**A LOOK AT THE SKY IN 2021**

Who would have thought that, as I was writing the 2020 version of this article, we would be saddled with a global pandemic! And it appears we'll be starting this year with the same situation. Though observing the sky is fun to do in groups, you can also look upward and still practice social distancing! Here's a look at some sky events for the new year.

We have two lunar eclipses and two solar eclipses in 2021, though neither of the solar events are visible from Central Illinois. The annular solar eclipse on June 10 is only visible from northern Canada and the Arctic. For the December 4 total eclipse, the Moon's shadow just barely clips Antarctica. The first lunar eclipse of the year occurs on the morning of May 26 and the west coast is favored, though we'll get to see a little bit of it. The umbral phase begins at 4:45am and totality begins at 6:11am, but the Sun rises (and the Moon sets) at 5:28am. It's also a “supermoon.” The November 19 event is technically a partial eclipse though 97% of the Moon will be in the Earth's umbra shadow. The umbral phase begins at 1:18am and maximum eclipse occurs at 3:04am. The umbral eclipse is over by 4:47am, about two hours before sunrise.

The inner planets are best seen when their separation from the Sun is at a maximum; which is called an “elongation.” Mercury has three evening and three morning elongations, though depending on how Mercury's orbit aligns with the horizon, not all are favorable. In the evening sky, Mercury will be best seen from January 10 to February 5 in the west-southwest. On January 23, Mercury sets just as twilight ends. A better look will happen from roughly April 28 to June 4. On May 17, Mercury sets in the west-northwest (to the upper left of Venus) just after the evening twilight fades. If you’re an early riser, set the alarm for between June 22 and July 23. Greatest elongation is the 4th of July; look in the east-northeast. Also favorable is the view from October 13 to November 10 with greatest elongation on October 24. Look eastward.

Venus begins the year in the morning sky but it’s pretty low. On New Year’s morning, Venus rises in the southeast after twilight has begun and it’ll get lower until it passes behind the Sun on March 26. Venus then passes into the evening sky, but it is slow to rise in the evening twilight glow. Through the summer, Venus sets roughly a half hour before evening twilight ends. Venus doesn’t set in a dark sky until early September. Greatest elongation is technically October 29 and in late November it sets at 7:30pm. Venus remains in the evening sky for the rest of 2021 but, by mid-December, it is headed back towards the Sun’s glare.

The outer planets are best seen near their opposition dates. Is during this time the planet rises at sunset and is visible all night. The planet is usually closest to our Earth and thus appears fairly large in a telescope and is bright in our sky. For 2021, Saturn’s opposition date is August 2, followed by Jupiter on August 19, Neptune on September 14, and Uranus on November 4. Two of the brighter asteroids, Vesta and Ceres, have opposition dates on March 4 in Leo’s tail (magnitude 6.0) and November 27 respectively.

With the planets traveling at different speeds, it is always interesting to see them catch and pass each other. On January 11, Jupiter, Saturn, and Mercury gather within 2.5 degrees, low in southwest in the evening sky. The morning of March 5 brings Mercury to within 0.4 degrees of Jupiter in the east-southeast, with Saturn to the upper right of the pair. Five mornings later (the 10th), the three planets make a straight line with a crescent Moon below. Mercury & Venus play tag (1° separation) very low in the west on the evening of April 25, right after sunset. And they pass each other again (0.4 degrees) on May 28. Mars makes trip through the Beehive star cluster on the evening of June 23 – look above and left of Venus in the west. Mars passes Venus (0.5 degrees) with a crescent Moon nearby on the early evening of July 12. On the evening of December 5, a thin crescent Moon, then Venus, Saturn and Jupiter, make nearly a straight line in the west.

You never can tell when a new comet may be discovered – take Comet NEOWISE last year as an example. Many are periodic but none are expected to reach greater then 9th magnitude. Comet d’Arrest could brighten some in late August in southern Ophiuchus and Comet Churyumov-Gerasimenko is closest to the Sun (“perihelion”) on November 2 near the star Pollux.

Meteor showers are fun to watch as you need no special equipment; just your eyes and a dark sky. The Moon will spoil the January Quadrantids and the October Orionids. The November Leonids and December Geminids occur during a waxing gibbous Moon which will set after midnight leaving the sky dark for a few hours. The April Lyrids (April 21-22) occur during a first quarter Moon. We’re fortunate that the one of the most potent showers of the year, the Perseids, peaking on August 11-12, occur during a waxing crescent Moon, which will set early. You may see a couple of meteors a minute after midnight. Should we plan a “meteor party?” As to rocket launches, there are many scheduled in 2021 but those worthy of note include a second uncwedied test of the Boeing Starliner and possibly a crewed mission in the summer. “Crew 2” will venture to the International Space Station on March 30 with a cargo mission to follow in May. Russia will launch a Soyuz to ISS in April. China will supposedly begin work on a space station. In November we anticipate the first launch of the Orion who will take a crew to the Moon in 2024. The James Webb telescope, after so many delays, will hopefully launch aboard an Ariane 5 rocket on Halloween.
The CU Astronomical Society still meets on the second Thursdays of each month, most probably using Zoom for the beginning of the year. The Staerkel Planetarium will be closed to public audiences until at least the end of the spring semester due to COVID. That also means there most probably won’t be any public viewing sessions until May or June. Keep checking www.cuas.org or see our Facebook page for updates. The Staerkel Planetarium has been offering online programming – see www.parkland.edu/planetarium for more information.