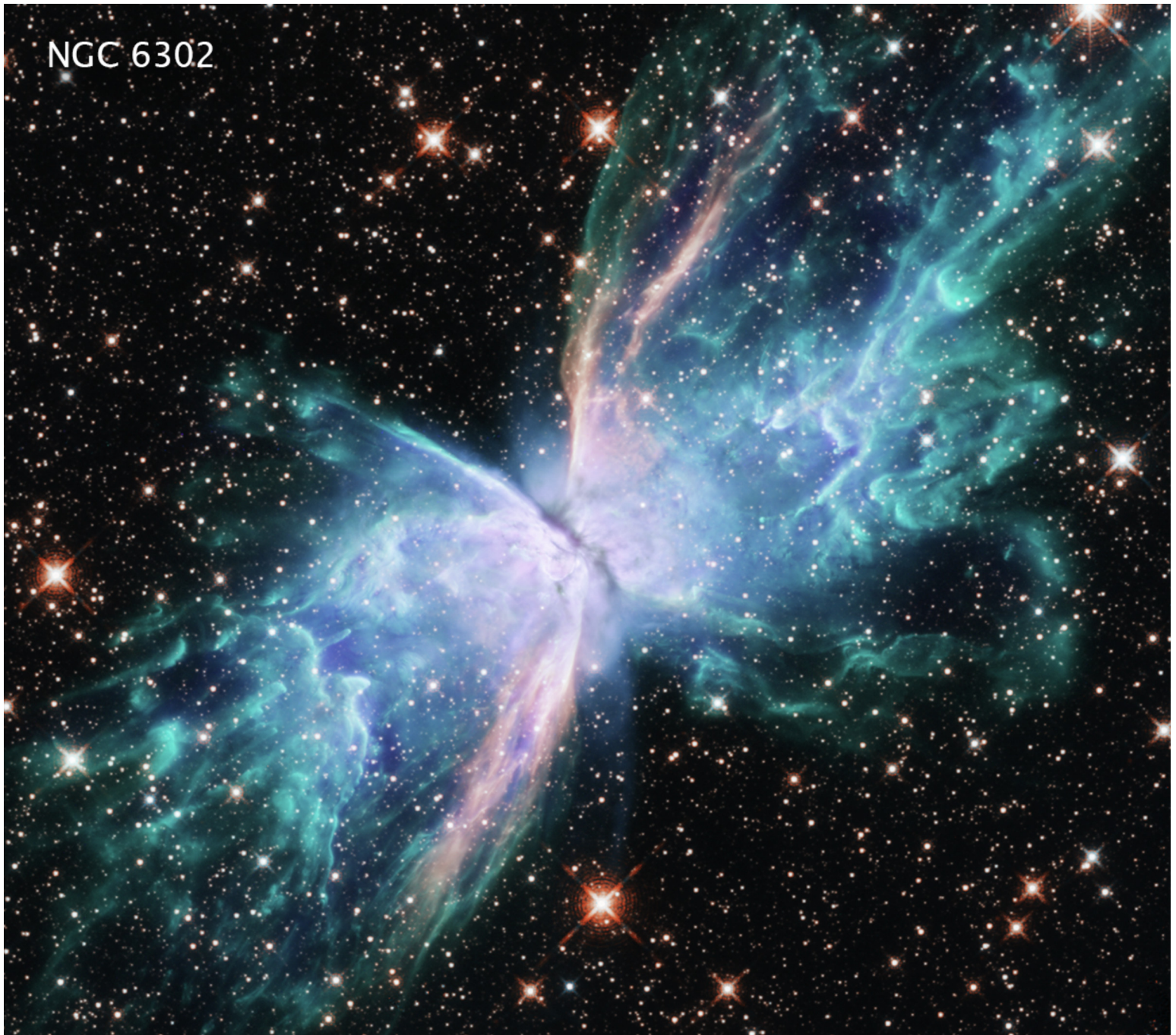
Future star parties were discussed, including the possibility of virtual star parties. Virtual meetings were discussed but not yet finalized.

Best wishes to Director Thomas Gaudin, who is relocating to New Mexico for graduate school.

