

2020

Buhl Planetarium &amp; Observatory

**ASTRONOMICAL CALENDAR****Summer****JUNE 2020**

1	Mon	M13 globular cluster well-placed for observation (Use telescope in Hercules)
3	Wed	Mercury at highest point in evening sky (Look west-northwest at sunset)
5	○ Fri	Full Moon (Strawberry Moon)
9	Tues	Moon within 3 degrees of both Jupiter and Saturn (Look south before dawn)
13	☾ Sat	Moon within 3 degrees of Mars (Look southeast before dawn) Moon at last quarter phase
20	Sat	Summer solstice
21	● Sun	New Moon
27	Sat	Bootid meteor shower peak (Best displays soon after dusk)
28	☾ Sun	Moon at first quarter phase

**JULY 2020**

5	○ Sun	Full Moon (Buck Moon) Penumbral lunar eclipse (Look south midnight into Monday) Moon within 2 degrees of Jupiter (Look south midnight into Monday)
6	Mon	Moon within 3 degrees of Saturn (Look southwest before dawn)
8	Wed	Venus at greatest brightness (Look east at dawn)
11	Sat	Moon within 2 degrees of Mars (Look south before dawn)
12	☾ Sun	Moon at last quarter phase
14	Tues	Jupiter at opposition (Look south midnight into Wednesday)
17	Fri	Moon just over 3 degrees from Venus (Look east before dawn)
20	● Mon	New Moon; Saturn at opposition (Look south midnight into Tuesday)
27	☾ Mon	Moon at first quarter phase
28	Tues	Piscis Austrinid meteor shower peak (Best displays before dawn)
29	Wed	Southern Delta Aquariid and Alpha Capricornid meteor showers peak

**AUGUST 2020**

1	Sat	Moon within 2 degrees of Jupiter (Look southeast after dusk)
2	Sun	Moon within 3 degrees of Saturn (Look southeast after dusk)
3	○ Mon	Full Moon (Sturgeon Moon)
9	Sun	Conjunction of the Moon and Mars (Look south before dawn)
11	☾ Tues	Moon at last quarter phase
12	Wed	Perseid meteor shower peak (Best displays before dawn)
15	Sat	Moon within 4 degrees of Venus (Look east before dawn)
17	Mon	Kappa Cygnid Meteor Shower peak (Best displays around 11 pm)
18	● Tues	New Moon
25	☾ Tues	Moon at first quarter
28	Fri	Ceres at opposition (Use telescope in Aquarius after midnight into Saturday) Moon within 2 degrees of Jupiter (Look south around 10 pm)
29	Sat	Moon just over 2 degrees from Saturn (Look south around 10:30 pm)



## Summer Planet Visibilities

June	Evening:	Mercury (Look low in west at dusk early June)
	Morning:	Venus (Look east at dawn) Mars (Look southeast at dawn) Jupiter (Look south at dawn) Saturn (Look south at dawn)
July	Evening:	Jupiter (Look southeast at dusk) Saturn (Look southeast at dusk)
	Morning:	Mercury (Look east at dawn in late July) Venus (Look east at dawn) Mars (Look south at dawn) Jupiter (Look southwest at dawn) Saturn (Look southwest at dawn) Uranus (Use telescope to look east before dawn at the end of July) Neptune (Use telescope to look south before dawn at the end of July)
August	Evening:	Jupiter (Look south at dusk) Saturn (Look south at dusk)
	Morning:	Mercury (Look east at dawn at the beginning of August) Venus (Look east at dawn) Mars (Look south at dawn) Jupiter (Look southwest at dawn) Saturn (Look southwest at dawn)

### Science Fact

From our perspective, the Sun appears to move across the sky in a path known as the ecliptic. From a grand view in space, the ecliptic is, in fact, the plane of the Earth's orbit around the Sun.

Facing south and looking up at the night sky, the planets appear to move roughly along this same path, the ecliptic. In reality, Earth and the other major planets are all orbiting in nearly the same plane around our Sun since they were formed by the Sun's spinning, flattened, proto-planetary disk.

The Moon can appear up to 5 degrees north or south of the ecliptic, since the Moon's orbit is tipped 5 degrees with respect to the Earth's orbit.

## 2020 Buhl Planetarium & Observatory ASTRONOMICAL CALENDAR

### Astronomy History

On July 30, 1610 in Padua, Italy, Galileo Galilei peered at Saturn through his telescope and observed what he thought might be handles or large moons on each side.

Two years later, they vanished from view, only to return in another two years. Years later with improved optics, Dutch astronomer Christiaan Huygens discovered Titan, a moon of Saturn, and also determined that Galileo's "handles" are Saturn's rings, which disappear when they are edge-on from our perspective on Earth. Italian-French astronomer Giovanni Cassini later discerned a gap in Saturn's ring system, now known as the "Cassini Division."

