

Skylights

Newsletter of the Astronomical Society of Northern New England



JUNE 2018



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 June

By *Bernie Reim*

The month of June is named after Juno, the Roman goddess who was the wife of Zeus and the queen of the gods. According to myth, Juno had the power to see through a veil of clouds that Zeus put up, so our latest mission to Jupiter was named Juno since it does much the same thing for us today, except Juno uses scientific instruments that humans designed using the principles of mathematics and not magical powers.

June always marks the beginning of summer for us in the northern hemisphere. This year that will happen at 6:07 a.m. on Thursday, June 21. That marks the highest point on the ecliptic above the celestial equator that the sun will reach for the year. For us that is about 68 degrees high in the sky, which is our latitude plus the tilt of the earth.

We should get much warmer nights this month, but they will also be shorter because of the high angle of the sun. There are many interesting highlights this month which include good appearances of all 5 of the brightest planets with Saturn reaching opposition on June 27. There will also be some close conjunctions with the moon and as a nice bonus, the brightest asteroid, named Vesta, will reach opposition on June 19 and become visible without optical aid.

Venus reaches its highest altitude in our sky on June 6 at 28 degrees above the horizon. It will then set around 10:30 pm, which is about as late as it could ever set. As Venus continues to catch up with us in our respective orbits, it is also getting larger and brighter even as it is getting less illuminated by the sun. Venus will go from 80% illuminated down to 70% this month. Venus is now in Gemini the twins. It will be almost evenly spaced with Castor and Pollux on June 8 and as it continues to travel eastward along the ecliptic, it will get very close to the Beehive open star cluster in Cancer, also known as M44 or Praesepe, the manger, on June 20, just before summer starts.

The Beehive cluster is one of the closest open

star clusters to Earth. It is a visible to the naked eye as a faint smudge about three times the width of the full moon, but knowing more about it will make it that much more interesting. It has over 1,000 stars in it and it spans about 30 light years of the sky at a distance of 600 light years away. The Beehive cluster is related to the nearby Hyades cluster in Taurus, since they both have a common point of origin in space within our galaxy based on their age and proper motion around the galaxy. The Beehive cluster is only 600 million years old, which is actually quite young. Our own sun and earth are about 8 times older than that. Fish had not even emerged in our oceans at that time in our history. Only some primitive jelly fish existed back then.

Jupiter is now just passed opposition, but it is still high and bright in our eastern evening sky. The other night at 9 pm, I saw Venus setting at about the same height above the western horizon as Jupiter was as it was rising over the eastern horizon. That was 25 degrees. Right in middle between them, at the highest point on the ecliptic, was a first quarter moon.

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What's Up "Continued from page 1"

Roughly the same set-up will happen again at first quarter moon this month on June 20.

Jupiter is getting a little fainter and farther away now, but the king of the planets is still much closer and brighter than usual. It will end its retrograde loop in Libra on July 9, two months after its opposition last month on May 9. Look for all 4 of its bright Galilean moons with just a pair of binoculars.

Saturn will reach opposition in the constellation of Sagittarius on June 27, the same day that the full moon will be only one degree above the ringed planet. That is a very auspicious way to mark its opposition this year. Saturn's famous rings are now tilted open at nearly 26 degrees, about the maximum possible from our line of sight. Since Saturn is now at its closest and largest and brightest for the year, look for its dusky polar caps, its elusive and shadowy crepe ring near the planet, and the very narrow Encke Gap in the A ring out beyond the much wider Cassini Division. You would need a telescope to help reveal these Saturnian wonders.

Mars is the most dramatic planet this month. It will once again more than double in brightness, from minus 1.2 to minus 2.2 magnitude. It will also get 25% larger in size as we are now rapidly catching up with the red planet in our orbits around the sun. Mars begins the month rising at midnight, but ends the month rising by 10:30 pm. Mars will slow its eastward motion and begin its retrograde motion in Capricorn on June 28, just one month before its long-awaited opposition on July 29, which will be its best opposition in 15 years. Look for its beautiful golden-orange glow one constellation to the east of Saturn.

Mercury makes a brief appearance low in the west-northwestern sky half an hour after sunset starting near the middle of the month. Look for a slender waxing crescent moon to pass near Mercury on June 14, which is also Flag Day, and then pass near Venus the next evening in Gemini.

