# Snake River Skies

*The Newsletter of the Magic Valley Astronomical Society*

www.mvastro.org


**Membership Meeting**

Saturday, September 9th 2017
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

Sadly, there was no message this month from President Robert Mayer. So, I decided to share my message to the Boise Astronomical Society.

Folks,

The Idaho Star Party™ is officially upon us and once again we venture to Bruneau Dunes for our annual event.

This year our guest speaker is Dr. Tanya Harrison, PhD, Director of Research for Arizona State University's Space Technology and Science ("NewSpace") Initiative. You may read about her profile on page 14 of this newsletter.

There was no monthly meeting this month since we have ISP this month and we will be having our annual Star-B-Que in lieu of a potluck. The Star-B-Que tickets will still be available as will registration if you haven't already done so at the Eagle Cove Campground Pavilion. Just look for Becky Nielsen or Jeffery Creed our co-coordinators for this year's event to finalize registration. Don't forget your packet as it contains your ISP Challenge information as well as registration information.

The final note I would like to add is, bearing unforeseeable circumstances, our past president and emcee for the past Idaho Star Party™ Mr. Art Martini will return to ISP from Las Vegas, NV where he now calls home and will once again emcee our door prize give away.

Hope to see many of you there.

Take care and clear skies,

David Olsen, Editor
Magic Valley Astronomical Society
President & Newsletter Ed.
Boise Astronomical Society

## Calendar for August

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3 | 4<br>Labor Day | 5 | 6<br>Full Moon<br>Harvest Moon<br>  <br>100% Visible | 7 | 8 | 9<br>MVAS Meeting at 7:00pm at the Herrett Center<br>Public Star Party Centennial Obs. |
| 10 | 11 | 12 | 13<br>Last Quarter<br>Visible 45% ↓<br>  | 14 | 15 | 16 |
| 17 | 18 | 19 | 20<br>New Moon<br>Lunation 1172<br>1% Visible↑<br>  | 21 | 22<br>Autumnal Equinox<br>  | 23 |
| 24 | 25 | 26 | 27 | 28<br>First Quarter<br>54% Visible ↑<br>  | 29 | 30 |

Snake River Skies is the Newsletter of the Magic Valley Astronomical Society and is published electronically once a month.


**Be Safe – Get Out There – Explore Your Universe**

# Celestial Calendar for August

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

9/1 The peak of the Aurigid meteor shower (zenithal hourly rate of 6 per hour) occurs at 2:00; the equation of time equals 0 at 8:00; Venus is 1.2 degrees south-southwest of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 13:00
9/4 Mercury is stationary in right ascension at 16:00; the Moon is at the descending node (longitude 324.2°) at 18:41
9/5 Mercury, Mars, and the first-magnitude star Regulus (Alpha Leonis) lie within a circle with a diameter of 3.19° at 0:00; Neptune (magnitude +7.8, apparent size 2.4") is at opposition at 5:00
9/6 Neptune is 0.8 degree north of the Moon.
9/8 The north pole of the Sun is most inclined (7.25°) towards the Earth today; asteroid 89 Julia (magnitude +9.0) is at opposition at 21:00
9/9 Uranus is 4.1° south-southeast of the Moon at 13:00
9/10 Mercury (magnitude 0.0) is 0.6 degree south of Regulus (magnitude +1.4) at 12:00; Mercury is at the ascending node through the ecliptic planet at 20:00
9/11The Moon is 9.3 degrees south-southeast of the bright open cluster M45 (the Pleiades) at 20:00
9/12 Jupiter is 3.1 degrees north-northeast of the first-magnitude star Spica (Alpha Virginis) at 1:00; Mercury is at greatest western elongation (17.9 degrees) at 10:00; the Moon is 0.4 degree north of the first-magnitude star Aldebaran (Alpha Tauri), with an occultation taking place in the Azores, Central and North America, and Hawaii, at 13:00
9/14 The Moon is 0.73 degree north of asteroid 8 Flora at 1:00; the Moon is 5.0 degrees south of the bright open cluster M35 in Gemini at 2:00; Saturn is at eastern quadrature at 3:00; the Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to be at a mid-point at 9:46; Mercury (magnitude -0.6) is 10.9 degrees east-southeast of Venus (magnitude -3.9) at 12:00
9/15 Mercury is at perihelion (0.3075 astronomical units from the Sun) at 12:00; the Moon is 9.3 degrees south of the first-magnitude star Pollux (Beta Geminorum) at 15:00
9/16 The Moon is 2.8 degrees south of M44 at 15:00; Mercury (magnitude -0.8) is 0.06 degree north of Mars (magnitude +1.8) at 18:00; the Sun enters Virgo (ecliptic longitude 174.14 degrees) at 20:00
9/17 The Moon is at the ascending node (longitude 144.0 degrees) at 18:28
9/18 Venus is 0.53 degree north-northeast of the Moon; the Moon is 0.14 degree northwest of Regulus, the Moon, Venus, and Regulus lie within a circle with a diameter of 2.36 degrees at 5:00; Mars is 0.17 degree southwest of the Moon; the Moon, Mercury, and Mars lie within a circle with a diameter of 1.83 degrees at 21:00; Mercury is 0.05 degree northwest of the Moon.
9/20 Venus (magnitude -3.9) is 0.46 degree north-northeast of Regulus (magnitude +1.4) at 2:00.
9/22 The Moon is 6.5 degrees north-northeast of Spica at 6:00; Jupiter is 4.0 degrees south of the Moon at 8:00;
9/25 Asteroid 2 Pallas is stationary at 11:00; Mercury is at its greatest heliocentric latitude north (7 degrees north of the ecliptic plane) at 18:00
9/26 The Moon is 9.5 degrees north of the first-magnitude star Antares (Alpha Scorpii) at 1:00
9/27 Saturn is 3.5 degrees south of the Moon at 1:00 asteroid 4 Vesta is in conjunction with the Sun at 14:00; Pluto is stationary in right ascension at 21:00; 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 occur at 21:25
9/30 Fall Astronomy Day; Comet 41P/Tuttle-Giacobini-Kresak is 0.95 degree north of Pluto at 9:00.