There being no further business, Keith asked for a motion to adjourn. Theo so moved and Tom seconded. The meeting was adjourned at about 8:30 PM.

Respectfully submitted,

Bud Hamblen
Secretary



Hubble was recently retrained on NGC 6302, known as the "Butterfly Nebula," to observe it across a more complete spectrum of light, from near-ultraviolet to near-infrared, helping researchers better understand the mechanics at work in its technicolor "wings" of gas. The observations highlight a new pattern of near-infrared emission from singly ionized iron, which traces an S shape from lower left to upper right. This iron emission likely traces the central star system's most recent ejections of gas, which are moving at much faster speeds than the previously expelled mass.

The star or stars at its center are responsible for the nebula's appearance. In their death throes, they have cast off layers of gas periodically over the past couple thousand years. The "wings" of NGC 6302 are regions of gas heated to more than 36,000 degrees Fahrenheit that are tearing across space at more than 600,000 miles an hour.

Credit: [NASA](#), [ESA](#), and [J. Kastner \(RIT\)](#)



In honor of the club's 90th anniversary we partnered with Hatch Show Print to create a unique poster that would honor the achievement of the club. For those who don't know Hatch Show has been making posters for a variety of events and concerts for 140 years. In all that time we are their first astronomy club.

On the poster at the center is the moon. This was made from a wood grained stencil that the shop has used for over 50 years. To contrast that the telescope that the people are using is a brand new stencil made for our poster. The poster has three colors. First the pale yellow color of the moon was applied. Next the small stars, circles, and figures at the bottom were colored in metallic gold. The third color is

a blue for the night sky. Where it overlaps with the metallic gold it creates a darker blue leaving the figures at the bottom looking like silhouettes. This was a one time printing so the 100 that we have are all that will be printed.

The prints are approximately 13 3/4" x 22 1/4" and are available for \$20 at our membership meetings, or \$25 with shipping by ordering through bsasnashville.com. Frame not included.



Become a Member of BSAS!
Visit bsasnashville.com to join online.

All memberships have a vote in BSAS elections and other membership votes. Also included are subscriptions to the BSAS and Astronomical League newsletters.

Annual dues:

Regular: \$25
Family: \$35
Senior/Senior family: \$20
Student*: \$15

* To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

About BSAS

Organized in 1928, the Barnard-Seyfert Astronomical Society is an association of amateur and professional astronomers who have joined to share our knowledge and our love of the sky.

The BSAS meets on the third Wednesday of each month at the Cumberland Valley Girl Scout Building at the intersection of Granny White Pike and Harding Place in Nashville. Experienced members or guest speakers talk about some aspect of astronomy or observing. Subjects range from how the universe first formed to how to build your own telescope. The meetings are informal and time is allotted for fellowship. You do not have to be a member to attend the meetings.

Membership entitles you to subscriptions to *Astronomy and Sky & Telescope* at reduced rates; the club's newsletter, the *Eclipse*, is sent to members monthly. BSAS members also receive membership in the Astronomical League, receiving their quarterly newsletter, the *Reflector*, discounts on all astronomical books, and many other benefits.

In addition to the meetings, BSAS also sponsors many public events, such as star parties and Astronomy Day; we go into the schools on occasion to hold star parties for the children and their parents. Often the public star parties are centered on a special astronomical event, such as a lunar eclipse or a planetary opposition.

Most information about BSAS and our activities may be found at bsasnashville.com. If you need more information, write to us at info@bsasnashville.com.

Free Telescope Offer

Did someone say free telescope? Yes, you did read that correctly. The BSAS Equipment & Facilities Committee has free telescopes ranging in size from 2.6" to 8" that current members can actually have to use for up to 60 days at a time. We also have some other items in the loaner program such as a photometer, H-alpha solar telescope, educational CDs, tapes, DVDs, and books. Some restrictions apply. A waiting list is applicable in some cases. The BSAS Equipment Committee will not be held responsible for lost sleep or other problems arising from use of this excellent astronomy gear. For information on what equipment is currently available, contact info@bsasnashville.com.