As a bonus, the brightest asteroid, named Vesta, will reach opposition this month on June 19 in Sagittarius very close to Saturn. Vesta is only the second largest asteroid after Ceres and is about half its size at 330 miles in diameter, and it was only the fourth one discovered, in 1807, but it is the brightest one. It will be visible even without optical aid this month as it will reach 5.3 magnitude before it fades a little towards the end of the month.

Vesta is a very fascinating place, since it could have become a full planet based on its geology, if it hadn't been prevented from developing due to Jupiter's strong gravity. Vesta is differentiated and has a crust, mantle, and core like the earth, making it unique among all the millions of asteroids that orbit between Mars and Jupiter.

A huge chunk of Vesta is missing near its South Pole. That happened during a massive collision about one billion years ago that almost blew this entire protoplanet apart. That one collision ejected half a million cubic miles of material into space and is even now the source of fully 5% of all of the meteorites that we find on Earth. There are called HED meteorites, which stands for Howardite-Eucrite-Diogenite and they are very similar to igneous rocks on Earth.

June 1. The moon passes near Saturn in Sagittarius this morning.

June 3. Mars and the moon will rise just 3 degrees apart this morning.

June 4. The Compton Gamma Ray telescope was deorbited on this day in 2000 after 10 years.

June 5. Voyager 2 reached Neptune on this day in 1989 and made many interesting discoveries. The last transit of Venus occurred on this day in 2012. The next one will not be until 2117.

June 6. Last quarter moon is at 2:33 p.m. EDT.

June 13. New moon is at 3:44 p.m. On this day in 1983 Pioneer 10 left the solar system, crossing the heliopause at 121 a.u. from the sun, or about 3 times farther out than Pluto.

June 16. On this day in 1963 Valentina Tereshkova became the first woman in space and still remains as the only woman to do a solo space flight. Look for the Beehive star cluster half way in between brilliant Venus and the waxing crescent moon this evening.

June 19. Vesta is at opposition with the sun tonight in Sagittarius near Saturn.

June 20. First quarter moon is at 6:52 a.m. EDT.

June 21. Summer starts today at 6:07 a.m.

June 23. The moon and Jupiter are only 4 degrees apart in Libra tonight.

June 26. Charles Messier was born on this day in 1730. He was a French comet hunter that developed a catalog of 110 objects in the sky that were not comets.

June 27. Saturn will reach opposition tonight, rising at sunset and not setting until sunrise.

June 28. Full moon is at 12:54 a.m. This is also called the Strawberry or Rose Moon.

June 29. George Ellery Hale was born on this day in 1868.

June 30. On this day in 1908 a comet or asteroid exploded a few miles above Tunguska, Siberia with the force of 20 megatons of TNT, or about 1,000 times the energy of the first atomic bomb.

Moon Phases

June 6
Last Quarter

June 13
New

June 20
First Quarter

June 28
Full

Moon Data

June 2
Moon at apogee

June 3
Mars 3° south
of Moon

June 6
Neptune 2° north
of Moon

June 9
Uranus 5° north
of Moon

June 14
Moon at perigee

June 16
Venus 2° north
of Moon

June 23
Jupiter 4° south
of Moon

June 27
Saturn 1.8° south
of Moon

Submitted by Glenn Chaple



Sky Object of the Month – June 2018

(Courtesy LVA's Observer's Challenge*)

Messier 51 – Face-on Spiral Galaxy in Canes Venatici (Mag. 8.4; Size 11.2' X 6.9')

