

Snake River Skies

The Newsletter of the Magic Valley Astronomical Society

www.mvastro.org

Membership Meeting

Saturday, April 14th 2018
7:00pm at the
Herrett Center for Arts & Science
College of Southern Idaho.
Public Star Party Follows at the
Centennial Observatory

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Magic Valley Astronomical Society is a
member of the Astronomical League



M-51 imaged by
Rick Widmer &
Ken Thomason
Herrett Telescope
Shotwell Camera

President's Message

Tim Frazier

April 2018

It really is beginning to feel like spring. The weather is more moderate and there will be, hopefully, clearer skies. (I write this with some trepidation as I don't want to jinx it in a manner similar to buying new equipment will ensure at least two weeks of cloudy weather.) Along with the season comes some great spring viewing. Leo is high overhead in the early evening with its compliment of galaxies as is Coma Berenices and Virgo with that dense cluster of extragalactic objects.

One of my first forays into the Coma-Virgo cluster was in the early 1960's with my new 4 ¼ inch f/10 reflector and my first star chart, the epoch 1960 version of Norton's Star Atlas. I figured from the maps I couldn't miss seeing something since there were so many so closely packed. That became the real problem as they all appeared as fuzzy spots and the maps were not detailed enough to distinguish one galaxy from another. I still have that atlas as it was a precious Christmas gift from my grandparents but now I use better maps, larger scopes and GOTO to make sure it is M84 or M86.

This is also a season when naked eye observing is so rewarding. There are four bright planets visible: Venus just after sunset and Jupiter, Saturn and Mars in the early morning. With a small scope and help from an app such as [Night Sky](#), you can find a fifth planet, Uranus, in the early evening western sky. By mid-month you can enjoy the [Lyrid meteor shower](#) which is the oldest recorded shower with observations going back to 687 BCE. This shower is caused by the debris from periodic Comet Thatcher which orbits the sun every 415 years.

With the warmer temperatures comes more frequent and longer observing sessions. On April 16th, I'm presenting a night sky program at the Sawtooth National Recreational Area's headquarters just north of Ketchum. The Idaho Conservation League, whose efforts resulted in the Dark Sky Reserve, sponsors this evening's event. More information on this program is available [here](#) and anyone wanting to join me is more than welcome. On April 20th is the Three Creeks Star party and everyone is encouraged to attend. It is a bit of a drive but well worth it.







Moving equipment will be much easier now that our trailer is finished and should be ready for our upcoming star parties. I plan to pick it up early this month and get it to the sign shop to have our name and some cool graphics applied to the sides. Also, the paperwork for the Rotary Club grant is filed and we should hear something on our request for a new telescope by mid-month. Hopefully we will have a new piece of equipment to haul in our trailer.

Clear skies and warm nights,

Tim

Calendars

April 2018

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 April Fool's Day Easter 	2	3	4	5	6	7
8 Last Quarter 	9	10	11	12	13	14
15	16 New Moon 1% Visible ↑ Lunation 1179 	17	18	19	20	21 
22 Full Moon  Earth Day	23	24	25	26	27	28
29	30 Full Moon 100% ↓ 					

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Be Safe – Get Out There – Explore Your Universe

