

February Celestial Calendar by Dave Mitsky

All times, unless otherwise noted, are UT (subtract five hours and, when appropriate, one calendar day for EST)

- 2/1 Asteroid 19 Fortuna (magnitude +10.1) is at opposition at 1:23; the Moon is 0.92 degree north-northeast of the first-magnitude star Regulus (Alpha Leonis) at 19:00
- 2/3 The astronomical cross-quarter day (i.e., a day half way between a solstice and an equinox) known as Imbolc, Candlemas, or Groundhog Day occurs today in astronomical terms
- 2/7 Last Quarter Moon occurs in Libra at 15:54; the Moon is 4.3 degrees north of Jupiter at 19:47
- 2/9 The Curtiss Cross, an X-shaped clair-obscure illumination effect located between the craters Parry and Gambart, is predicted to be visible at 7:19; the Moon is 4.4 degrees north of Mars at 5:12; the Moon is 9.4 degrees north of the first-magnitude star Antares (Alpha Scorpii) at 11:00; the Moon is 0.93 degree south of asteroid 4 Vesta at 12:35
- 2/10 Jupiter is at western quadrature at 23:00
- 2/11 The equation of time is at a minimum for the year (-14.24 minutes) at 10:00; the Moon is at apogee, subtending 29' 27" from a distance of 405,700 kilometers (252,090 miles), at 14:16; the Moon is 2.5 degrees north of Saturn at 14:46
- 2/12 Mars is 5.0 degrees north of Antares at 2:00
- 2/14 Asteroid 3 Juno is in conjunction with the Sun at 11:00; Mercury is at its greatest latitude south of the ecliptic plane (-7.0 degrees) at 18:00; Venus is at its greatest latitude south of the ecliptic plane (- 3.4 degrees) at 20:00; the Moon is at the descending node (longitude 315.0 degrees) at 21:12
- 2/15 The Moon is 1.1 degrees north-northwest of Mercury at 18:00; a partial solar eclipse is at maximum at 20:51; New Moon (lunation 1177) occurs in Capricornus at 21:05
- 2/16 The Sun enters Aquarius (ecliptic longitude 327.88 degrees) at 15:00; the Moon is 0.53 degree south-southeast of Venus at 17:00
- 2/17 The Moon, Venus, and Neptune lie within a circle with a diameter of 5.65 degrees at 3:00; the Moon is 1.6 degrees south-southeast of Neptune at 4:00; Mercury is in superior conjunction at 12:00
- 2/20 The Moon is 4.4 degrees south-southeast of Uranus at 11:00
- 2/21 Venus is 0.54 degree south-southeast of Neptune at 19:00
- 2/22 The Lunar X (the Purbach or Werner Cross), an X-shaped illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to be visible at 18:04
- 2/23 The Moon is 9.1 degrees south-southeast of the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 1:00; sunrise takes place on the isolated lunar mountain Mons Pico at 1:33; First Quarter Moon occurs in Taurus at 8:08; the Moon is 0.7 degree north of the first-magnitude star Aldebaran (Alpha Tauri) at 17:07; sunrise takes place on the isolated lunar mountain Mons Piton at 17:08
- 2/25 The Moon is 4.5 degrees south of the bright open cluster M35 in Gemini at 7:00; Mercury, Venus, and Neptune lie within a circle with a diameter of 4.54 degrees at 12:00; Mercury is 0.43 degree south-southeast of Neptune at 13:00
- 2/26 The Moon is 8.6 degrees south of the first-magnitude star Pollux (Beta Geminorum) at 19:00
- 2/27 The Moon is at perigee, subtending 32' 50" from a distance of 363,933 kilometers (226,137 miles), at 14:39; the Moon is 2.3 degrees south of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 17:28
- 2/28 The Moon is at the ascending node (longitude 134.9 degrees) at 5:04; asteroid 51 Nemausa (magnitude +9.8) is at opposition at 5:06

Nicolas Copernicus (1473-1543), Galileo Galilei (1564-1642), Jacques Cassini (1677-1756), William Huggins (1824-1910), John Dreyer (1852-1926), Bernard Lyot (1897-1952), and Clyde Tombaugh (1906-1997) were born this month.

