

Central Coast Astronomical Stargazing November

Preparing for your stargazing session:

Step 1: Download your free map of the night sky: SkyMaps.com

They have it available for Northern and Southern hemispheres.

Step 2: Print out this document and use it to take notes during your stargazing session.

Step 3: Watch our stargazing video: youtu.be/46XmFYh6hLU

**Image credit: all astrophotography images are courtesy of NASA unless otherwise noted. All planetarium images are courtesy of Stellarium.*

Main Focus for the Session:

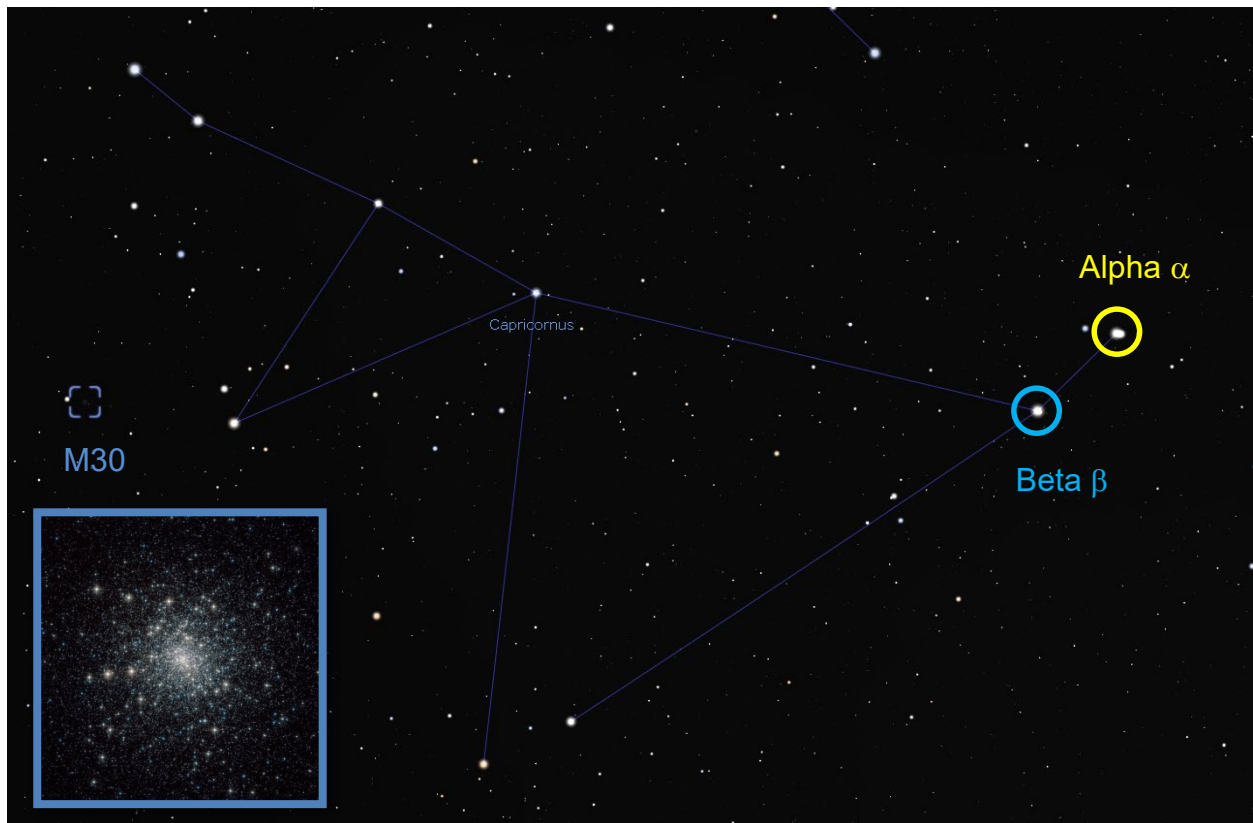
1. Capricornus (Sea Goat)
2. Piscis Austrinus (Southern Fish)
3. Aquarius (Water Bearer)
4. Cetus (Whale or Monster)
5. Pisces (Fishes)

Notes:

1. Capricornus (Sea Goat)

Alpha 1 and Alpha 2 Capricorni: Located in the tail of the goat, this is a naked eye yellow double star (both are yellow), about 376" apart. Alpha 1 is a supergiant star about 500 light years away with a magnitude of 4.2 and Alpha 2 is a giant star about 109 light years away with a magnitude of 3.6 visual. Alpha 1 has a magnitude 9.2 companion about 45" away and Alpha 2 has a magnitude 11.0 companion about 6.6" away.