Celestial Calendar

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

- 4/1** The Moon is 6.9 degrees north-northeast of the first-magnitude star Spica (Alpha Virginis) at 12:00; Mercury is in inferior conjunction with the Sun (0.597 astronomical unit from the Earth and 2.84 degrees north of the Sun) at 18:00
- 4/2** Mars (magnitude +0.3) is 1.3 degrees south of Saturn (magnitude +0.6) at 13:00
- 4/3** The Moon is 3.8 degrees north-northeast of Jupiter at 16:00
- 4/5** The Moon is 9.1 degrees north of the first-magnitude star Antares (Alpha Scorpii) at 3:00
- 4/7** The Moon is 1.9 degrees north of Saturn at 13:00; the Moon, Mars, and Saturn lie within a circle with a diameter of 3.46 degrees at 16:00; the Moon is 3.1 degrees north of Mars at 18:00
- 4/8** The Moon is at apogee, subtending 29' 34" from a distance of 404,144 kilometers (251,123 miles), **4/9** The Curtiss Cross, an X-shaped clair-obscure illumination effect located between the craters Parry and Gambart, is predicted to begin at 10:41
- 4/10** The Moon is at the descending node (longitude 312.6 degrees) at 8:10
- 4/12** Venus is at the ascending node through the ecliptic plane at 3:00; the Moon is 1.9 degrees south of Neptune at 23:00
- 4/13** Mercury is at the descending node through the ecliptic plane at 2:00
- 4/14** Mercury is stationary in right ascension, with prograde or direct (eastward) motion to begin, at 4:00; the Moon is 3.6 degrees south-southeast of Mercury at 12:00
- 4/15** Mercury is stationary in longitude at 9:00; the equation of time equals zero at 16:00
- 4/16** The Moon is 4.4 degrees south-southeast of Uranus at 6:00
- 4/17** Saturn is at aphelion (10.0657 astronomical units from the Sun) at 11:00; the Moon is 5.2 degrees south-southeast of Venus at 22:00
- 4/18** Saturn is stationary in right ascension, with retrograde (westward) motion to begin, at 0:00; Saturn is stationary in longitude at 1:00; the Moon is 8.8 degrees south-southeast of the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 13:00; Uranus is in conjunction with the Sun at 14:00
- 4/19** The Sun enters Aries (longitude 29.08 degrees on the ecliptic) at 4:00; the Moon is 1.1 degrees north-northwest of the first-magnitude star Aldebaran (Alpha Tauri), with an occultation taking place in northern Canada, northern Greenland, northern and eastern Scandinavia, central and northern Russia, and most of Kazakhstan and Uzbekistan, at 5:00
- 4/20** The Moon is at perigee, subtending 32' 25" from a distance of 368,714 kilometers (229,108 miles), at 14:41; the Moon is 4.1 degrees south of the bright open cluster M35 in Gemini at 19:00
- 4/22** Pluto is stationary in longitude at 2:00; the Moon is 8.2 degrees south of the first-magnitude star Pollux (Beta Geminorum) at 7:00; Pluto is stationary in right ascension, with retrograde motion to begin, at 15:00; the peak of the Lyrid meteor shower (20 per hour) occurs at 18:00; the Lunar X (also known as the Werner or Purbach Cross), an X-shaped clair-obscure illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to begin at 19:13;
- 4/23** Sunrise takes place on the isolated lunar mountain Mons Pico at 5:23; the Moon is 1.6 degrees south of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 6:00; Mercury is at aphelion (0.4667 astronomical unit from the Sun) at 11:00; the Moon is at the ascending node (longitude 131.2 degrees) at 12:21; sunrise takes place on the isolated lunar mountain Mons Piton at 21:15
- 4/24** The Moon is 1.2 degrees north of the first-magnitude star Regulus (Alpha Leonis), with an occultation taking place in far northeastern Kazakhstan and central Russia, at 20:00
- 4/26** Mars (magnitude -0.3) is 1.4 degrees south of Pluto (magnitude +14.3) at 6:00
- 4/28** The dwarf planet/asteroid 1 Ceres (magnitude +8.4) is at perihelion (2.5595 astronomical units from the Sun) at 11:00; the Moon is 6.9 degrees north-northeast of Spica at 20:00
- 4/29** Mercury is at greatest western elongation (27.0 degrees) at 18:00
- 4/30** Full Moon, known as the Egg or Grass Moon, occurs at 0:58; the Moon is 3.7 degrees north-northeast of Jupiter.

Christiaan Huygens (1629-1695) was born this month.

Charles Messier discovered the open cluster M50 in Monoceros on April 5, 1772. Charles Messier discovered the spiral galaxy M58 in Virgo on April 15, 1772. Johann Koehler discovered the elliptical galaxies M59 and M60 in Virgo on April 11, 1779. Caroline Herschel discovered C/1790 H1 (Herschel) on April 18, 1790. The first photograph of the Sun was taken on April 2, 1845. The first radar signal was bounced off of the Sun on April 7, 1959. The Hubble Space Telescope was placed in orbit on April 25, 1990. The Compton Gamma Ray Observatory achieved orbit on April 7, 1991.