Nicolas Louis de Lacaille discovered the open cluster NGC 3228 in Vela on February 11, 1752. Nicolas Louis de Lacaille discovered the face-on barred spiral galaxy M83 in Hydra on February 23, 1752. Johann Bode discovered the globular cluster M53 in Coma Berenices on February 3, 1775. The planetary nebula M97 in Ursa Major was discovered by Pierre François André Méchain on February 16, 1781. Caroline Herschel discovered the open cluster NGC 2360 in Canis Major on February 26, 1783. William Herschel discovered the face-on barred spiral galaxy NGC 4027 in Corvus on February 7, 1785. William Herschel's 40-foot-focal-length telescope saw first light on February 19, 1787. Clyde Tombaugh discovered Pluto on February 18, 1930. James Hey detected radio waves emitted by the Sun on February 27, 1942. Gerald Kuiper discovered the Uranian satellite Miranda (magnitude +15.8) on February 16, 1948. The first pulsar, PSR B1919+21, was discovered by Jocelyn Bell Burnell and Antony Hewish on February 24, 1967. Supernova 1987A was discovered by Ian Shelton, Oscar Duhalde, and Albert Jones on February 23, 1987.

The zodiacal light should be visible from a dark location in the west after evening twilight from February 2nd to February 16th. Click on <https://www.atoptics.co.uk/highsky/zod1.htm> for more on the zodiacal light.

Information on Iridium flares and passes of the ISS, the Tiangong-1, the Tiangong-2, the USAF's X-37B, the HST, and other satellites can be found at <http://www.heavens-above.com/>

The Moon is 14.9 days old, is illuminated 99.7%, subtends 33.2', and is located in the constellation of Leo at 0:00 UT on February 1st. The Moon is at apogee on February 11th and at perigee on February 27th. The Curtiss Cross occurs on February 9th and the Lunar X occurs on February 22nd. New Moon occurs on February 15th. There is no Full Moon this month. The Moon occults Regulus on February 1st, an event best seen from northern Asia, Russia, northern Europe, and northwestern Alaska and on the night of February 28th/March 1st, an event visible from northern and western Europe, Greenland, and northern North America. An occultation of Aldebaran on February 23rd favors northern Asia, Russia, and most of Europe. Browse <http://www.lunar-occultations.com/iota/> for information on these events and upcoming lunar occultations. Click on http://www.calendar-12.com/moon_calendar/2018/february for a February 2018 lunar calendar. Visit <http://saberdoesthestars.wordpress.com/2011/07/05/saber-does-the-stars/> for tips on spotting extreme crescent Moons. Times and dates for the lunar crater light rays predicted to occur this month are available at <http://www.lunar-occultations.com/rlo/rays/rays.htm>

The Sun is located in the constellation of Capricornus on February 1st. It enters Aquarius on February 16th. A moderate partial solar eclipse, number 17 in Saros 150, is visible from most of Chile, Argentina, Uruguay, the Falkland Islands, and Antarctica on February 15th. The instant of greatest eclipse takes place at 20:52:33 TD (Terrestrial Dynamical) Time (20:51:25 UT). A maximum of 60% coverage will occur in Antarctica. Consult <https://www.eclipsewise.com/solar/SEprime/2001-2100/SE2018Feb15Pprime.html> for more on the eclipse. The middle of eclipse season (i.e., when the Sun is at same longitude as the Moon's descending node, 315.1 degrees) occurs on February 4th.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on February 1: Mercury (magnitude -0.6, 4.9", 95% illuminated, 1.38 a.u., Capricornus), Venus (magnitude -3.9, 9.8", 100% illuminated, 1.70 a.u., Capricornus), Mars (magnitude +1.2, 5.6", 91% illuminated, 1.67 a.u., Scorpius), Jupiter (magnitude -2.0, 35.9", 99% illuminated, 5.50 a.u., Libra), Saturn (magnitude +0.6, 15.3", 100% illuminated, 10.83 a.u., Sagittarius), Uranus (magnitude +5.9, 3.5", 100% illuminated, 20.39 a.u. on February 15th, Pisces), Neptune (magnitude +8.0, 2.2", 100% illuminated, 30.89 a.u. on February 15th, Aquarius), and Pluto (magnitude +14.3, 0.1", 100% illuminated, 34.30 a.u. on February 15th, Sagittarius).

Mercury, Venus, and Neptune can be seen in the west and Uranus in the southwest in the evening sky. In the morning sky, Mars and Jupiter lie in the south and Saturn in the southeast.

Mercury is in conjunction with the Sun on February 17th. It then reappears low in the west at dusk and draws closer to Venus but won't be visible, despite being unusually bright, until the very end of the month.

A very slender waxing crescent Moon lies less than three degrees from Venus very low in the west-southwest on the evening of February 16th. On February 28th, Venus is just five degrees above the horizon 30 minutes after the Sun sets. Mercury is positioned 2.3 degrees from Venus on that date.