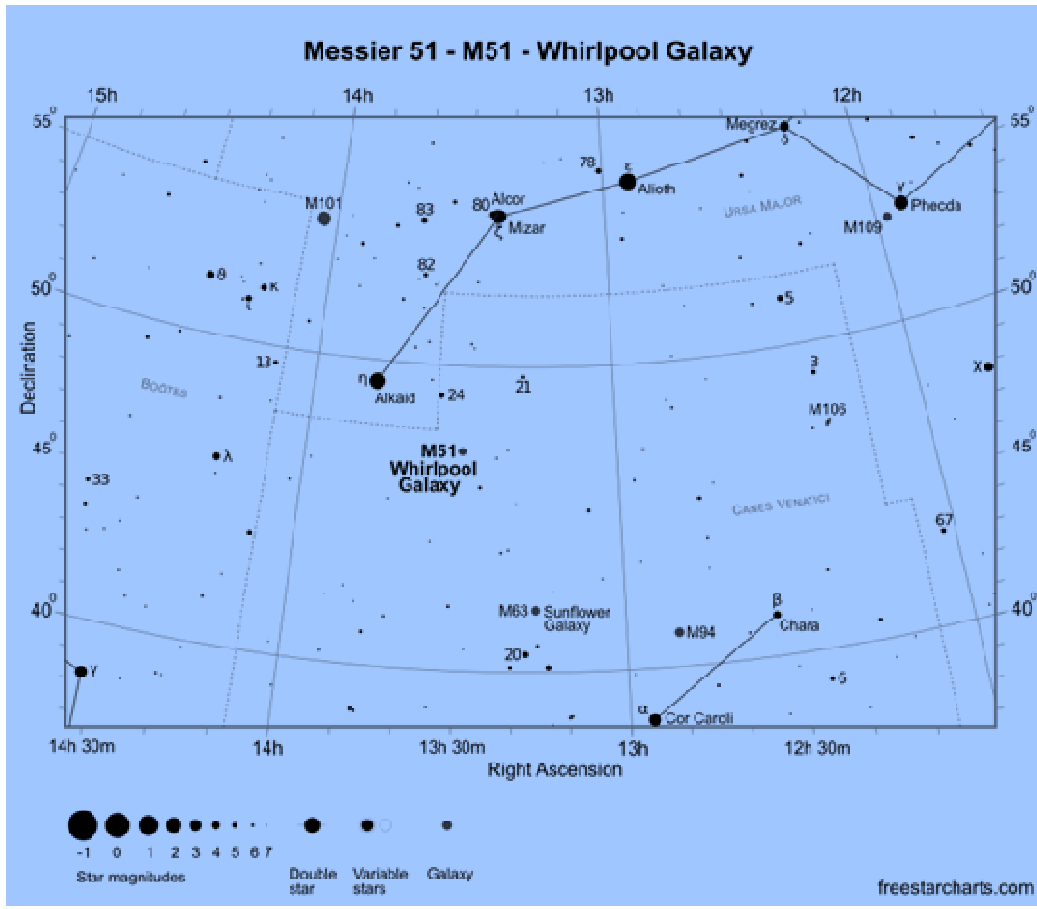
If you've been actively engaged in backyard astronomy for any length of time, you must certainly have trained your telescope in Messier 51. One of the brightest of Messier Catalog galaxies (it was discovered by the French comet hunter in 1773), it can even be glimpsed with binoculars from dark sky locations. M51 is actually two galaxies in one – an interacting system comprised of a face-on spiral (M51a [NGC 5194]) and a smaller galaxy of indeterminate type (M51b [NGC 5195]).

Through a small aperture scope (or medium sized instrument under hazy or slightly light-polluted skies), this galactic pair bears the “double nebula” appearance that Messier noted. The spiral nature of M51 was discovered by William Parsons, the 3rd Earl of Rosse, who viewed it with a 72-inch reflecting telescope (the “Leviathan of Parsonstown”) in 1845. Compare his drawing (below left) with a recent photographic image made by Amateur Telescope Makers of Boston member Mario Motta (below right).

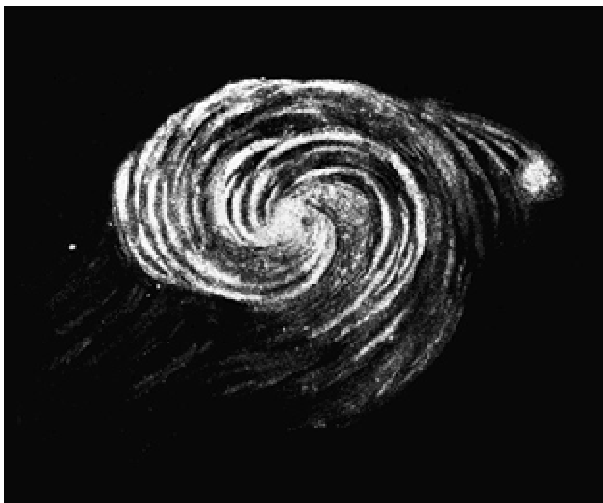
The speculum metal mirror of Parsons' 72-inch scope reflected a fraction of the light that the aluminum-coated glass mirrors of modern-day reflectors do. You won't need a 72-inch scope to capture the spiral arms of M51 or the bridge of light that connects the two. What is the smallest aperture that will reveal both?