The Sun, the Moon, & the Planets



The Moon is 14.3 days old, is illuminated 99.9%, subtends 31.7', and is located in Virgo at 0:00 UT on April 1st. The Moon is at its greatest northern declination of +20.4 degrees on April 21st and its greatest southern declination of -20.3 degrees on April 8th. Longitudinal libration is at a maximum of +4.9 degrees on April 2nd and a minimum of -5.7 degrees on April 14th. Latitudinal libration is at a maximum of +6.6 degrees on April 17th and a minimum of -6.6 degrees on April 3rd and -6.5 degrees on April 30th. The Moon is at apogee (a distance of 63.36 Earth-radii) on April 8th and perigee (a distance of 57.81 Earth-radii) on April 20th. New Moon occurs on April 16th. The Moon occults Aldebaran on April 19th and Regulus on April 24th from certain parts of the world. It also occults the fourth-magnitude multiple star Nu Geminorum from the southern half of North America and all of Central America on the night of April 20th. Consult <http://www.lunar-occultations.com/iota/bstar/bstar.htm> for additional information on these events. 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 light rays predicted to occur this month are available at <http://www.lunar-occultations.com/rlo/rays/rays.htm>

The Sun is located in Pisces on April 1. It enters Aries on April 19th.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on April 1: Mercury (not visible, 11.2", 1% illuminated, 0.60 a.u., Pisces), Venus (-3.9, 10.6", 94% illuminated, 1.58 a.u., Aries), Mars (+0.3 magnitude, 8.4", 88% illuminated, 1.11 a.u., Sagittarius), Jupiter (-2.4 magnitude, 42.6", 100% illuminated, 4.63 a.u., Libra), Saturn (+0.5 magnitude, 16.7", 100% illuminated, 9.98 a.u., Sagittarius), Uranus (+5.9 magnitude, 3.4", 100% illuminated, 20.90 a.u. on April 16th, Pisces), Neptune (+7.9 magnitude, 2.2", 100% illuminated, 30.70 a.u. on April 16th, Aquarius), and Pluto (+14.3 magnitude, 0.1", 100% illuminated, 33.46 a.u. on April 16th, Sagittarius).

Venus is located in the west in the evening. At midnight, Jupiter is in the southeast. Mercury and Neptune can be found in the east, Mars and Saturn in the south, and Jupiter in the southwest in the morning sky.

Mars, Saturn, and Pluto are all located in Sagittarius this month.

Mercury is in inferior conjunction on April 1st and is stationary on April 14th. It reaches aphelion on April 23th. Mercury is at greatest elongation on April 29th. Unfortunately, this will be the lowest morning apparition of the planet, less than ten degrees above the horizon at sunrise, for observers at mid-northern latitudes this year.

Venus grows increasingly more prominent in the evening sky as April progresses. Its altitude as the Sun sets increases from 18 degrees to 24 degrees. The waxing crescent Moon passes five degrees south of Venus on April 17th. Venus lies within five degrees of M45 (the Pleiades) from April 22nd to April 28th. A minimum separation of 3.5 degrees takes place on April 25th. Venus is nearly exactly halfway between Melotte 25 (the Hyades) and M45 as night begins on April 27th.

Mars rises at approximately 2:15 a.m. local time as April begins. It becomes an increasingly more viable telescopic target as it grows from 8.4 to 11.0 arc seconds in apparent size and brightens by more than half a magnitude, a change in brightness of some 75%. The Red Planet and Saturn are in conjunction, with a minimum separation of 1.3 degrees, on April 2nd. Mars is only 0.4 degree north-northeast of the bright globular cluster M22 on that date. The two planets are two degrees apart on April 5th. On April 7th, the waning crescent Moon, Mars, and Saturn will all fit into a standard binocular field of view just above the Teapot of Sagittarius, with Mars and Saturn separated by three degrees. The gap between Mars and Saturn grows to 14 degrees by the final day of April.

Mars passes 1.4 degrees south of Pluto on the morning of April 26th. Notable surface features visible along the Martian central meridian at 5:00 a.m. EDT include Mare Cimmerium and Mare Sirenum during the first week of April, Solis Lacus (the Eye of Mars) on April 11th and April 12th, and Syrtis Major and Hellas, the planet's most prominent dark and bright areas respectively, on April 29th and April 30th.