Beta Capricorni: Located in the base of the tail of the goat is a white and blue double about 205" apart. The white component is magnitude 3.4 while the blue companion is magnitude 6.2 visual. This double is estimated to be 150 light years away. The white component is about 100 times brighter than our sun. This is a colorful double easily split by any telescope.



M 30, globular cluster: This object is about 30,000 light years away and is about 7.3 magnitude. It was discovered by Charles Messier on August 8, 1764. M 30 is about 25' west of the 5.5 magnitude star 41 Capricorni and about 2.5 degrees in front of the goat's mouth as pictured in H. A. Rey's book. This is a binocular object. We call it the Jellyfish cluster because of the lines of stars from it look like tentacles.

2. Piscis Austrinus (Southern Fish)

Fomalhaut (Mouth of the Fish), Alpha Piscis Austrini is a white star, magnitude 1.17, about 23 light years distant, and is the 18th brightest star in the sky (about twice the diameter of our sun and 14 times brighter). It is sometimes called the “Solitary One” because it is a bright star in an empty region of the southern Autumn sky, making it stand out. Fomalhaut is Arabic, meaning the “mouth of the fish”.

Beta Piscis Austrini: A white and bluish double star about 30” apart. The white component has a magnitude of 4.4 while the bluish star has a magnitude of 7.9 visual.



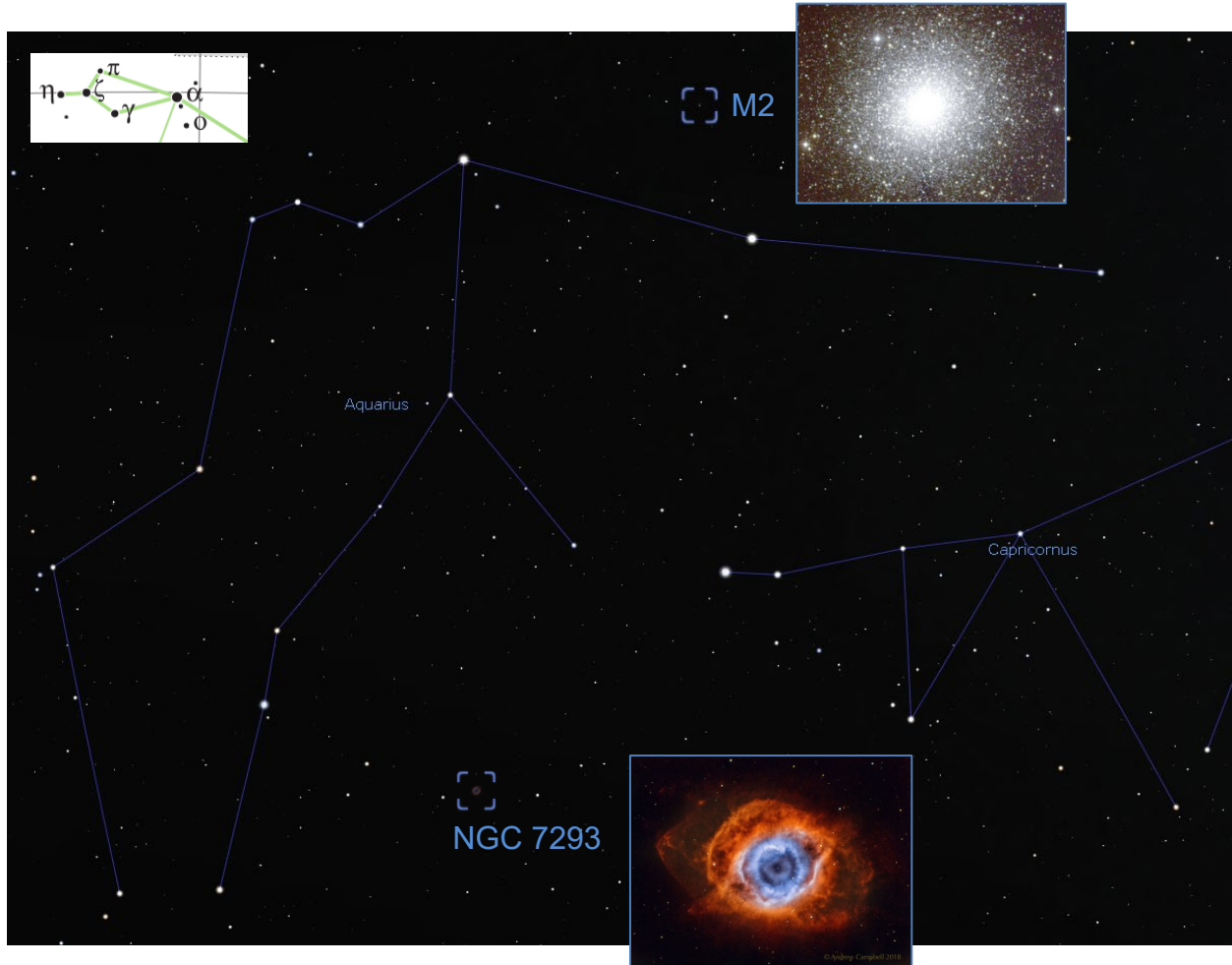
Image right: DSS (Digital Surveyed Sky) image of Fomalhaut. This image shows Fomalhaut, the star around which the newly discovered planet orbits. Fomalhaut is blazing through hydrogen at such a furious rate that it will burn out in only one billion years, 10% the lifespan of our star.

