

# Skylights

Newsletter of the Astronomical Society of Northern New England



APR 2019



Member of NASA's



Astronomical League

## ASNNE MISSION

ASNNE is an incorporated, non-profit, scientific and educational organization with three primary goals:

- 1) To have fun sharing our knowledge and interest with others.
- 2) To provide basic education in astronomy and related sciences to all who are interested.
- 3) To promote the science of Astronomy.

## What's Up in April

By Bernie Reim

The month of April is named after the Latin Aprilis, which means to open. That is what the buds, leaves, and flowers will be doing this month in the northern hemisphere as we tilt more towards the sun once again. This is farther tipping the balance point of the earth reached on the Vernal Equinox that will continue until the summer solstice in June when the sun will reach its highest and most glorious point in our sky.

This is the first full month of spring, but as T.S. Eliot says, "April is the cruellest month", because of what it can reveal to us. Winter is still in full swing in the White Mountains and its surrounding towns. Deep snow covers the countryside, and it was one degree Fahrenheit on the summit of Mt. Washington with a sustained wind of 38 mph on the last day of this winter. Its brilliantly gleaming white peak and deeply etched ravines were outlined in stark contrast against the flawless blue sky. The regal presence of this highest peak seemed to survey all of New England effortlessly and with unending calm and a great sense of serenity and peace. We often forget how close all of this wonderful beauty is to us in this area and how lucky we are to be able to enjoy it and learn more about it. We are all a part of this natural world on the surface of the earth as well as the infinitely greater but just as natural world that stretches way beyond our surface into the more unfathomable and mysterious depths of space.

This will be a great month to farther explore those depths as the nights will be warming up even as they get shorter. Many highlights await us including four of the five brightest planets gracing our morning sky, Mars and the moon dancing through Taurus, close lunar conjunctions with Jupiter and Saturn in the morning sky, the Lyrid meteor shower, and even two asteroids visible with binoculars or a small telescope.

Venus continues to slowly sink farther into the morning twilight and it now rises only one hour before sunrise. However, our first planet,

Mercury will join it for most of this month, reaching greatest western elongation from the sun on the 11<sup>th</sup>. You may need binoculars to spot them. Notice that Venus is about 40 times brighter than Mercury. When you look at our first planet this month be aware that we just launched a mission last October that will take 7 years to get there even though it is not that far away.

Both Jupiter and Saturn continue to rise earlier and climb higher into our morning sky this month. Jupiter rises first, around 1 am, and by the end of April it will rise by 11 pm. The King of the planets will stop its direct, eastward motion and begin its retrograde motion on the 10<sup>th</sup>, exactly two months before it reaches opposition. Notice that Jupiter is slowly getting brighter and that it is about 15 times brighter than Saturn. Jupiter is still in Scorpius and after it starts its westward motion it will be inching closer to the bright star named Antares, which means rival of Mars. Both Antares and Betelgeuse in Orion are similar. Both are huge red supergiant stars near the end of their lives. They are each

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**What's Up "Continued from page 1"**

about 600 light years away and about 700 times larger than our sun, which means that if you could place either of these giants in our sky where our sun is located, the orbits of all the planets out to Mars would fit inside the surface of these monster stars.

On Earth Day, April 22, the moon will be just above Antares and the next morning it will be pass within one degree of Jupiter. Then keep following the moon through Sagittarius and watch it pass very close to Saturn just two days later, on the 25<sup>th</sup>. Saturn also begins its retrograde motion this month, on the 29<sup>th</sup>, 19 days after Jupiter.

Then Mars remains as the sole evening planet. Watch it closely as it is making a scenic trek through Taurus, pointing out some of its highlights along the way. The red planet begins the month just below the Pleiades and will then pass right between the 7 sisters and the Hyades with Aldebaran, marking the eye of Taurus the Bull. Compare these two red orbs and you will see that the star is twice as bright as the planet. Also notice the bright red color of Betelgeuse, about another 15 degrees to left of Aldebaran. It is about another 4 times brighter than Aldebaran. Keep watching as a slender waxing crescent moon passes near the pair during the evenings of the 8<sup>th</sup> and 9<sup>th</sup>.

The annual Lyrid Meteor shower will peak on the morning of Monday the 22<sup>nd</sup>, which is also Earth Day. You could normally expect up to 20 meteors per hour emanating from Lyra in the Summer Triangle, but this year the full moon will be occur just 3 days earlier, washing out much of the action. Caused by the earth passing through the debris trail of Comet Thatcher, there will be a short window to catch some of these tiny sand grain-sized particles burning up high in our atmosphere before the moon rises around 11 pm.

