

Skylights

Newsletter of the Astronomical Society of Northern New England



Jan 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 January

By Bernie Reim

The month of January is named after the Roman god Janus who looks forward into the future at the same time that he looks backward into the past. He is depicted with two faces. Janus is the god of beginnings, endings, transitions, and passages.

The days are still very short and the nights are still quite long during this first full month of winter. There are five good highlights that will make it well worth braving the cold this month to witness. These are, in order of their dramatic impact; a total lunar eclipse starting Sunday night the 20th, the best meteor shower of the year, the Quadrantids on the 3rd, a nice conjunction of Venus and Jupiter on the 22nd, Comet Wirtanen still hanging around, now in the Big Dipper, and a potentially dangerous asteroid passing through Taurus and part of the Winter Hexagon all this month.

In honor of this month's namesake, here is a review of the top discoveries in astronomy for last year and a taste of what to expect for this year.

In reverse order, the fifth greatest astronomical discovery of last year was the Gaia mission's mapping of over a billion stars in our galaxy and millions of other galaxies. Not only were their current positions mapped, but the parallaxes and proper motions of these objects were also determined, giving us a moving, three-dimensional image of many stars in our galaxy along with many other galaxies.

The fourth one was confirming a 100-mile-high plume of water ejected from the ocean under Jupiter's moon Europa. When the next mission to this intriguing moon, called the Europa Clipper, due to launch in 2023, gets there a few years later, it can simply fly through a plume like this to sample it for any signs of life without drilling into the moon.

The third one was finding an underground lake about a mile below the surface of Mars that is about 12 miles wide and at least 3 feet deep.

The second one was finding a strange, cigar-shaped object about half a mile long named Oumuamua, Hawaiian for "scout". This comet came in from another solar system and even has different chemistry than comets from our own solar system.

The top discovery in astronomy for the entire year of 2018 was confirming the fact that we detected about a dozen neutrinos that emanated from a galaxy 5.7 billion light years away located in the arm of Orion. Called a blazer, this galaxy is shooting a powerful jet of material into space at nearly the speed of light. Created by material falling into the supermassive black hole at the center of this galaxy, this jet is pointing directly at us. We detected them using a combination of different types of telescopes, called multi-messenger astronomy. One of them is called IceCube, a neutrino telescope built into the ice near the south pole.

No one can predict exactly what we may discover this year, but here are a few missions that could certainly lead to some great new discoveries.

"Continued on page 2"

Inside This Issue

Club Contact List	pg 2
Moon Data	pg 3,4
This Months Observer's Challenge	
RED ALERT: LASERS IN SPACE	pg 5
MEMBERSHIP DUES ARE DUE	
NASA's Space Place	
Meteor Showers in 2019	
January's Evening Eclipse and Morning Conjunctions	pg 6,7
Astroimaging with a Point & Shoot	pg 8,9,10
Club Meeting & Star Party Dates	pg 11
Directions ASNNE Locations	
Become a Member	pg 12

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What's Up "Continued from page 1"

On this first day of this year, the New Horizons space craft that had a wildly successful encounter with Pluto that went beyond all expectations a few years ago on July 14 of 2015, will encounter its second target, a Kuiper Belt object named Ultima Thule.

The first image of a black hole's event horizon will probably be processed and released this year from the Event Horizon Telescope. NASA's first crewed spaceflights of commercial capsules are expected to begin this spring or summer. India is slated to launch a mission that will land on the moon early this year. Japan's Hayabusa2 is scheduled to leave the asteroid Ryugu late this year with samples that should get back to earth in 2020.

Then the James Webb telescope should be progressing nicely towards its new launch date of March 30 of 2021.

The entire country is perfectly placed to observe the total lunar eclipse that will start at 9:37 pm on Sunday the 20th. However, nothing will really be visible until shortly before the moon enters the deeper part of Earth's shadow, called the umbra, at 10:34 pm. The moon will be completely immersed in our shadow by 11:41 pm and will spend just over an hour there until 12:43 am. Then the partial phase ends about an hour later at 1:51 am and the entire eclipse doesn't completely end until 2:48 am.

That is the timeline of this event, but the real beauty and magic of the interaction between our three most common and obvious objects, the sun, moon, and Earth, seen in a completely new way, happens as you observe carefully along with gaining a better understanding of what is really happening here. The coppery red color that you will slowly see the moon turn is actually the reflection of all of the sunrises and sunsets on Earth projected onto the moon all at once. Our atmosphere is bending, or refracting the sunlight around the earth and onto the moon to create this visually stunning three-dimensional image of our only natural satellite, capturing an elusive moment in time as our shadows intersect. You can even try to envision a fourth dimensional image of the constantly moving shadows of the earth and the moon as this is happening right in front of your eyes. Also try to photograph this great event as it unfolds.