*NASA's Cassini space mission to Saturn and its Huygens probe that parachuted to a landing on Titan were named for these pioneering astronomers who explored Saturn through their telescopes.*

### Celestial Events to Watch for This Summer



(NASA Hubble Space Telescope)

#### JUPITER AND SATURN

*Jupiter and Saturn both promise command performances this July, putting on their best and brightest shows of the year.*

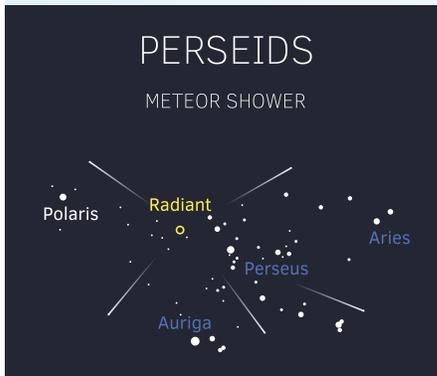
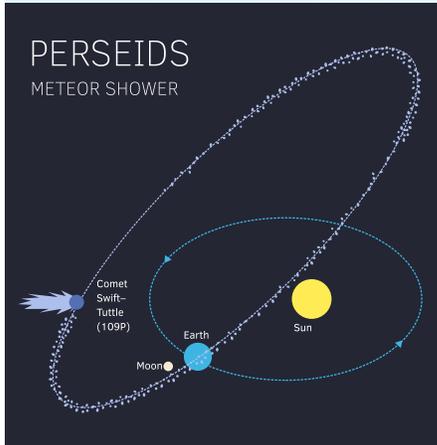
Both planets appear near to each other and to the Full Moon the night of Sun., July 5 into Mon., July 6. The real show begins on Tues., July 14, when Jupiter will be in opposition; Saturn will provide an encore one week later on Mon., July 20.

As Earth and the other planets orbit the Sun, from time to time, Earth will line up directly between the Sun and another planet. For example, when Earth lines up between the Sun and Jupiter, Jupiter is said to be in "opposition." From our perspective on Earth, Jupiter appears on the "opposite" side of our sky to the Sun. As the Sun sets in the west, Jupiter appears in the east.

On Tues., July 14, Jupiter will be in opposition, reaching its highest point in the sky after midnight and remaining above the horizon until dawn on Wednesday. With binoculars or a small telescope, try to spot the colorful stripes of the Jovian atmosphere or even the Galilean moons—the four largest moons of Jupiter, discovered by Galileo.

On Mon., July 12, Saturn will be in opposition, also reaching its highest point in the sky after midnight and glowing yellowish-white above the horizon until dawn on Tuesday. The New Moon phase will provide a dark sky with no moonlight to compete with Saturn. In addition, this year, the north face of Saturn's rings are tilted a generous 21 degrees toward Earth for viewing through a telescope.

**2020** Buhl Planetarium & Observatory  
**ASTRONOMICAL CALENDAR**



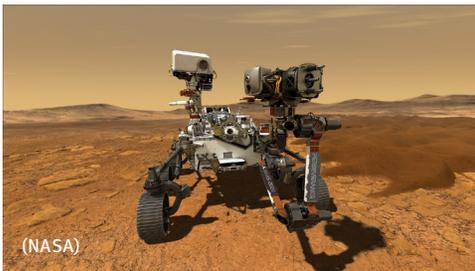
**August: Perseid Meteor Shower**

*Nature will set off celestial fireworks to close out the summer. Meteors will streak through the night sky on warm August nights, peaking in the hours before dawn on Wed., Aug. 12. These meteors are called the Perseids, as they appear to radiate from the constellation Perseus.*

In reality, these meteors come from debris left behind by Comet Swift-Tuttle in its orbit around the Sun. Each year in August, Earth passes through this debris field. The debris slams into Earth's atmosphere at up to 130,000 mph, lighting up the night sky as the Perseid meteor shower.

Comet Swift-Tuttle has quite an eccentric orbit, lapping the Sun every 133 years. Swift-Tuttle last reached perihelion—its closest point to the Sun in its orbit—in December 1992. As the comet drew near to the Sun, the Sun warmed the ice, and debris was left behind in the orbital path. Perseid fans today are still enjoying the benefits of this last fresh deposit of comet ice into the debris field from 1992.

At its peak, the Perseid meteor shower could produce a meteor every minute! Even with a last-quarter Moon obscuring some of the meteors with moonlight, the Perseids tend to be bright enough to put on a spectacular show. Find a comfortable location with a wide view of the sky. No need for a telescope or binoculars, just give your eyes about 20 minutes to adjust. Scan all around the sky for brilliant streaks of light and enjoy the show. Even on an August night, be prepared with some warm layers to bundle up if need be.



**Mission to Mars**

*This summer, our latest and greatest robot explorer will launch for the Red Planet!*

The Mars 2020 Mission will blast off atop an Atlas V rocket from Cape Canaveral, with a current launch window of July 17–Aug. 5, 2020. In February 2021, the Perseverance Rover will be deployed on Mars. This robotic mission will explore the Martian atmosphere and terrain for signs of past habitability. It will seek biosignatures, signs of possible past microbial life in rocks.

Perseverance is based on the engineering design of the Curiosity rover, with new and improved wheels and a new drill for coring samples from Martian rocks. Perseverance will store those rock samples in tubes on the Martian surface, perhaps for transport back to Earth by a future mission. Perseverance will also test a method for producing oxygen from the Martian atmosphere, which is 96% carbon dioxide, as a step toward preparing to send humans to Mars.



Perseverance will even deploy an experimental robot helicopter named Ingenuity. This flying drone will scout potential targets for Perseverance. This technology may help future rovers map out their Martian commutes!