Not one, but two of the largest asteroids will be at their best this month. The brighter one is Pallas, which will reach opposition on the 6<sup>th</sup> near the bright star Arcturus in Bootes. It will get as bright as 7.9 magnitude, which about the same as Neptune, so you would need binoculars or a small telescope to spot it. Pallas is about 300 miles in diameter, which is not quite large enough to spin itself into a round shape.

The other asteroid is named 7 Iris, and it is a little smaller and fainter. It is only 120

miles in diameter and will only reach 9.4 magnitude, or about 3 times fainter than Pallas. You can see it with a telescope all this month in Virgo near a nice galaxy named M104, the Sombrero Galaxy, located about 30 million light years away in the Virgo Cluster of galaxies, one of about 2,000 galaxies living in that nearby cluster. That may seem far away, but this is really our own celestial backyard. To bring it even closer to home, our very own Milky Way is one of over a million galaxies that are all part of the Virgo super cluster of galaxies stretching over 100 million light years across.

April 1. On this day in 1997 comet Hale-Bopp made its closest approach to the sun. This was a once-in-a-lifetime comet that hung around for a whole year and was easily visible with the naked eye as its tail stretched over a quarter of the sky.

April 2. The moon is near Venus this morning.

April 5. New moon is at 4:52 a.m. EDT.

April 7. The Compton Gamma Ray Observatory was launched on this day in 1991.

April 8. The moon, Aldebaran, Mars, and the Pleiades form a celestial diamond in Taurus.

April 11. Halley's Comet made its closest approach to Earth on this day in 1986.

April 12. First quarter moon is at 3:07 p.m. Yuri Gagarin became the first human to orbit the earth on this day in 1961. John Glenn would be a close second on Feb. 20 of 1962.

April 13. The moon will pass near the Beehive star cluster in Cancer tonight.

April 14. The moon will pass within 5 degrees of Regulus in Leo tonight.

April 19. Full moon is at 7:13 a.m. This is also called the Grass, Egg, Pink, or Fish Moon.

April 22. The Lyrid meteor shower peaks this morning. The moon will pass near Antares.

April 25. The Hubble Space Telescope was launched on this day in 1990. Designed to last only 10 to 15 years, it is still going strong 29 years and over one million amazing images later. Our knowledge of the universe and where we really live has vastly expanded over those 29 years thanks to its incredible discoveries. The moon will pass near Saturn this morning. Saturn will be occulted by the moon for parts of the world on the morning of the 26<sup>th</sup>, but not for us.

April 26. Last quarter moon is at 6:19 p.m.

April 30. Frances Wright, an American astronomer who taught at Harvard, was born on this day in 1897. She taught celestial navigation to naval officers and wrote 3 books on the subject.