The Quadrantid meteor shower will peak on the night of the third into the fourth. It has a very narrow peak, but you could expect up to 100 meteors per hour emanating from just below the Big Dipper. This shower is also caused by an asteroid, like the Geminids, and not a comet.

Venus and Jupiter will be just two degrees apart in the morning sky at 5 am on Tuesday the 22nd. Comet Wirtanen is still visible, but you will need binoculars to find it now in the Big Dipper. An asteroid named 433 Eros will be closest to Earth on the 15th and visible all month in Taurus with a good pair of binoculars or a small telescope.

Then Saturn will reappear in the morning sky by the middle of the month. Mars is still the only evening planet, visible in Pisces the Fish and setting around 11 pm each night as it moves at about the same rate that we are moving around the sun. Even though the red planet is dropping a little farther behind us each day, it still has a nice orange color and is brighter than average. The moon only looks orange right when it rises or sets or when it gets eclipsed, but Mars always looks a little orange.

Jan.1. New Horizons will encounter a Kuiper Belt object named Ultima Thule today. Mr. Piazzi discovered the largest asteroid, Ceres, on this day in 1801. The moon will pass just north of Venus this morning.

Jan.2. Earth is at perihelion, or closest to the sun at 91.4 million miles today.

Jan.3. The Quadrantid meteor shower peaks tonight. The moon passes just north of Jupiter this morning.

Jan.5. New moon is at 8:28 p.m. EST.

Jan.7. On this day in 1610 Galileo discovered 3 moons of Jupiter.

Jan.8. Stephen Hawking was born on this day in 1942.

Jan.12. The moon passes just south of Mars tonight.

Jan.14. First quarter moon is at 1:46 a.m.

Jan.15. Venus passes Antares in Scorpius this morning.

Jan.21. Full moon is at 12:16 a.m. This is also called the Wolf or Old Moon. There will also be a total lunar eclipse tonight visible for all of North America.

Jan.22. Venus passes just 2 degrees north of Jupiter this morning.

Jan.27. Last quarter moon is at 4:10 p.m.

Jan.30. The moon passes just north of Jupiter this morning.

Jan.31. The moon passes very close to Venus this morning.

Moon Phases

- Jan 5**
New
- Jan 14**
First Quarter
- Jan 21**
Full
- Jan 27**
Last Quarter

Moon Data

- Jan 1**
Venus 1.3° south
of Moon
- Jan 3**
Jupiter 3° south
of Moon
- Jan 8**
Moon at apogee
- Jan 10**
Neptune 3° north of
Moon
- Jan 12**
Mars 5° north
of Moon
- Jan 14**
Uranus 5° north
of Moon
- Jan 21**
Moon at perigee



LVAS Observer's Challenge* – November 2018

By Glenn Chaple for the LVAS

NGC 1514 – Planetary Nebula in Taurus Magnitude: 10.9 Size: 2.3' X 2.0'

This month's Observer's Challenge changed William Herschel's idea about the construction of the universe. Early in his astronomical career, he considered all nebulae to be unresolved masses of stars much as the Milky Way when viewed with the unaided eye. This idea changed on the evening of November 13, 1790, when his systematic survey of the heavens brought him face-to-face with "a most singular phenomenon; a star of 8th magnitude with a faint luminous atmosphere of circular form." He added "Our judgement I may venture to say, will be, that the nebulousity about the star is not of a starry nature". He catalogued it as H IV-69, his 69th Class IV (Planetary Nebulae) object.