Mars increases in apparent diameter from 5.6 arc seconds to 6.6 arc seconds and brightens by 0.4 magnitudes during February. It glows at magnitude +1.2 on February 1st, magnitude +1.0 on February 15th, and magnitude +0.8 on February 28th. On February 1st, Mars is less than one degree from the binary star Graffias (Beta Scorpii). Mars departs Scorpius and travels eastward into Ophiuchus on February 8th. It lies five degrees north of Antares on February 11th. On February 24th, the Red Planet passes 14 arc minutes north of the ninth-magnitude globular cluster NGC 6287. Mars rises around 2:00 a.m. local time by the end of February.

As the month begins, Jupiter rises before 2:00 a.m. local time. By the end of February, the gas giant planet rises shortly before midnight. It brightens from magnitude -2.0 to magnitude -2.2 and increases in apparent diameter from 35.9 arc seconds to 38.9 arc seconds during February. The Moon passes four degrees north of Jupiter on February 7th. Ganymede disappears into eclipse starting at 2:43 a.m. EST (7:43 UT) and reappears at 4:24 a.m. EST (9:24 UT) on February 6th. Europa enters the shadow of Jupiter at 5:08 a.m. EST (10:08 UT) on February 11th. Io reappears from occultation ten minutes later at 5:18 a.m. EST (10:18 UT). Callisto is due south of Jupiter on that date. Data on Galilean satellite events is available online at <http://www.shallowsky.com/jupiter/> and <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> and on page 51 of the February 2018 issue of *Sky & Telescope*. Click on <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> or consult page 50 of the February 2018 issue of *Sky & Telescope* to determine transit times of the central meridian by the Great Red Spot.

At mid-month, Saturn shines at magnitude +0.6. Its rings are inclined 26 degrees from edge-on and span 36 arc seconds. Saturn is situated four degrees from the bright globular cluster M22 in Sagittarius on February 1st, three degrees from M22 on February 14th, and two degrees from the globular cluster on the final day of the month. The Moon passes two degrees north of Saturn on February 11th. The Ringed Planet rises shortly after 3:00 a.m. local time by the end of February. For information on the satellites of Saturn, browse <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/>

On February 1st, Uranus can be found in southeastern Pisces three degrees from the fourth-magnitude star Omicron Piscium and the fifth-magnitude star Mu Piscium. The prograde (eastward) motion of the seventh planet takes it to a location 2.3 degrees west of Omicron Piscium by the end of the month. Uranus is located five degrees south of the waxing Moon on February 20th. Uranus sets shortly after 11:00 p.m. local time as February begins and nearly two hours before that time by the end of the month.

Neptune lies 1.1 degrees southwest of the fourth-magnitude star Lambda Aquarii on February 1st. It disappears from view after the first week of February.

See <http://www.curtrenz.com/uranep.html> for additional information on the two outer planets.

Online finder charts for Uranus and Neptune can be found at <http://www.nakedeyeplanets.com/uranus.htm> and <http://www.nakedeyeplanets.com/neptune.htm> and also at http://www.skyandtelescope.com/wp-content/uploads/WEB_Uranus_Neptune17.pdf

Click on <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> for JavaScript utilities that will illustrate the positions of the five brightest satellites of Uranus and the position of Triton, Neptune's brightest satellite.

The dwarf planet Pluto is not visible this month.

For more on the planets and how to locate them, browse <http://www.nakedeyeplanets.com/> and <https://freestarcharts.com/planets-this-month>

Comet C/2016 R2 (PanSTARRS) travels northeastward through Taurus and Perseus during February. The comet may shine at tenth or eleventh magnitude as it does so. It passes about two degrees to the east of the center of M45 on February 4th. Visit <http://cometchasing.skyhound.com/> and <http://www.aerith.net/comet/future-n.html> for additional information on comets visible this month.

Asteroid 1 Ceres takes a northwestward course through northern Cancer this month. It passes about one degree north of the fourth-magnitude star Iota Cancri on February 3rd and about one half of a degree south of the sixth-magnitude star Sigma1 Cancri on February 21st. Asteroids brighter than magnitude +11.0 coming to opposition this month include asteroid 19 Fortuna on February 1st and asteroid 51 Nemausa on February 28th. From certain parts of southern Canada and the northern United States, asteroid 20 Massalia (magnitude +10.0) occults the 9.2-magnitude star HD 35003 in Taurus for a maximum of 19 seconds on the night of February 16th. For more on this event, see http://asteroidoccultation.com/2018_02/0217_20_54194.htm

A wealth of information on solar system celestial bodies is posted at <http://www.curtrenz.com/astronomy.html> and <http://nineplanets.org/>