## Moon Phases

**Apr 5**  
New

**Apr 12**  
First Quarter

**Apr 19**  
Full

**Apr 26**  
Last Quarter

## Moon Data

**Apr 1**  
Venus 3° north of  
Moon

**Apr 2**  
Neptune 3° north of  
Moon

Mercury 4° north of  
Moon

**Apr 6**  
Uranus 5° north  
of Moon

**Apr 9**  
Mars 5° north  
of Moon

**Apr 16**  
Moon at perigee

**Apr 23**  
Jupiter 1.6° south  
of Moon

**Apr 25**  
Pluto 0.07° south  
of Moon

Saturn 0.4° north of  
Moon

**Apr 28**  
Moon at apogee

## OBSERVER'S CHALLENGE\* – APRIL, 2019

*By Glenn Chaple*

**NGC 2964/2968 - Galaxies in Leo (NGC 2964 Mag: 11.3 Size: 3.0' X 1.7')  
(NGC 2968 Mag: 11.8 Size 2.2' X 1.5')**

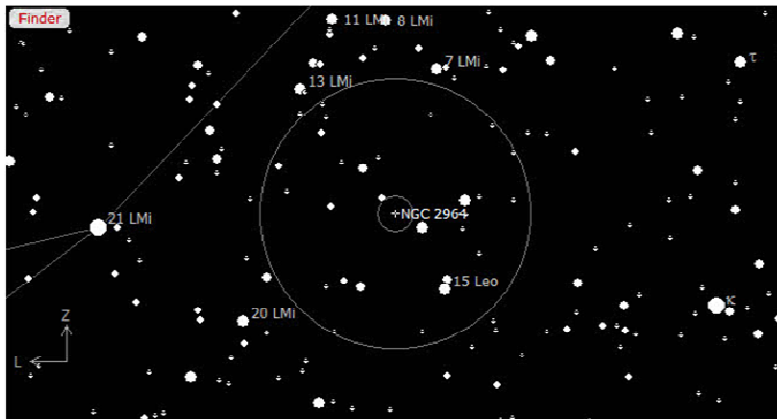
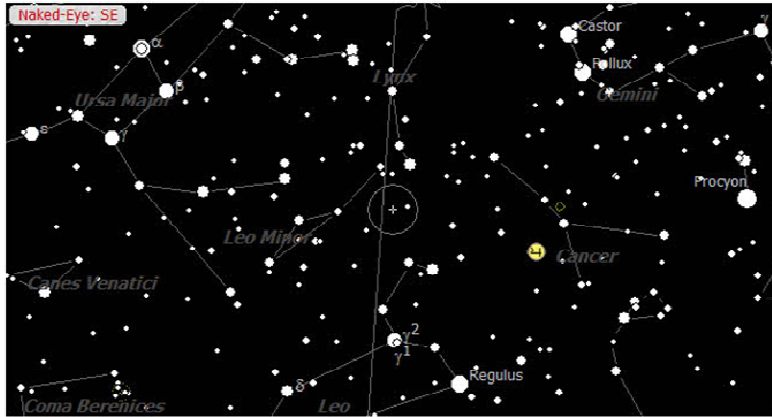
As was the case last month, our Observer's Challenge consists of a pair of galaxies – in this case, NGC 2964 and NGC 2968, located in the northwest corner of Leo above the Lion's head. NGC 2964, an inclined spiral, is the brighter and slightly larger of the two. NGC 2968, classified as a lenticular galaxy, lies 5.8' northeast.

A third galaxy, NGC 2970, is 4.6' further northeast and appears in the upper left-hand corner of Mario Motta's image below. With NGC 2964 and 2968, it forms what is sometimes called the Leo Triplet 2 or forgotten Leo Triplet (Leo Triplet 1 being consisted of the galaxies Messier 65, Messier 66, and NGC 3628). At 13<sup>th</sup> magnitude and less than 1.0' in diameter, this elliptical galaxy appears almost star-like in large-aperture scopes.

NGC 2964 and NGC 2968 were discovered by William Herschel in 1785. The brighter NGC 2964 was designated as a H114<sup>1</sup>, his 114<sup>th</sup> Class 1 (Bright Nebulae) object, while NGC 2968 was relegated to Class 2 (Faint Nebulae) and designated as H491<sup>2</sup>. Herschel's son, John, discovered NGC 2700 in 1828. NGC 2964 is believed to be 60 million light years away, while NGC 2968 and NGC 2970 are about 75 million light years distant.

*\*The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone who is interested. If you'd like to contribute notes, drawings, or photographs, we'll be happy to include them in our monthly summary. Submit your observing notes, sketches, and/or images to either Roger Ivester ([rogerivester@me.com](mailto:rogerivester@me.com)) or Fred Rayworth ([queex@embarqmail.com](mailto:queex@embarqmail.com) or [fred@fredrayworth.com](mailto:fred@fredrayworth.com)). To find out more about the Observer's Challenge or access past reports, log on to [rogerivester.com/category/observers-challenge-reports](http://rogerivester.com/category/observers-challenge-reports).*

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Finder charts from [bristolweather.org.uk/galaxies](http://bristolweather.org.uk/galaxies)



Image by Mario Motta M.D.