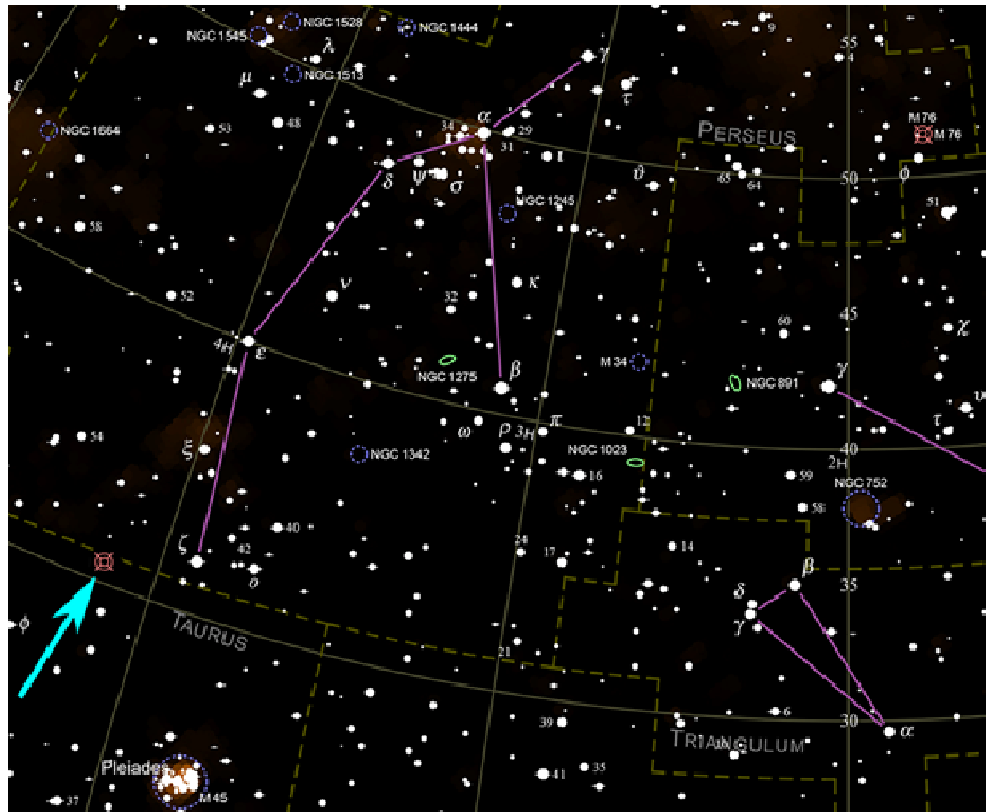
Herschel's find, better known by the New General Catalog designation NGC 1514 or its nick-name, the "Crystal Ball Nebula, lies in the northwest corner of Taurus. The finder chart shows its location about 3 degrees east and slightly south of the 3rd magnitude star zeta (ζ) Persei.

In the case of a typical planetary nebula like the Ring Nebula (M57), a faint central star is hidden by the surrounding nebulousity. NGC 1514 presents the opposite situation – its 9th magnitude central star overshadows the faint enveloping gaseous shell. To capture this planetary, you'll need dark skies, a 6-inch scope or larger (the Crystal Ball has been viewed with smaller apertures by experienced observers) and high magnification (100X and up). A nebula filter like an OIII will help.

NGC 1514 is bracketed to its northwest and south-southeast by a pair of 8th magnitude stars. If their images appear sharply focused while NGC 1514's central star seems somewhat fuzzy, you've hit the jackpot.

The Crystal Ball Nebula's central star is actually binary - a stellar pair with a period of over 9 years – exceptionally long for a planetary nebula. It lies an estimated 2200 light years away.

"Continued on page 4"



www.utopia-photography.ch/universe



1514 (left) visible light, (right) infrared Image courtesy NASA/JPL-Caltech/UCLA/DSS

*The purpose of the LVAS 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, the LVAS will be happy to include them in our monthly summary. Submit your observing notes, sketches, and/or images to either Roger Ivester (rogerivester@me.com) or Fred Rayworth (queex@embarqmail.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to lvastronomy.com/index.php/observer-s-challenge.

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

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 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!



The latest issue of the Space Place Newsletter: News and Notes for Formal and Informal Educators can be found at: <http://spaceplace.nasa.gov/en/educators>.

Space Place is a NASA website for elementary school-aged kids, their teachers, and their parents.

Check out our great sites for kids:



The Space Place website (<http://spaceplace.nasa.gov>)



The *SciJinks Weather Laboratory* at <http://scijinks.gov>



NASA Climate Kids at <http://climate.nasa.gov/kids>

MEMBERSHIP DUES

Membership fees are for the calendar year beginning in January and ending in December. Dues (see page 12 for prices) are payable to the treasurer during November for the upcoming year. New members who join during or after the month of July shall pay half the annual fee, for the balance of the year. Checks should be made payable to the Astronomical Society of Northern New England (A.S.N.N.E). If you would like to mail in your dues, use the form on page 12.

A Member who has not paid current dues by the January meeting will be dropped from membership, (essentially a two-month grace period.) Notice of this action shall be given to the Member by the Treasurer. Reinstatement shall be by payment of currently due dues.



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 to find local clubs, events, and more!