M51 is easily located 3½ degrees southwest of the 2nd magnitude star eta (η) Ursae Majoris. A quick search method is to make a low power sweep of the area one-fourth of the way between eta UMa and Cor Caroli (alpha [α] Canum Venaticorum). This magnificent spiral is about 25 million light years away and is about half the size of the Milky Way.

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Mario Motta, MD

Principal Meteor Showers in 2018

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>

Our Club has Merchandise for Sale at: www.cafepress.com/asnne



ALL money raised goes to our operating fund.

Any design can be put on any item.

Just let our club member, David Bianchi, know.

This article is provided by NASA Space Place.
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What Is the Asteroid Belt?

By Linda Hermans-Killiam

There are millions of pieces of rocky material left over from the formation of our solar system. These rocky chunks are called asteroids, and they can be found orbiting our Sun. Most asteroids are found between the orbits of Mars and Jupiter. They orbit the Sun in a doughnut-shaped region of space called the asteroid belt.

Asteroids come in many different sizes—from tiny rocks to giant boulders. Some can even be hundreds of miles across! Asteroids are mostly rocky, but some also have metals inside, such as iron and nickel. Almost all asteroids have irregular shapes. However, very large asteroids can have a rounder shape.

The asteroid belt is about as wide as the distance between Earth and the Sun. It's a big space, so the objects in the asteroid belt aren't very close together. That means there is plenty of room for spacecraft to safely pass through the belt. In fact, NASA has already sent several spacecraft through the asteroid belt!

The total mass of objects in the asteroid belt is only about 4 percent the mass of our Moon. Half of this mass is from the four largest objects in the belt. These objects are named Ceres, Vesta, Pallas and Hygiea.

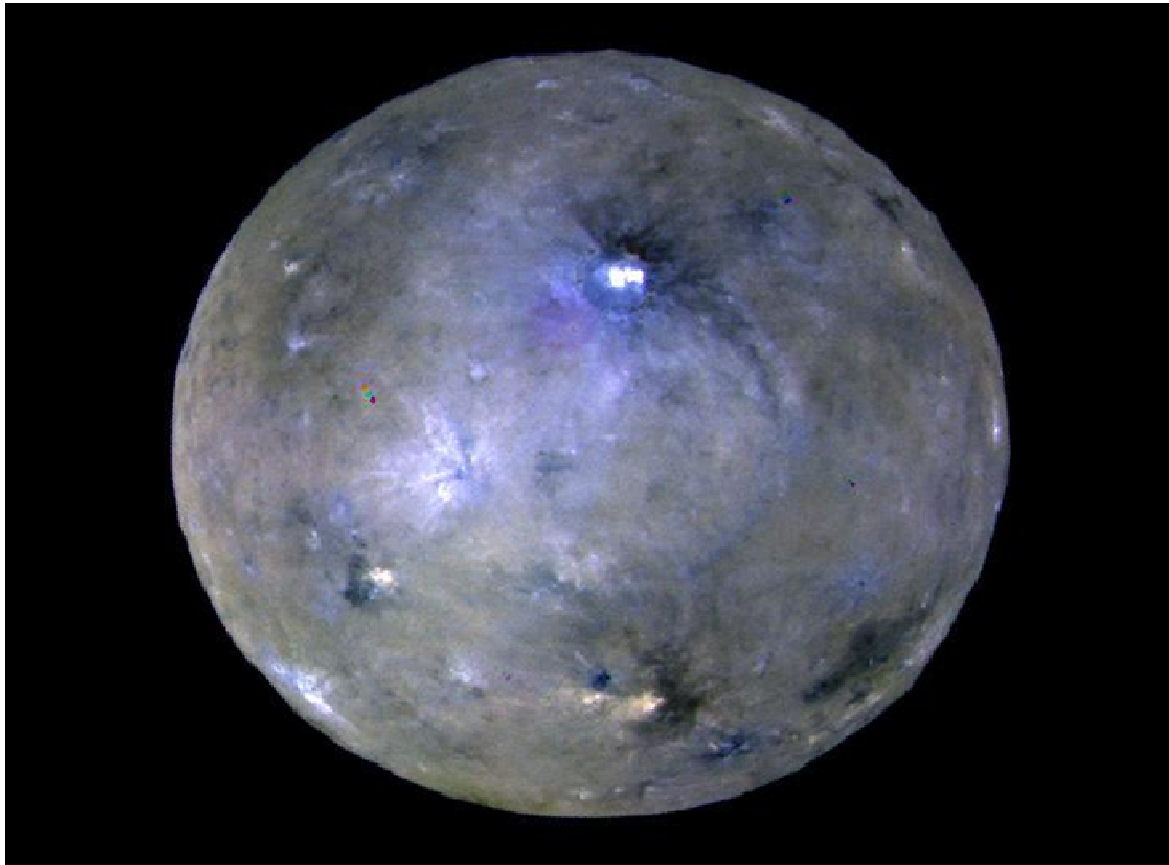
The dwarf planet Ceres is the largest object in the asteroid belt. However, Ceres is still pretty small. It is only about 587 miles across—only a quarter the diameter of Earth's moon. In 2015, NASA's Dawn mission mapped the surface of Ceres. From Dawn, we learned that the outermost layer of Ceres—called the crust—is made up of a mixture of rock and ice.