## Principal Meteor Showers in 2019

**January 4**  
Quadrantids

**April 22**  
Lyrids

**May 6**  
Eta Aquarids

**July 30**  
Delta Aquarids

**August 12**  
Perseids

**October 9**  
Draconid

**October 21**  
Orionids

**November 9**  
Taurids

**November 18**  
Leonids

**November 26**  
Andromedids

**December 14**  
Geminids

**December 22**  
Ursids

*Note: Dates are  
for maximum*

## Got any News? Skylights Welcomes Your Input.



*Here are some suggestions:*

*Book reviews -- Items for sale -- New equipment --  
Ramblings -- Star parties -- Observing -- Photos.*

**Our Club has Merchandise for Sale at: [www.cafepress.com/asne](http://www.cafepress.com/asne)**



*ALL money raised goes to our operating fund.  
Any design can be put on any item.  
Just let our club member, David Bianchi, know.*

## **RED ALERT – Downward Pointing Lasers**

NASA is planning to use (or is already using) downward pointing lasers which are mounted on their spacecrafts. For those of us who look at the night sky through a telescope, or a pair of binoculars, this is a potential hazard. If a laser beam enters our instrument at the very time we are viewing, eye injury or blindness could occur. Contact physicist, Dr. Jennifer Inman, [jennifer.a.inman@nasa.gov](mailto:jennifer.a.inman@nasa.gov) and tell her your concerns about this perilous issue. Why should we have to live in fear each time we look into a telescope or a pair of binoculars? This is unacceptable!



**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.org](https://nightsky.jpl.nasa.org) to find local clubs, events, and more!

## Mars the Wanderer

By David Prosper

April's skies find Mars traveling between star clusters after sunset, and a great gathering of planets just before sunrise.

**Mars** shows stargazers exactly what the term “planet” originally meant with its rapid movement across the evening sky this month. The ancient Greeks used the term *planete*, meaning *wanderer*, to label the bright star-like objects that travelled between the constellations of the zodiac year after year.

You can watch Mars as it wanders through the sky throughout April, visible in the west for several hours after sunset. Mars travels past two of the most famous star clusters in our night sky: the **Pleiades** and **Hyades**. Look for the red planet next to the tiny but bright Pleiades on April 1st. By the second week in April, it has moved eastward in Taurus towards the larger V-shaped Hyades. Red Mars appears to the right of the slightly brighter red-orange star **Aldebaran** on April 11th. We see only the brightest stars in these clusters with our unaided eyes; how many additional stars can you observe through binoculars?

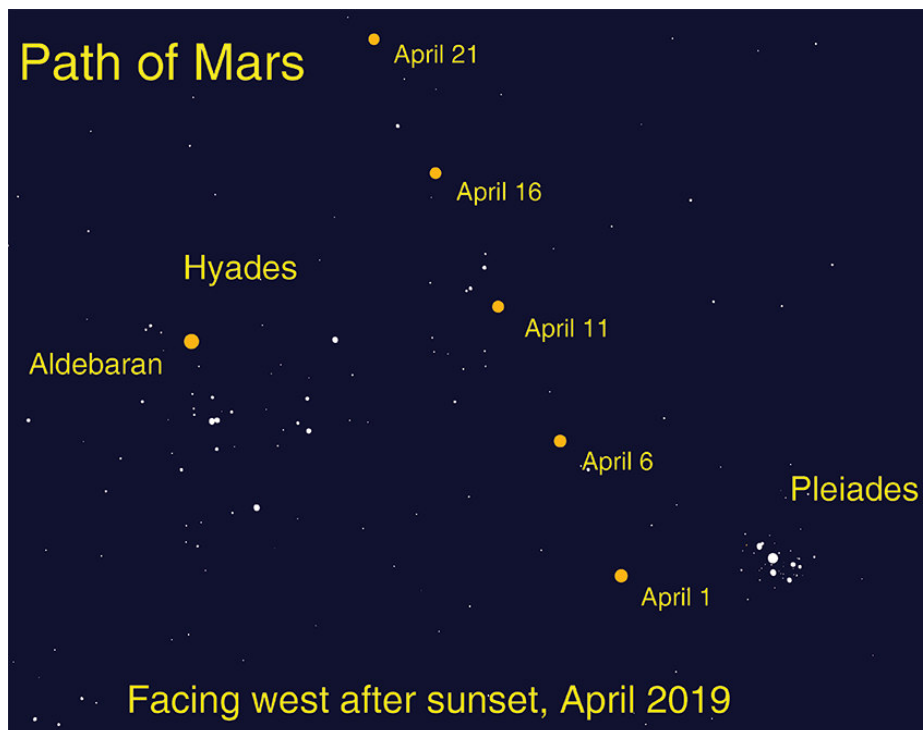
Open clusters are made up of young stars born from the same “star nursery” of gas and dust. These two open clusters are roughly similar in size. The Pleiades appears much smaller as they are 444 light years away, roughly 3 times the distance of the Hyades, at 151 light years distant. Aldebaran is in the same line of sight as the Hyades, but is actually not a member of the cluster; it actually shines just 65 light years away! By comparison, Mars is practically next door to us, this month just a mere 18 light minutes from Earth - that's about almost 200 million miles. Think of the difference between how long it takes the light to travel from these bodies: 18 minutes vs. 65 years!