January's Evening Eclipse and Morning Conjunctions

By David Prosper

Observers in the Americas are treated to an evening **total lunar eclipse** this month. Early risers can spot some striking morning conjunctions between **Venus, Jupiter**, and the **Moon** late in January.

A **total lunar eclipse** will occur on **January 20th** and be visible from start to finish for observers located in North and South America. This eclipse might be a treat for folks with early bedtimes; western observers can even watch the whole event before midnight. Lunar eclipses takes several hours to complete and are at their most impressive during total eclipse, or totality, when the Moon is completely enveloped by the umbra, the darkest part of Earth's shadow. During totality the color of the Moon can change to a bright orange or red thanks to the sunlight bending through the Earth's atmosphere - the same reason we see pink sunsets. The eclipse begins at 10:34 pm Eastern Standard Time, with totality beginning at 11:41 pm. The total eclipse lasts for slightly over an hour, ending at 12:43 am. The eclipse finishes when the Moon fully emerges from Earth's shadow by 1:51 am. Convert these times to your own time zone to plan your own eclipse watching; for example, observers under Pacific Standard Time will see the eclipse start at 7:34 pm and end by 10:51 pm.

Lunar eclipses offer observers a unique opportunity to judge how much the Moon's glare can interfere with stargazing. On eclipse night the Moon will be in **Cancer**, a constellation made up of dim stars. How many stars you can see near the full Moon before or after the eclipse? How many stars can you see during the total eclipse? The difference may surprise you. During these observations, you may spot a fuzzy cloud of stars relatively close to the Moon; this is known as the "**Beehive Cluster**," **M44**, or **Praesepe**. It's an open cluster of stars thought to be about 600 million year old and a little under 600 light years distant. Praesepe looks fantastic through binoculars.

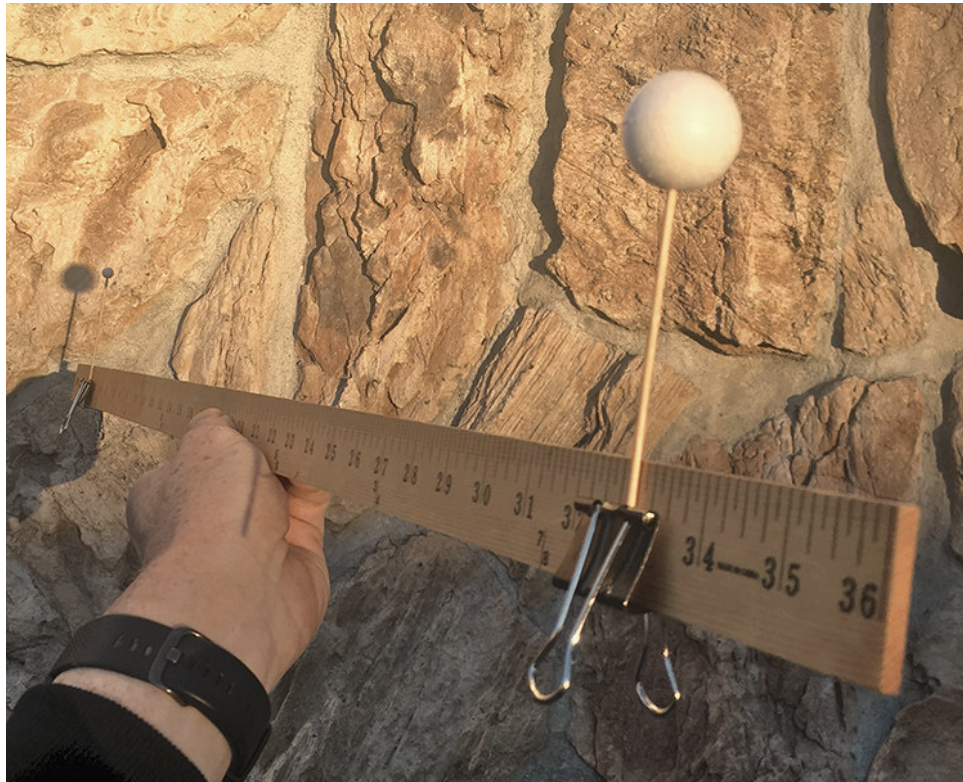
"Continued on page 7"

Mars is visible in the evening and sets before midnight. It is still bright but has faded considerably since its closest approach to Earth last summer. Watch the red planet travel through the constellation Pisces throughout January.