The field of view is 2.7 x 2.9 degrees.



3. Aquarius (Water Bearer)

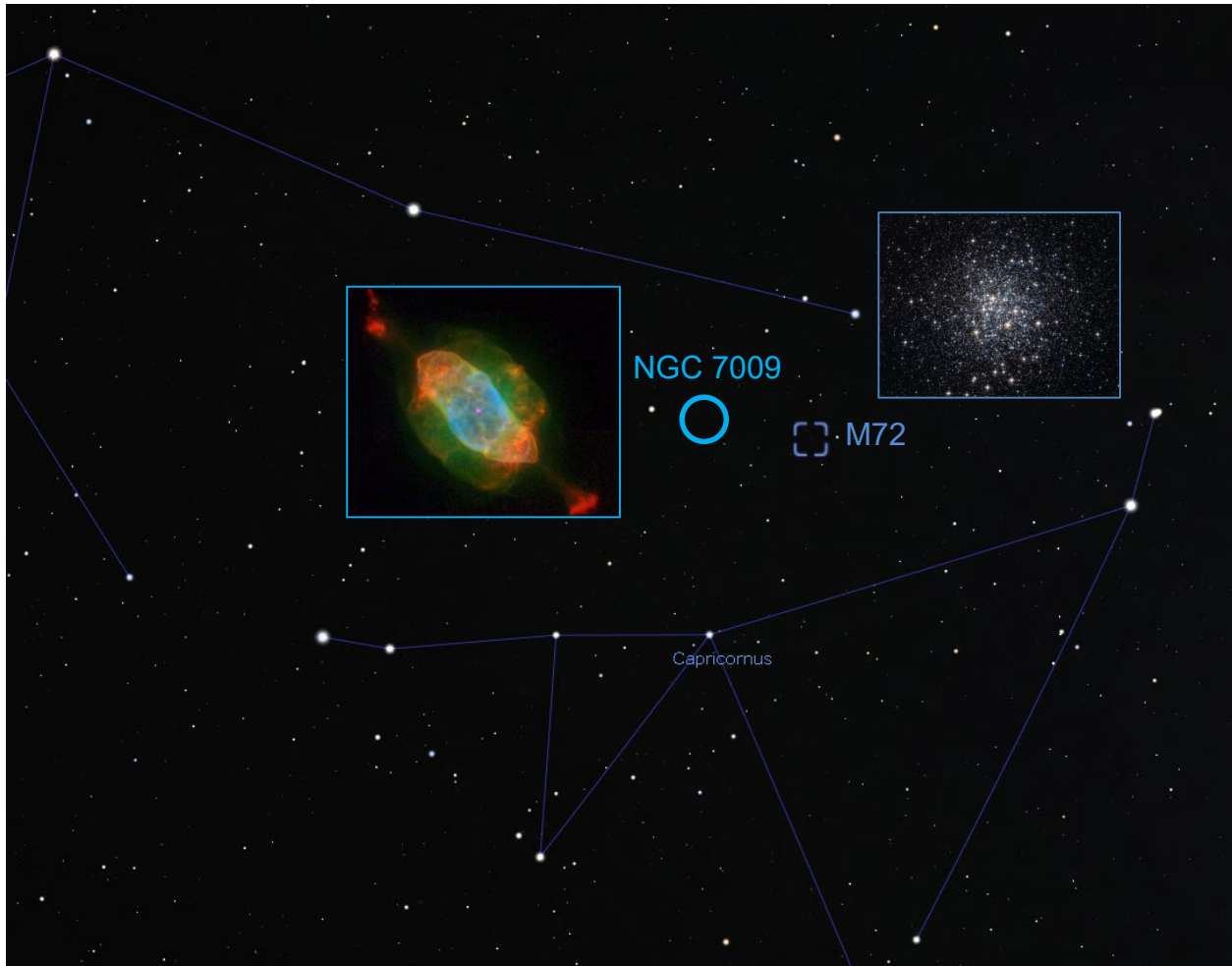
Water Urn or “Y” asterism: It is made up of Zeta (ζ in the center), Pi (π), Eta (η), and Gamma (γ) Aquarii. This asterism is a “Y” shaped trefoil which looks a bit like a Mercedes-Benz symbol. Easily seen in binoculars, it is a good starting point for learning the constellation. The “Y” shape will fit into a 4 degree circle without trouble.