Various events taking place within our solar system are discussed at <http://www.bluewaterastronomy.info/styled-4/index.html>

Information on the celestial events transpiring each week can be found at <http://astronomy.com/skythisweek> and <http://www.skyandtelescope.com/observing/sky-at-a-glance/>

Free star maps for February can be downloaded at <http://www.skymaps.com/downloads.html> and <http://www.telescope.com/content.jsp?pageName=Monthly-Star-Chart>

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on February 2nd, 5th, 7th, 10th, 13th, 16th, 19th, 22nd, 25th, and 27th. Consult page 50 of the February 2018 issue of *Sky & Telescope* for the times of the minima. The Demon Star is at minimum brightness for approximately two hours centered at 11:30 p.m. EST on February 1st (4:30 UT on February 2nd) and at 10:05 p.m. EST on February 24th (3:05 UT on February 25th). For more on Algol, see <http://stars.astro.illinois.edu/sow/Algol.html> and <http://www.solstation.com/stars2/algol3.htm>

Data on current supernovae can be found at <http://www.rochesterastronomy.org/snimages/>

Information on observing some of the more prominent Messier galaxies is available at <http://www.cloudynights.com/topic/358295-how-to-locate-some-of-the-major-messier-galaxies-and-helpful-advice-for-novice-amateur-astronomers/>

Finder charts for the Messier objects and other deep-sky objects are posted at <https://freestarcharts.com/messier> and <https://freestarcharts.com/ngc-7023> and http://www.cambridge.org/features/turnleft/seasonal_skies_october-december.htm

Telrad finder charts for the Messier Catalog and the SAC's 110 Best of the NGC are posted at http://www.astro-tom.com/messier/messier_finder_charts/map1.pdf and <http://www.saguaroastro.org/content/db/Book110BestNGC.pdf> respectively.

Deep-sky object list generators can be found at <https://dso-browser.com/> and <http://www.virtualcolony.com/sac/> and <http://tonightssky.com/MainPage.php>

Freeware sky atlases can be downloaded at <http://www.deepskywatch.com/files/deepsky-atlas/Deep-Sky-Hunter-atlas-full.pdf> and <https://www.uv.es/jrtorres/triatlas.html>

Forty binary and multiple stars for February: 41 Aurigae, Struve 872, Otto Struve 147, Struve 929, 56 Aurigae (Auriga); Nu-1 Canis Majoris, 17 Canis Majoris, Pi Canis Majoris, Mu Canis Majoris, h3945, Tau Canis Majoris (Canis Major); Struve 1095, Struve 1103, Struve 1149, 14 Canis Minoris (Canis Minor); 20 Geminorum, 38 Geminorum, Alpha Geminorum (Castor), 15 Geminorum, Lambda Geminorum, Delta Geminorum, Struve 1108, Kappa Geminorum (Gemini); 5 Lyncis, 12 Lyncis, 19 Lyncis, Struve 968, Struve 1025 (Lynx); Epsilon Monocerotis, Beta Monocerotis, 15 (S) Monocerotis (Monoceros); Struve 855 (Orion); Struve 1104, k Puppis, 5 Puppis (Puppis)

Notable carbon star for February: BL Orionis (Orion)

Fifty deep-sky objects for February: NGC 2146, NGC 2403 (Camelopardalis); M41, NGC 2345, NGC 2359, NGC 2360, NGC 2362, NGC 2367, NGC 2383 (Canis Major); M35, NGC 2129, NGC 2158, NGC 2266, NGC 2355, NGC 2371-72, NGC 2392, NGC 2420 (Gemini); NGC 2419 (Lynx); M50, NGC 2232, NGC 2237, NGC 2238, NGC 2244, NGC 2245, NGC 2251, NGC 2261, NGC 2264, NGC 2286, NGC 2301, NGC 2311, NGC 2324, NGC 2335, NGC 2345, NGC 2346, NGC 2353 (Monoceros); NGC 2169, NGC 2174, NGC 2194 (Orion); M46, M47, M93, Mel 71, NGC 2421, NGC 2423, NGC 2438, NGC 2439, NGC 2440, NGC 2467, NGC 2506, NGC 2509 (Puppis)

Top ten binocular deep-sky objects for February: M35, M41, M46, M47, M50, M93, NGC 2244, NGC 2264, NGC 2301, NGC 2360

Top ten deep-sky objects for February: M35, M41, M46, M47, M50, M93, NGC 2261, NGC 2362, NGC 2392, NGC 2403

Challenge deep-sky object for February: IC 443 (Gemini)

The objects listed above are located between 6:00 and 8:00 hours of right ascension.