Venus makes notable early morning appearances beside both **Jupiter** and the **Moon** later this month; make sure to get up about an hour before sunrise for the best views of these events. First, Venus and Jupiter approach each other during the third full week of January. Watch their conjunction on the 22nd, when the planets appear to pass just under $2\frac{1}{2}$ degrees of each other. The next week, observe Venus in a close conjunction with a crescent Moon the morning of the 31st. For many observers their closest pass - just over half a degree apart, or less than a thumb's width held at arm's length - will occur after sunrise. Since Venus and the Moon are so bright you may still be able to spot them, even after sunrise. Have you ever seen Venus in the daytime?

If you have missed **Saturn** this winter, watch for the ringed planet's return by the end of the month, when it rises right before sunrise in Sagittarius. See if you can spot it after observing Venus' conjunctions!

You can catch up on all of NASA's current and future missions at nasa.gov



Caption:

Have you ever wondered how eclipses occur? You can model the Earth-Moon system using just a couple of small balls and a measuring stick to find out! The “yardstick eclipse” model shown here is set up to demonstrate a lunar eclipse. The “Earth” ball (front, right) casts its shadow on the smaller “Moon” ball (rear, left). You can also simulate a solar eclipse just by flipping this model around. You can even use the Sun as your light source! Find more details on this simple eclipse model at bit.ly/yardstick eclipse

Point and Shoot Camera Astroimaging

Canon Powershot SX50 HS

Image & write-up submitted by Paul Kursewicz

Comet46/pWirtanen

Specs: FL 40mm, ISO 1250, 3 x 1 min exposures, 12-12-18



During the preceding days prior to the Christmas Comet's closest approach to our planet, I managed to walk away with three pretty good images of the comet, despite interferences from clouds and moonlight. This first picture is a wide angle shot that includes the Hyades and Pleiades open clusters. The comet (center of image) formed a perfect triangle with these two open clusters. At this time, the comet was four days away from closest approach. Comet46/pWirtanen has a short orbital period of 5.4 years and is considered to be in the Jupiter family of comets.

“Continued on page 9”

“Comet46/pWirtanen *continued from page 8*”

Comet46/pWirtanen

Specs: FL 1200mm, ISO 1600, 3 x 1 min exposures, 12-12-18



This close-up image was taken on the same night as the previous picture. I was hoping to capture its tail, but, later found out the ion tail will be behind the comet near closest approach. A tail may be seen in the coming days and weeks when its orientation will be different. The nucleus of the comet is approximately .75 miles in diameter (rather small). Its very bright because of its closeness to Earth. In contrast, the coma is rather dim, diffuse, and ghostly looking, which made it rather difficult to see in light polluted skies. In an absolute sense, the coma is bigger than the planet Jupiter.

“*Continued on page 10*”

“Comet46/pWirtanen *continued from page 9*”

Comet46/pWirtanen

Specs: FL 153mm, ISO 1600, 3 x 1 min exposures, 12-15-18



This image of the comet was taken on the 15th, the day before closest approach where it positioned itself close to the Pleiades. The minimum distance between the comet and us occurred on the 16th (7,199,427 miles or 30 Moon distances). Ranked in terms of distance from Earth, it was the 20th closest approach of a comet dating as far back as the ninth century A.D., and the tenth closest approach since 1950. It was discovered about seventy years ago. On January 10, the comet reaches a maximum northern declination of +59 degrees. The comet is receding from us now so it will appear fainter each and every day.

Club Meeting & Star Party Dates

Date	Subject	Location
Jan 4th	<p>ASNNE Club Meeting:</p> <p>7:30-9:30PM: Club Meeting</p> <p><u>Meeting Agenda</u></p> <p>Guest speaker/topic - ASNNE is proud to present Sascha Deri, CEO of bluShift Aerospace. Born and raised in Maine, Sascha moved to Massachusetts after college. There he founded altE, a \$24M solar company. Sascha started bluShift Aerospace in 2014, and moved it to Brunswick, Maine in 2017. The bluShift team is designing safe, low cost launch vehicles that use a proprietary, bio-derived solid fuel. This new line of rockets will be built and launched here in Maine, creating 20-30 aerospace jobs in-state over the next five years.</p> <p>Business Meeting starts at 6pm</p> <p>Bernie Reim - What's UP Astro Shorts: (news, stories, jokes, reports, questions, photos, observations etc.)</p>	The New School, Kennebunk, Me.
TBD	<p>Club/Public Star Party</p> <p><i>(Check List-serve / website for updates or cancellations)</i></p>	Starfield Observatory, 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

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.

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 _____