Jean-Dominique Maraldi discovered the globular cluster M15 on September 7, 1746. On September 11, 1746, Jean-Dominique Maraldi discovered the globular cluster M2. Nicolas-Louis de Lacaille discovered NGC 104 (47 Tucanae), the second largest and brightest globular cluster, on September 14th, 1751. Comet C/1793 S2 (Messier) was discovered by Charles Messier on September 24th, 1793. Karl Harding discovered asteroid 3 Juno on September 1, 1804. Neptune was discovered by Johann Gottfried Galle on September 23, 1846, using Urbain Le Verrier's calculations of its position. On September 19, 1848, William Bond discovered Saturn's fourteenth-magnitude satellite Hyperion, the first irregular moon to be discovered. On September 13, 1850, John Russell Hind discovered the asteroid 12 Victoria. E. E. Barnard discovered Jupiter's fifth satellite, fourteenth-magnitude Amalthea, using the 36-inch refractor at the Lick Observatory, on September 9, 1892.

**The Sun, the Moon, & the Planets**

The Sun is located in Leo on September 1st. On September 16th, the Sun enters Virgo. The Sun crosses the celestial equator from north to south at 20:02 UT on September 22nd, the date of the autumnal equinox.

**September Moon**

The September New Moon is on the 20th at 11:30PM MDT. It is the beginning of Lunation 1172 which ends 29.57 days later with the New Moon of Oct. 19th at 1:12PM MDT.

The Full Moon of September in Aquarius occurs at 1:04AM MDT on the 6th. It is called the “Fruit Moon”. Colonial Americans called it the “Harvest Moon” which is defined as the full moon closest to the equinox or the first full moon following the equinox. September’s Full Moon is the Harvest Moon by the first definition and the second definition places it in October in 2017. To the Celts it was the “Singing Moon”, and Chinese refer to it as “Chrysanthemum Moon”. It was the “Barley Moon” in Medieval England. Anishinaabe (Odawa and Ojibwa) people in northern Michigan recognize it as “Waatebagaa-giizis" (Leaves Turning Moon).

Lunar Perigee (closest to Earth) is 229,820 miles or 57.99 Earth radii on the 13th at 12:11PM EDT. Apogee (maximum orbital distance) occurs on the 27th at 3AM EDT when it is at 251,250 miles (63.40 Earth radii).