Jupiter increases in apparent diameter from 42.6 to 44.6 arc seconds and in brightness from magnitude -2.4 to magnitude -2.5 in April. Jupiter's axial tilt reaches a maximum this month, with its south pole inclined 3.4 degrees with respect to the Earth. The Full Moon passes 3.7 degrees north-northeast of Jupiter on April 30th. Shadow transits by the Galilean satellite Ganymede take place from 1:17 to 3:01 a.m. EDT on April 7th/8th and from 5:14 to 6:59 a.m. EDT on April 15th. On the night of April 18th/19th, both Ganymede and Callisto are positioned south of Jupiter due to the planet's axis being at maximum tilt. For information on transits of Jupiter's central meridian by the Great Red Spot, consult https://www.projectpluto.com/jeve_grs.htm#apr or page 50 of the April 2018 issue of Sky & Telescope.

As April begins, **Saturn** rises at approximately 2:15 a.m. local daylight time. The planet rises around 12:15 p.m. local daylight time, brightens to magnitude +0.4, and subtends 17.5 arc seconds by the end of the month. At midmonth, its rings span 39 arc seconds and are tilted 25 degrees towards the Earth. Saturn is at aphelion, the farthest it has been from the Sun since 1959, on April 17th and is stationary in right ascension some 14 hours later. This is the first time in 30 years that these two events have occurred so close together. During April, Saturn's almost stationary motion keeps it within two degrees of M22.

Uranus is in conjunction with the Sun on April 18th and consequently is not visible this month.

By the end of April, eighth-magnitude **Neptune** may be visible very low in the east at dawn between the fourth-magnitude stars Lambda and Phi Aquarii. On April 30th, the eighth planet is located 1.5 degrees west-southwest of Phi Aquarii.

The dwarf planet **Pluto** is fairly high in the sky in northwestern Sagittarius during morning twilight.

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

Asteroids



Dwarf planet/asteroid 1 Ceres shines at eighth magnitude as it travels southeastward through northern Cancer this month. It passes just north of the sixth-magnitude star 46 Cancri on April 5th and less than a degree north of the seventh-magnitude star 70 Cancri on April 30th. Observers in southeastern United States may see asteroid 20 Massalia occult the tenth-magnitude star TYC 1357-02401 in Gemini for a maximum of 4.7 seconds at approximately 1:18 UT on the night of April 28th/29th. Consult <http://asteroidoccultation.com/> as the event nears for a path map and precise predictions. Click on http://www.asteroidoccultation.com/2018_04_si.htm for information on other asteroid occultations taking place this month. See <https://www.curtrenz.com/asteroids.html> for additional current information on asteroids.

Carbon Star



Notable carbon star for April: V Hydrae (Hydra) Right ascension: 10^h 51^m 37.25661^s / Declination: -21° 15' 00.3245"

Comets



Comet C/2016 R2 (PanSTARRS) treks in a northeastward direction through Perseus and Auriga in April. It lies 2.5 degrees south of the first-magnitude star Capella (Alpha Aurigae) on April 30th. Visit <http://cometchasing.skyhound.com/> and <http://www.aerith.net/comet/weekly/current.html> for information on this month's comets.

Orbiting Earth



Information on Iridium flares and passes of the ISS, the Tiangong-1 (which reentered the Earth's atmosphere at 00:16 UTC on 2 April 2018 over the South Pacific Ocean at [24.5°S 151.1°W](#)), the Tiangong-2, the USAF's X-37B, the HST, and other satellites can be found at <http://www.heavens-above.com/>

Meteors



The Lyrid meteor shower peaks after the First Quarter Moon sets on the morning of April 22nd. A typical zenithal hourly rate is about 20 meteors per hour but short outbursts have occurred occasionally. The radiant lies between the Keystone of Hercules and Lyra. For more on this year's Lyrids, see <http://earthsky.org/?p=158735> and <https://www.amsmeteors.org/meteor-showers/meteor-shower-calendar/>

A wealth of current 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.bluewater...ed-4/index.html>

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

The Deep Sky



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 April can be downloaded at <http://www.skymaps.com/downloads.html> and <https://www.telescope.com/content.jsp?pageName=Monthly-Star-Chart>

The fifth-magnitude G-type main-sequence star 61 Virginis - <http://www.solstation.com/stars/61vir2co.jpg> - is a sun-like star at a distance of 28 light years. It hosts three exoplanets and is visible to the naked-eye.