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The Dawn spacecraft also visited the asteroid Vesta. Vesta is the second largest object in the asteroid belt. It is 329 miles across, and it is the brightest asteroid in the sky. Vesta is covered with light and dark patches, and lava once flowed on its surface.

The asteroid belt is filled with objects from the dawn of our solar system. Asteroids represent the building blocks of planets and moons, and studying them helps us learn about the early solar system.

For more information about asteroids, visit: <https://spaceplace.nasa.gov/asteroid>



Caption: This image captured by the Dawn spacecraft is an enhanced color view of Ceres, the largest object in the asteroid belt. Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA

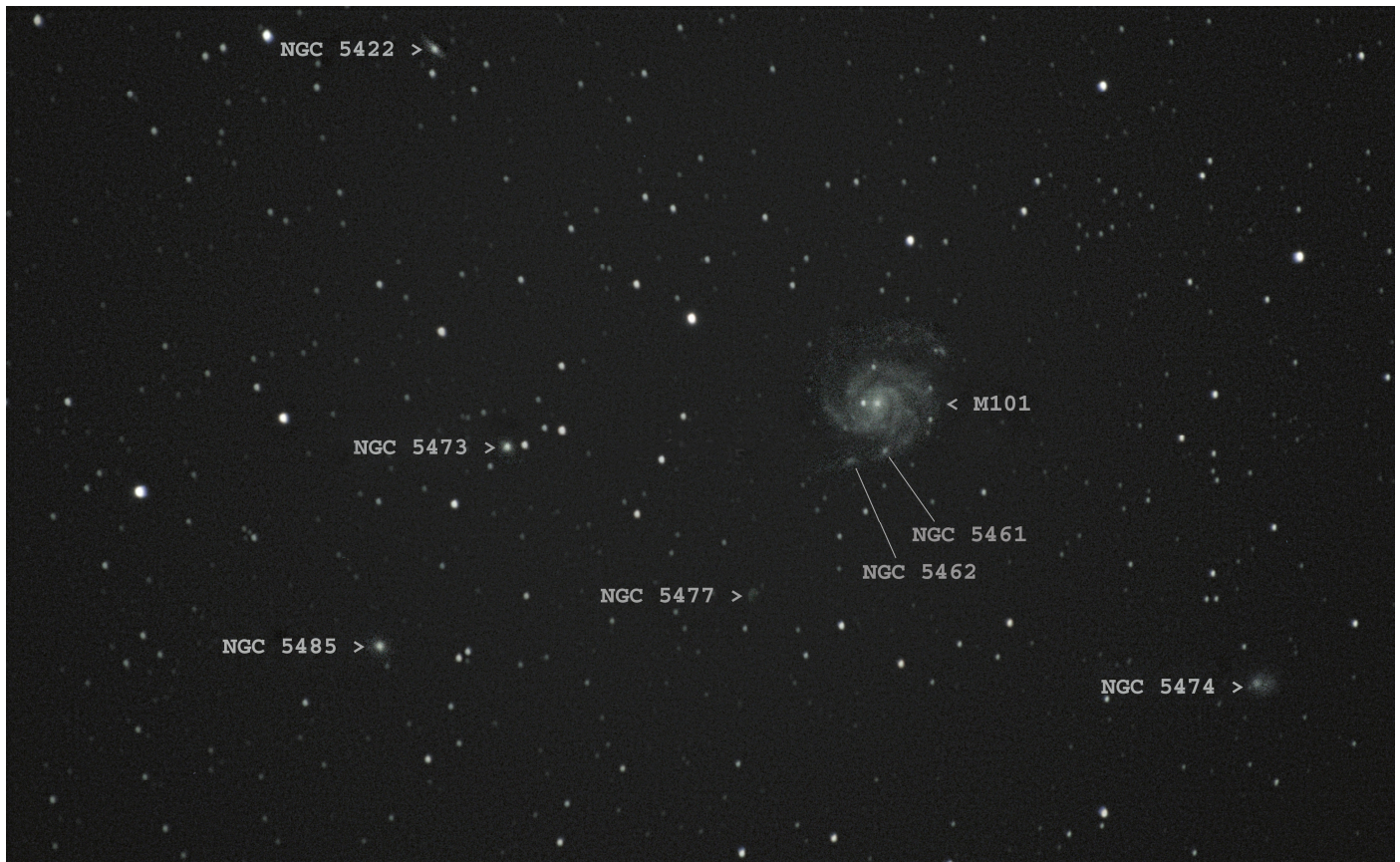
Point and Shoot Camera Astroimaging

Canon Powershot SX50 HS

Image submitted by Paul Kursewicz

M101 (Pinwheel Galaxy)

Specs: 1200mm FL, ISO 1600, 24 x 1min 30sec exposures, 05-08-18



M101 is a face-on spiral galaxy 21 million miles away from Earth and is located in the constellation Ursa Major, the Great Bear. It has a diameter of 170,000 light-years (larger than our galaxy) and has around a trillion stars, ten times the amount in the Milky Way. M101 is noted for its high population of [H II regions](#), many of which are very large and bright. Two can easily be seen here located in its outer spiral arm and are labeled NGC 5461 and NGC 5462. These Diffuse Nebula are typically clouds of partially ionized gas in which star formation has recently taken place. NGC 5474 and NGC 5477 are two of several companion galaxies of M101, NGC 5474 being the closest. NGC 5422, NGC 5473, and NGC 5485 are background galaxies.

June's Guest Speaker: Dr. Elizabeth McGrath

Most of the visible matter in the Universe today is contained within a relatively small fraction of very massive galaxies. Understanding how these galaxies develop over time is therefore one of the key astrophysical questions today. The answer lies not only in weighing the mysterious quantities known as dark matter and dark energy, but also in understanding how matter and radiation interact, particularly during energetic events such as star formation, galaxy collisions, and the formation of supermassive black holes. Observations in the local universe suggest that the most massive galaxies completed their star-formation very early in the history of the