Helix Nebula, NGC 7293, planetary nebula: It is a very large planetary nebula at a size of 16' x 12' and may be the closest one to earth at 650 light years away. With a magnitude of 7.3 and such a large size, it has a low surface brightness, yet is easily seen in binoculars. There are reports of naked eye sightings of the Helix Nebula in southern locations such as Western Australia, where it is sometimes overhead. The Helix Nebula was discovered by Karl Harding in the Autumn of 1823. It is located 1.2 degrees west of the magnitude 5.2 star, Upsilon Aquarii.

M2, globular cluster: It has a magnitude of 6.4 and is 41,000 light years away, containing about 1.5 million stars. M2 has a diameter of about 190 light years. It was discovered by Jean-Dominique Maraldi on September 11, 1746. This globular cluster is

an easy binocular object. About 5 degrees north of Beta Aquarii, M2 forms an almost right angle triangle with Alpha and Beta Aquarii.



Saturn Nebula, NGC 7009, planetary nebula: Discovered by William Herschel on September 7, 1782, this planetary nebula was the first deep sky object he had ever found. The Saturn Nebula has a magnitude of 7.8, is about 3,200 light years away and has a size of 30" x 26". The central star has a magnitude of 12.0 visual. The Saturn Nebula nickname was coined by William Parsons, Third Earl of Rosse. This object can be found 1.25 degrees west of Nu Aquarii.

M 72, globular cluster: This object was discovered by Pierre Mechain on August 29, 1780. It has a magnitude of 9.2, is about 100 light years in diameter and is about 58,000 light years away. M 72 is a faint object in binoculars and can be found 3.5 degrees south of Mu Aquarii.

4. Cetus (Whale or Monster)

Mira (The Wonderful), Omicron Ceti, variable star was the first variable star to be discovered. It is a long-period pulsating variable, changing in brightness on average from the 3rd magnitude to the 9th magnitude over an average period of 331 days. Mira was first noticed by David Fabricius who saw it fade from maximum in 1596 and thought it was a nova. It was plotted as a 4th magnitude star and given the Greek letter omicron ("O") in Bayer's 1603 Uranometria star atlas, not realizing its nature. (This was all before the telescope was invented in 1608.)