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on April 3rd, 6th, 9th, 12th, 14th, 17th, 20th, 23rd, 26th, and 29th. A favorable date for observing Algol at mid-eclipse from the eastern United States is on April 8th at 11:24 a.m. EDT or 3:24 UT. Consult <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> for the times of the eclipses. For more on Algol, see <http://stars.astro.illinois.edu/sow/Algol.html> and <http://www.solstation.com/stars2/algol3.htm>

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

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

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

Stellarium and Cartes du Ciel are two excellent freeware planetarium programs that are available at <http://stellarium.org/> and <https://www.ap-i.net/skychart/en/start>

Deep-sky object list generators can be found at <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 <http://astro.mxd120.com/free-star-atlases>

Seventy-five binary and multiple stars for April: h4481 (Corvus); Aitken 1774, Gamma Crateris, Jacob 16, Struve 3072, h4456, Burnham 1078 (Crater); h4311, Burnham 219, N Hydrae, h4455, h4465 (Hydra); 31 Leonis, Alpha Leonis (Regulus), h2520, Struve 1417, 39 Leonis, Struve 1421, Gamma Leonis (Algieba), Otto Struve 216, 45 Leonis, Struve 1442, Struve 1447, 49 Leonis, Struve 1482, 54 Leonis, Struve 1506, Chi Leonis, 65 Leonis, Struve 1521, Struve 1527, Struve 1529, Iota Leonis, 81 Leonis, 83 Leonis, Tau Leonis, 88 Leonis, 90 Leonis, Struve 1565, Struve 1566, 93 Leonis, h1201, S Leonis (Leo); h2517, Struve 1405, Struve 1432, 33 Leo Minoris, Struve 1459, 40 Leo Minoris, Struve 1492 (Leo Minor); Struve 1401, Struve 1441, Struve 1456, Struve 1464, 35 Sextantis, 40 Sextantis, 41 Sextantis (Sextans); Struve 1402, Struve 1415, Struve 1427, Struve 1462, Struve 1486, Struve 1495, Struve 1510, Struve 1520, Xi Ursae Majoris, Nu Ursae Majoris, Struve 1541, 57 Ursae Majoris, Struve 1544, Struve 1553, Struve 1561, Struve 1563, 65 Ursae Majoris, Otto Struve 241 (Ursa Major)