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The rest of the bright planets rise before dawn, in a loose lineup starting from just above the eastern horizon to high above the south: **Mercury**, **Venus**, **Saturn**, and **Jupiter**. Watch this month as the apparent gap widens considerably between the gas giants and terrestrial planets. Mercury hugs the horizon all month, with Venus racing down morning after morning to join its dimmer inner solar system companion right before sunrise. In contrast, the giants Jupiter and Saturn move away from the horizon and rise earlier all month long, with Jupiter rising before midnight by the end of April.

The **Lyrids** meteor shower peaks on April 22nd, but sadly all but the brightest meteors will be washed out by the light of a bright gibbous Moon.

You can catch up on all of NASA's current and future missions at [nasa.gov](https://www.nasa.gov)



*Caption: The path of Mars between the Pleiades and Hyades in April.  
Image created with assistance from Stellarium.*

## Point and Shoot Camera Astroimaging

### Canon Powershot SX50 HS

*Image & write-up submitted by Paul Kursewicz*

Cheshire Cat & M38 & M36 Specs: RAW, f/5.6, FL 373mm, 18 x 1 min 30sec, ISO 800, 3-8-19



There is an asterism of *seven bright stars* in Auriga known as the *Cheshire Cat*. It is a fictional cat popularized in Alice's Adventures in Wonderland and known for its distinctive mischievous grin. Here, it appears just to the right of the open cluster **M38** (top center). Ron put the bug in me to take a picture of the *Cheshire Cat* when he referenced it in one of his recent ASNNE Group emails. The other bright open cluster (below center) is **M36**. All three objects can be easily seen in binoculars. A smaller open cluster **NGC 1907** was picked up in my long exposure image and is located at the 4 o'clock position of M38 (under one of the Cheshire Cat's eyes). Another bright open cluster in Auriga is **M37**. It is nearly 4 degrees east-southeast of M36 (outside the field of my photo) and is easy to see in binoculars. Look for a bright, orange star near the center.



# In Memoriam - Carl Tymoniewicz



## Obituary for Carl Michael Tymoniewicz

*(edited by Editor)*

Carl M. Tymoniewicz age 69 of Wells, Maine, passed away with family by his side on February 24, 2019. He was best known for his reupholstery work as the owner and operator of Carl's Upholstery, established in 1976. As a graduate of Haverhill Trade School, Carl carried out the tradition of fine craftsmanship in his work and went above and beyond to satisfy his customers. Carl is a Veteran of the U.S. Navy serving from September 1967 to July 1971.

Carl had a wide range of interests. He loved being by the water, going camping, boating, and fishing as much as he could. He enjoyed flying small aircraft out of the Sanford Seacoast Regional Airport, shooting at the Rod & Gun Club, archery, and stargazing as a member of the Astronomical Society of Northern New England.

Animals brought great joy to Carl, whether it be the love of a family pet or a chipmunk taking up residence under his garage. Also, Carl was a movie enthusiast and had built quite the collection varying from edge-of-your seat action films to romance movies and everything in between.

Carl is survived by his wife Tricia Tymoniewicz of Wells, Maine; his daughter and son-in-law Courtney and John DeRosie of Springvale, Maine; his son Brian Tymoniewicz of St. Cloud, Florida; his sister Maureen Tymoniewicz of Boscowen, New Hampshire; and three grandchildren Gavin DeRosie, Brooke Tymoniewicz and Emma Tymoniewicz.

Carl fought a courageous battle with lung cancer.