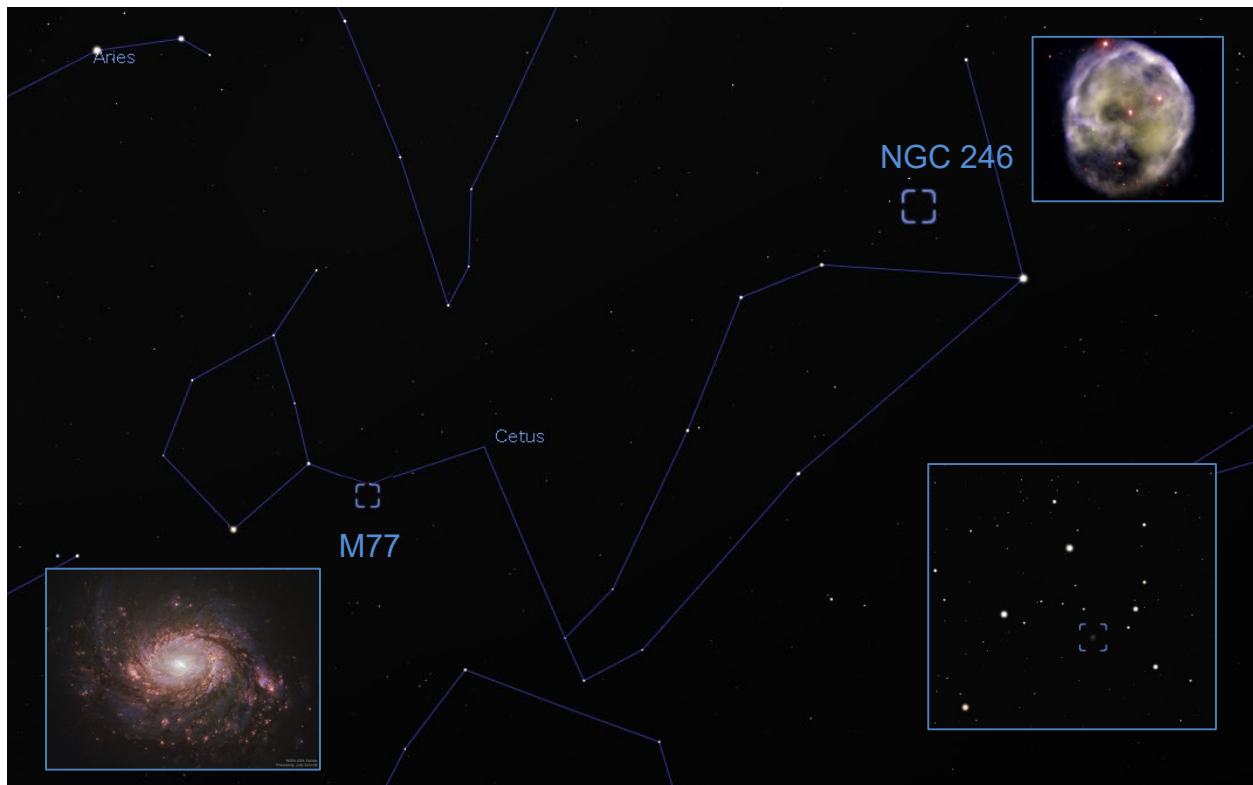
The periodic nature of Mira was discovered by Holwarda in 1638 and it has been followed through maximum and minimum ever since. As a variable star, Mira was discovered over a century before the second variable star, Algol (covered in last month's star gazing session), was discovered. Mira is about 400 light years away.

On average it is about as bright as our sun at minimum and about 250 times as bright as our sun at maximum. At maximum its diameter is larger than the orbit of Mars. Mira can be found between Alpha Ceti and Beta Ceti, about a third of that distance from Alpha Ceti. In Ultraviolet, Mira has a 13 light year-long comet like tail as it plows through the interstellar medium, see APOD for August 17, 2007 (shown below).



NGC 246 (Skull Nebula) is a planetary nebula. This large, 240" x 210", somewhat round nebula has several stars embedded within it. It is about 1,500 light years away and a brightness of 10.4 visual. The central star is about magnitude 12.0 visual.

NGC 246 was discovered by William Herschel on November 27, 1785. It forms an equilateral triangle with Phi One (ϕ 1) (17 Ceti) and Phi Two (ϕ 2) (19 Ceti), with NGC 246 being to the south of these two stars. It has a good response to an O-III filter.



M 77, galaxy: It is about 47 million light years away with a magnitude of 8.9 and a diameter of 100,000 light years across. M 77 was discovered by Pierre Mechain on October 29, 1780. It is located 52' east-southeast of Delta Ceti.

5. Pisces (Fishes)

Circlet, asterism: This asterism is the Western Fish and is shown as a circle of six 4th and 5th magnitude stars. The Circlet is about 10 degrees south of the southern side of the Great Square. It is also east-northeast of the “Y” asterism in Aquarius. The Circlet is easily seen in binoculars and a good start for tracing out Pisces.



M 74, galaxy: It has a magnitude of 8.5, is about 25 million light years away and 77,000 light years in diameter. M 74 was discovered by Pierre Mechain in September of 1780. It can be located about 1,25 degrees east-northeast of Eta Piscium.