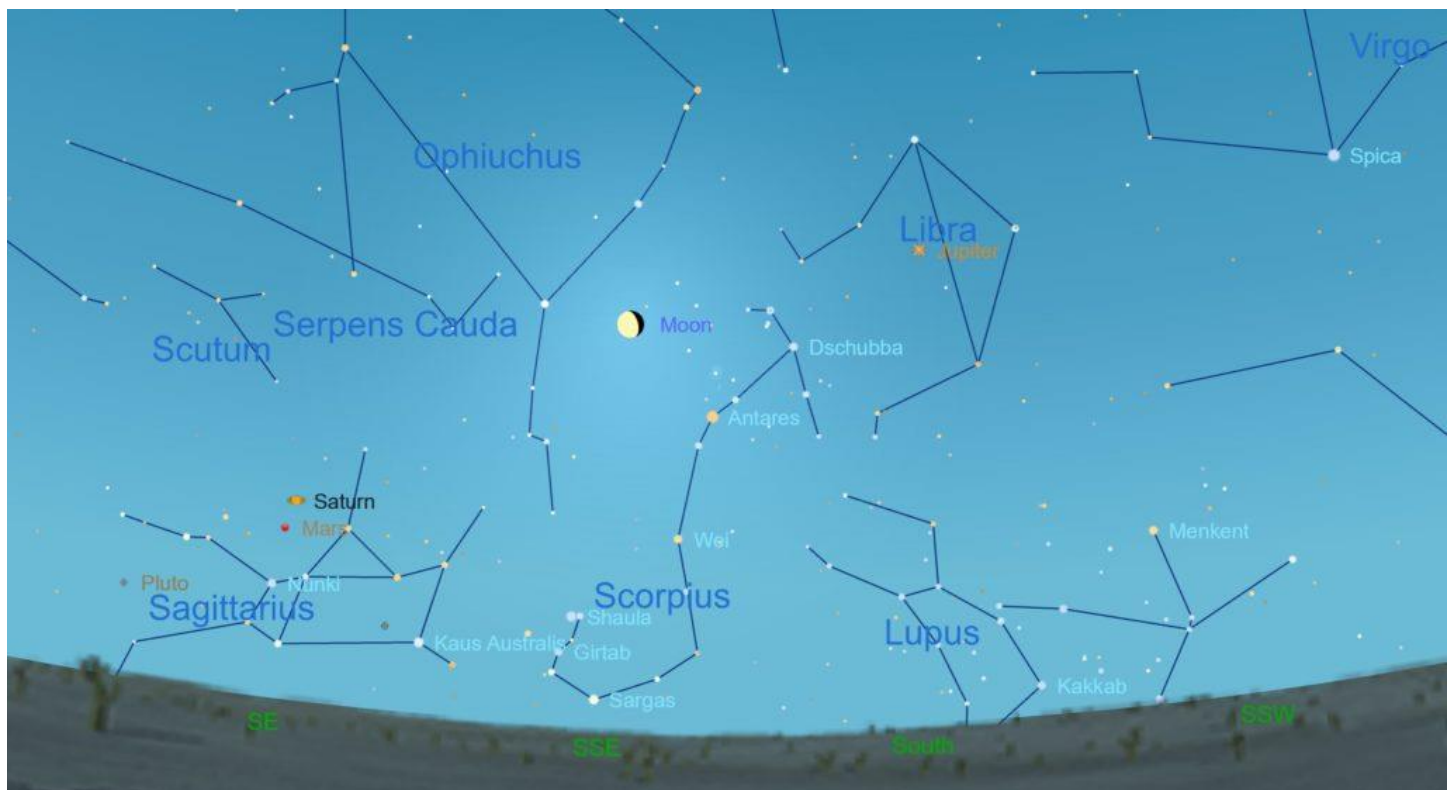
One hundred deep-sky objects for April: NGC 4024, NGC 4027 (Corvus); NGC 3511, NGC 3513, NGC 3672, NGC 3887, NGC 3892, NGC 3955, NGC 3962, NGC 3981 (Crater); NGC 3091, NGC 3109, NGC 3145, NGC 3203, NGC 3242, NGC 3309, NGC 3585, NGC 3621, NGC 3717, NGC 3904, NGC 3936 (Hydra); M65, M66, M95, M96, M105, NGC 3098, NGC 3162, NGC 3177, NGC 3185, NGC 3190, NGC 3226, NGC 3227, NGC 3300, NGC 3346, NGC 3367, NGC 3377, NGC 3384, NGC 3389, NGC 3412, NGC 3437, NGC 3489, NGC 3495, NGC 3507, NGC 3521, NGC 3593, NGC 3607, NGC 3608, NGC 3626, NGC 3628, NGC 3630, NGC 3640, NGC 3646, NGC 3655, NGC 3681, NGC 3684, NGC 3686, NGC 3691, NGC 3810, NGC 3842, NGC 3872, NGC 3900, NGC 4008 (Leo); NGC 3245, NGC 3254, NGC 3277, NGC 3294, NGC 3344, NGC 3414, NGC 3432, NGC 3486, NGC 3504 (Leo Minor); NGC 2990, NGC 3044, NGC 3055, NGC 3115, NGC 3156, NGC 3166, NGC 3169, NGC 3246, NGC 3423 (Sextans); IC 750, M97, M108, M109, NGC 3079, NGC 3184, NGC 3198, NGC 3310, NGC 3359, NGC 3610, NGC 3665, NGC 3675, NGC 3738, NGC 3877, NGC 3898, NGC 3941, NGC 3953, NGC 3998, NGC 4026 (Ursa Major)

Top ten deep-sky objects for April: M65, M66, M95, M96, M97, M105, M108, NGC 3115, NGC 3242, NGC 3628

Top ten binocular deep-sky objects for April: M65, M66, M95, M96, M97, M105, M108, M109, NGC 3115, NGC 3242

Challenge deep-sky object for April: Leo I is a dwarf spheroidal galaxy in the constellation Leo. Right ascension: 10^h 08^m 27.4^s / Declination: +12° 18' 27"

The objects listed above are located between 10:00 and 12:00 hours of right ascension. (abbreviated **RA**; symbol α) is the angular distance measured eastward along the celestial equator from the Sun at the March equinox to the hour circle of the point above the earth in question. When paired with declination, these astronomical coordinates specify the direction of a point on the celestial sphere (traditionally called in English the skies or the sky) in the equatorial coordinate system.