universe. Furthermore, there appears to be a correlation between the star-formation activity and the structural properties of galaxies. In order to explain these observations, prevailing theories for the formation of the most massive galaxies have relied on a combination of galaxy mergers followed by the structural transformation of disks to spheroids and the eventual quenching of star-formation through feedback from intense radiation surrounding supermassive black holes. To better test this hypothesis, however, it is necessary to observe galaxies at earlier times in the universe at the epoch when the first quenched galaxies appear. Dr. McGrath will discuss some of the observations she and her team have been making using data from the Hubble Space Telescope. Interestingly, a significant fraction of galaxies at these early epochs appear to quench their star-formation before undergoing any significant structural transformation, challenging our ideas about how at least some of the most massive galaxies form. These quenched red disks do not appear to have undergone any major galaxy mergers, which is also problematic for quenching scenarios, since black holes are commonly thought to be fed by the same mergers that transform galaxy structure. Dr. McGrath will discuss some plausible alternatives to the merger hypothesis and implications for galaxy formation in general. She will conclude by looking ahead to Hubble's successor, the James Webb Space Telescope, which will help resolve some of these outstanding questions surrounding the formation and evolution of the most massive galaxies in the universe.

Club Meeting & Star Party Dates

Date	Subject	Location
June 1	<p><u>ASNNE Club Meeting:</u> Business Meeting starts at 6:00PM 6:30-7:15PM: Starlady Joan Chamberlin conducts a basic astronomy class prior to the meeting. 7:30-9:30PM: Club Meeting</p> <p><u>Meeting Agenda</u> Guest Speaker: Dr. Elizabeth McGrath.</p> <p>Topic - Walk Among Giants: Revealing the Formation Histories of the Most Massive Galaxies in the Universe.</p> <p>(See page 9 for more details)</p> <p>Bernie Reim - "What's UP"</p> <p>Astro Shorts: (news, stories, jokes, reports, questions, photos, observations etc.)</p>	The New School, Kennebunk, Me.
June 15	Club/Public Star Party <i>Check List-serve / website for updates and or cancellations</i>	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

2018 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 _____