## Club Meeting & Star Party Dates

Date	Subject	Location
<u>Apr 5</u>	<p><b><u>ASNNE Club Meeting:</u></b></p> <p><b>Business Meeting</b> 6:30 PM  <b>Beginners Class</b> 7:00 - 7:30 PM (no class is scheduled)  <b>Regular Meeting</b> 7:30-9:30 PM</p> <p><b>Guest speaker/topic</b> - Our guest speaker will be club member <b>Dwight Lanpher</b>. Topic: <u>Leviathan of Parsonstown</u>. For a detailed description of his talk (and other information) see <b>page 11</b>.</p> <p><b>Bernie Reim</b> - What's UP  <b>Astro Shorts:</b> (news, stories, reports, questions, photos)</p>	<u>The New School, Kennebunk, Me.</u>
<u>Last Month</u>	<p>Ron Burk started the March meeting with a moment of silence for deceased club member Peter Talmage. A vote was taken by club members to rename the observatory as the "Talmage Observatory at Starfield." Professor Fabian Kislat gave us a talk about the use of a new detector that analyses X-rays, and the flight of that detector from a high-altitude balloon in Antarctica. The goal is to get a better understanding of black holes and neutron stars. See <b>page 12</b> for more details. After the talk Bernie Reim did his "What's Up."</p>	
<u>TBD</u>	<b>Club/Public Star Party:</b> If skies are clear members may go to the observatory after the meeting.	Talmage Observatory at Starfield West Kennebunk, Me.

### Directions to ASNNE event locations

#### Directions to The New School in Kennebunk [38 York Street (Rt1) Kennebunk, ME]

For directions to The New School you can use this link to the ASNNE NSN page and then click on "get directions" from the meeting location. Enter your starting location to generate a road map with complete directions. It works great. [http://nightsky.jpl.nasa.gov/club-view.cfm?Club\\_ID=137](http://nightsky.jpl.nasa.gov/club-view.cfm?Club_ID=137)

#### Directions to Starfield Observatory [Alewife Road, Kennebunk, ME]

##### From North:

Get off turnpike at exit 32, (Biddeford) turn right on Rt 111. Go 5 miles and turn left on Rt 35. Go 2 miles on Rt 35 over Kennebunk River to very sharp 90 degree left turn. The entrance to the Starfield Observatory site is at the telephone pole at the beginning of the large field on the left. Look for the ASNNE sign on the pole.

##### From South:

Get off the turnpike at exit 25 in Kennebunk. After toll both turn right on Rt 35. Go up over the turnpike and immediately turn right on Rt 35. About 4 miles along you will crest a hill and see a large field on your right. Continue until you reach the end of the field. Turn right into the Starfield Observatory site at the last telephone pole along the field. Look for the ASNNE sign on the pole. If you come to a very sharp 90 degree right turn you have just passed the field.

*Submitted by Carl Gurtman*

MONTHLY ASTRONOMY CLUB MEETING AND TALK

The Astronomical Society of Northern New England (ASNNE) will hold its monthly meeting on Friday, April 5, 2019 at 7:30 PM at The New School, 38 York Street, Kennebunk. All are welcome to attend. The business meeting, open to the public, commences at 6:30 PM. At 7:00 PM, our own Starlady Joan conducts a course for beginners; "Astronomy 101", also open to the public.

LEVIATHAN OF PARSONSTOWN. Any reviewer of the history of astronomy will read about a large telescope called the "Leviathan of Parsonsonstown". Built in Ireland in 1845 by the 3rd Earl of Rosse, it was the largest telescope in the world for 70 years. Each of two 72" speculum mirrors were alternately mounted in a 54' long tube, suspended between two purpose-built castle walls. Amateur astronomer and ASNNE Member Dwight Lanpher will speak about his visit last September to Birr Castle, County Offaly, Ireland to examine "*the Great Telescope*." His presentation will show technical details of how the telescope was operated and the modifications that were made during a \$1,200,000 renovation in 1995. Images will also include the last remaining of the two, 3-ton, speculum mirrors, which Dwight examined at its current location at the Museum of Science in London.

When not visiting ancient telescopes, Mr. Lanpher travels throughout New England and eastern Canada attending astronomy meetings as liaison for clubs in Maine, New Hampshire and a few in Massachusetts and observing at their star parties when the opportunity avails. Professionally, Mr. Lanpher works as an Electrical Engineer.

The April meeting agenda includes: Bernie Reim's "What's Up for the month" and the ever popular "Astro Shorts" – where attendees and members share questions, activities, news and observations. Our Astro Shorts meetings always give way to lively and informative discussions!

If skies are clear members may go to our observatory for an observing session. Recently, ASNNE Members were saddened by the untimely passing of one of our long-time Members, Peter Talmage. Among the other things he accomplished for ASNNE, Peter was the driving force behind the founding of our Starfield Observatory. In recognition of his work, and to honor his memory, our observatory will now be known as the Talmage Observatory at Starfield.