The Moon joins Jupiter, Mars, and Saturn in the early morning sky in early April, 2018.

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!



Measuring the Movement of Water on Earth

By Teagan Wall

As far as we know, water is essential for every form of life. It's a simple molecule, and we know a lot about it. Water has two hydrogen atoms and one oxygen atom. It boils at 212° Fahrenheit (100° Celsius) and freezes at 32° Fahrenheit (0° Celsius). The Earth's surface is more than 70 percent covered in water.

On our planet, we find water at every stage: liquid, solid (ice), and gas (steam and vapor). Our bodies are mostly water. We use it to drink, bathe, clean, grow crops, make energy, and more. With everything it does, measuring where the water on Earth is, and how it moves, is no easy task.

The world's oceans, lakes, rivers and streams are water. However, there's also water frozen in the ice caps, glaciers, and icebergs. There's water held in the tiny spaces between rocks and soils deep underground. With so much water all over the planet—including some of it hidden where we can't see—NASA scientists have to get creative to study it all. One way that NASA will measure where all that water is and how it moves, is by launching a set of spacecraft this spring called GRACE-FO.

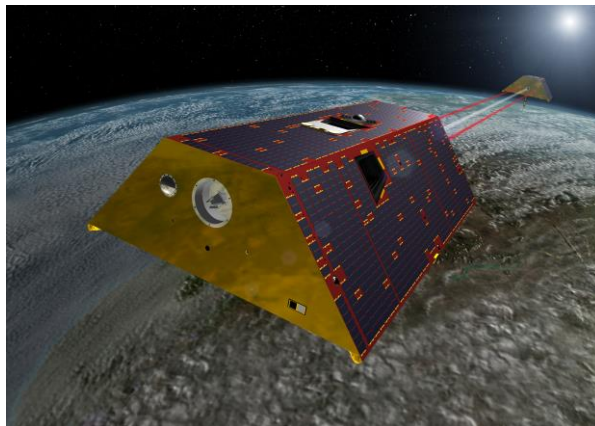
GRACE-FO stands for the "Gravity Recovery and Climate Experiment Follow-on." "Follow-on" means it's the second satellite mission like this—a follow-up to the original GRACE mission. GRACE-FO will use two satellites. One satellite will be about 137 miles (220 km) behind the other as they orbit the Earth. As the satellites move, the gravity of the Earth will pull on them.

Gravity isn't the same everywhere on Earth. Areas with more mass—like big mountains—have a stronger gravitational pull than areas with less mass. When the GRACE-FO satellites fly towards an area with stronger gravitational pull, the first satellite will be pulled a little faster. When the second GRACE-FO satellite reaches the stronger gravity area, it will be pulled faster, and catch up.

Scientists combine this distance between the two satellites with lots of other information to create a map of Earth's gravity field each month. The changes in that map will tell them how land and water move on our planet. For example, a melting glacier will have less water, and so less mass, as it melts. Less mass means less gravitational pull, so the GRACE-FO satellites will have less distance between them. That data can be used to help scientists figure out if the glacier is melting.

GRACE-FO will also be able to look at how Earth's overall weather changes from year to year. For example, the satellite can monitor certain regions to help us figure out how severe a drought is. These satellites will help us keep track of one of the most important things to all life on this planet: water.

You can learn more about our planet's most important molecule here: <https://spaceplace.nasa.gov/water>



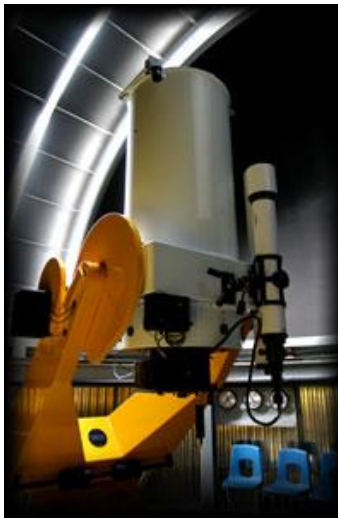
An artist's rendering of the twin GRACE-FO spacecraft in orbit around Earth. Credit: NASA