ASNNE is a local association of amateur astronomers that meets monthly at the New School, on Rte. 1, in Kennebunk, Maine. Meeting on the first Friday of each month; all those interested in astronomy are welcome; from stargazers and hobbyists, to serious observers, astrophotographers, and those interested in astronomical theory. The general public is also most welcome.

ASNNE hosts Star Parties at our own Talmage Observatory at Starfield, on Route 35 in West Kennebunk.

For more information about ASNNE, including directions and events, or to contact the club, please visit us at [www.ASNNE.org](http://www.ASNNE.org).

*Submitted by Carl Gurtman*

**ASTRONOMY CLUB TALK - FINDING OUT MORE ABOUT BLACK HOLES.**

At the last meeting of the Astronomical Society of Northern New England (ASNNE), members and guests were privileged to hear a presentation by Professor Fabian Kislat of the University of New Hampshire's Department of Physics and Astronomy. The topic was the use of a new detector that analyses X-rays, and the flight of that detector from a high-altitude balloon in Antarctica. The goal is to get a better understanding of black holes and neutron stars.

Professor Kislat received his Doctorate in Physics at the Humboldt University of Berlin, Germany. Subsequently, he was a post-doc and Research Assistant Professor at Washington University in St. Louis. He joined the University of New Hampshire's Department of Physics & Astronomy last year.

Professor Kislat first defined the terms he would be using in his talk. Interestingly, in accordance with Einstein's theories, radiation emitted from behind the black hole can be bent by the black hole's extremely strong gravity, so that we can see that radiation. Because the energies and temperatures are so high, the radiation is not emitted as visible light, but as X-rays.

Black holes are so dense that the photons around it are emitted from a space so small that we are unable to form images of the space around the black hole at stellar distances. However, processes that occur as the X-ray radiation is emitted, polarize some of that radiation, and polarization can be detected. The polarization carries information about the geometry of the black hole, and that leads to clues about its properties and formation.

The latter part of Professor Kislat's talk was about travelling to Antarctica, and the trials and tribulations of launching a balloon there. People who enjoy the hands-on aspects of science especially enjoyed that portion of his talk.

Professor Kislat's talk was very well-received. He made a complex subject understandable. ASNNE Members were quite involved with the material as it was presented, and asked questions throughout. A bigger and better detector is planned to be flown in the future! If you'd like to read more about Professor Kislat's work, go to: <https://www.unh.edu/unhtoday/2019/02/stellar-science>



Professor Kislat



To join **ASNNE**, please fill out the below membership form. *Checks should be made payable to: Astronomical Society of Northern New England (A.S.N.N.E).* For more details, please visit our website: <http://www.asnne.org>



Astronomical Society of Northern New England  
 P.O. Box 1338  
 Kennebunk, ME 04043-1338

**2019 Membership Registration Form**

(Print, fill out and mail to address above)

Name(s for family): \_\_\_\_\_

Address: \_\_\_\_\_

City/State: \_\_\_\_\_ Zip code: \_\_\_\_\_

Telephone # \_\_\_\_\_

E-mail: \_\_\_\_\_

Membership (check one):

Individual \$35 \_\_\_\_\_ Family \$ 40 \_\_\_\_\_ Student under 21 years of age \$10 \_\_\_\_\_ Donation \_\_\_\_\_

Total Enclosed \_\_\_\_\_

Tell us about yourself:

1. Experience level: Beginner \_\_\_\_\_ Some Experience \_\_\_\_\_ Advanced \_\_\_\_\_

2. Do you own any equipment? (Y/N) And if so, what types?  
 \_\_\_\_\_

3. Do you have any special interests in Astronomy?  
 \_\_\_\_\_

4. What do you hope to gain by joining ASNNE?  
 \_\_\_\_\_

5. How could ASNNE best help you pursue your interest in Astronomy?  
 \_\_\_\_\_

6. ASNNE's principal mission is public education. We hold many star parties for schools and the general public for which we need volunteers for a variety of tasks, from operating telescopes to registering guests to parking cars. Would you be interested in helping?

Yes \_\_\_\_\_ No \_\_\_\_\_

7. ASNNE maintains a members-only section of its web site for names, addresses and interests of members as a way for members to contact each other. Your information will not be used for any other purpose. Can we add your information to that portion of our web site?

Yes \_\_\_\_\_ No \_\_\_\_\_