Observatories and Planetariums

Bruneau Dunes Observatory – Bruneau Dunes State Park, Mt. Home, ID



You're invited to star gaze at the Bruneau Dunes Observatory! See the night sky as you've never seen it before. Observatory tours and solar viewing (through a specially adapted telescope) begin one hour before sunset, and are free of cost. Visitors can view short orientation program and then have the chance to survey the heavens through the observatory's collection of telescopes. There is a per person viewing fee (children 5 and under are free of cost). Check event [listings](#) for fees. The observatory is open on Friday and Saturday nights only, weather permitting. For presentation times, call 208-366-7919, or check the kiosk when you arrive at the park.



CSI Centennial Observatory / Faulkner Planetarium Herrett Center

Event	Place	Date	Time	Admission
Monthly Free Star Party	Centennial Observatory	Saturday, April 14 th , 2018	9:15 PM to midnight	FREE
Astronomy Talk : "Mars Approaches!"	Faulkner Planetarium	Wednesday, April 18 th , 2018	8:15 to 9:15 PM	Adults: \$2.50 Children (7-17) & CSI students, faculty, and staff: \$1.50 Ages 0-6: FREE
Astronomy Talk Night Telescope Viewing	Centennial Observatory	Wednesday, April 18 th , 2018	9:15 to 1:15 PM	Free with Astronomy Talk admission
International Astronomy Day Solar Viewing	Centennial Observatory	Saturday, April 21 st , 2018	11:00 AM to 4:00 PM	FREE
International Astronomy Day Nighttime Telescope Viewing	Centennial Observatory	Saturday, April 21 st , 2018	9:00 PM to midnight	FREE

**College of Southern Idaho Campus Twin Falls, ID
Faulkner Planetarium / Show Times**

<http://herrett.csi.edu/astronomy/planetarium/showtimes.asp>

[Now Showing](#)

About the Magic Valley Astronomical Society

Magic Valley Astronomical Society
550 Sparks St.
Twin Falls, ID

The Magic Valley Astronomical Society (MVAS) was founded in 1976. The Society is a non-profit [501(c) 3] educational and scientific organization dedicated to bringing together people with an interest in astronomy.

In partnership with the Centennial Observatory, Herrett Center, College of Southern Idaho - Twin Falls; we hold regularly scheduled monthly meetings and observation sessions, at which we share information on current astronomical events, tools and techniques for observation, astrophotography, astronomical computer software, and other topics concerning general astronomy. Members enthusiastically share their telescopes and knowledge of the night sky with all who are interested. In addition to our monthly public star parties we hold members only star parties at various locations throughout the Magic Valley.

MVAS promotes the education of astronomy and the exploration of the night sky along with safe solar observing through our public outreach programs. We provide two types of outreach; public star parties and events open to anyone interested in astronomy, and outreach programs for individual groups and organizations (e.g. schools, churches, scout troops, company events, etc.), setting up at your location. All of our outreach programs are provided by MVAS volunteers at no cost. However, MVAS will gladly accept donations. Donations enable us to continue and improve our public outreach programs.

Membership is not just about personal benefits. Your membership dues support the work that the Magic Valley Astronomical Society does in the community to promote the enjoyment and science of astronomy. Speakers, public star parties, classes and support for astronomy in schoolrooms, and outreach programs just to name a few of the programs that your membership dues support.

Annual Membership dues will be:

\$20.00 for individuals, families, and \$10.00 for students.

Contact Treasurer Jim Tubbs for dues information via e-mail: jtubbs015@msn.com

Donations to our club are always welcome and are even tax deductible. Please contact a board member for details.

Membership Benefits:

Lending Telescopes: The society currently has three telescopes for loan and would gladly accept others please contact President Robert Mayer, for more information on these and other benefits.



Telescopes are an individual thing and not practical for public use. However, everyone should have the experience of a good look at the moon for at least 5 minutes in their life time. It is a dimension and feeling that is unexplainable. Pictures or TV can't give this feeling, awareness, or experience of true dimension. A person will not forget seeing our closest neighbor, the moon. Norman Herrett in a letter to Dr. J. L. Taylor, president of the College of Southern Idaho, Twin Falls, ID, USA.