| Planet | Constellation | Magnitude | Moon Passage | Moon Phase | Moon Age |
|---|---|---|---|---|---|
| Sun | Virgo. | -26.8 | 1:30AM EDT 9/20 | New | 0 days |
| Mercury | Sextans | -0.9 | 0.05°SE, 7:00PM EDT, 9/18 | Waning Crescent | 28.19 days |
| Venus | Gemini | -3.8 | 0.53°SSW, 9:00 PM EDT, 9/17 | Waning Crescent | 27.27 days |
| Mars | Leo | +1.8 | 0.17°NE, 4:00PM EDT, 9/18 | Waning Crescent | 28.06 days |
| Jupiter | Virgo | -1.5 | 3.5°NNE, 6:00AM EDT, 9/22 | Waxing Crescent | .2.19 days |
| Saturn | Ophiuchus | .+0.5 | 3.5°N, 9:00PM EDT, 9/26 | Waxing Crescent | 6.81 days |
| Uranus | Pisces | +5.7 | 4.1°SSE, 9:00AM EDT, 9/9 | Waning Gibbous | 18.77 days |
| Neptune | Aquarius | +7.8 | 0.74°SSE, 1:00AM EDT, 9/6 | Waxing Gibbous | 15.44 days |

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

Mercury, Mars, and Regulus lie within a circle with a diameter of 3.2 degrees on September 5th. The Moon, Venus, and Regulus lie within a circle with a diameter of 2.4 degrees on September 18th. Later that day, the Moon, Mercury, and Mars lie within a circle with a diameter of 1.8 degrees.

**Mercury** can be seen in the east before sunrise in early September. Northern hemisphere observers are favored for this predawn apparition of the planet, the best one of the year. On September 4th, Mercury is stationary in right ascension and then resumes direct (eastward) motion. It achieves greatest western elongation (17.9 degrees) on September 12th and perihelion on September 15th. The speediest planet has a very close conjunction with Mars on September 16th and is occulted by the Moon from certain parts of the world on September 18th. Mercury disappears from view as September draws to a close.

During September, **Venus** shrinks in apparent size from 12.4 to 11.2 arc seconds but increases in illumination from 84% to 91%. Venus is occulted by the Moon from some parts of the world on September 18th and passes very close to Regulus on the night of September 19th.

**Mars** enters the morning sky in Leo in mid-September. The Red Planet has a very close conjunction with Mercury on September 16th and is occulted by the Moon in some parts of the world on September 18th.

On September 5th, **Jupiter** is in conjunction with Spica for the second time in 2017. The gas giant passes three degrees north-northeast of the star, which is 12 times fainter than Jupiter. The Moon passes 4.0 degrees north of Jupiter on September 22nd. Jupiter is quite low in the sky this month, occupying an altitude of only ten degrees 45 minutes after the Sun sets in early September. It is only four degrees high as the month ends.

**Saturn** sets before midnight local daylight time before September ends. Its rings span 38 arc seconds and are tilted 26.9 degrees with respect to the Earth in mid-September. Eighth-magnitude Titan, Saturn's largest satellite, passes just north of Saturn on September 11th and September 27th and south of the planet on September 3rd and September 19th. Titan is a maximum of 2.9 arc minutes from Saturn, some two times farther than its northern and southern approaches, at greatest eastern and western elongation. Saturn's faint satellites Enceladus and Mimas both reach greatest western elongation on September 17th. The waxing crescent Moon passes some three degrees north of the Ringed Planet on the evening of September 26th. For further information on Saturn's satellites, browse http://www.skyandtel...watching-tools/

**Uranus** lies 1.0 degree north of the fourth-magnitude star Omicron Piscium on September 1st and 1.2 degrees northwest of Omicron Piscium on the last day of the month. Browse http://bluewaterastr...-chart-2017.png for a finder chart.

**Neptune** (magnitude +7.8, apparent size 2.3") reaches opposition on September 5th. The eighth planet is 4.0 light-hours distant and located eight degrees south of the celestial equator on that date. Neptune is situated 1.2 degrees east of the fourth-magnitude star Lambda Aquarii as the month begins. By the end of September, Neptune's westward motion takes it to a position 0.7 degree southeast of the star. A finder chart is posted at http://bluewaterastr...-chart-2017.png

Additional online finder charts for Uranus and Neptune can be found at http://www.nakedeyep....com/uranus.htm and http://www.nakedeyep...com/neptune.htm

**Pluto** is highest in altitude in the late evening. The dwarf planet is stationary in right ascension on September 27th and then resumes direct (eastward) motion. Articles on observing Pluto are available on pages 48 and 49 of the July issue of Sky & Telescope and pages 64 and 65 of the July issue of Astronomy. See page 243 of the RASC Observer's Handbook 2017 for a paper finder chart. A basic finder chart is posted online at http://www.bluewater...finder-2017.png and a more detailed one at http://wwwcdn.skyand.../Pluto_2017.pdf

**Planet Plotting**

Morning planets include Venus (-3.9 to -3.8) in Cancer and Leo. Mars (+1.8) is in Leo in September. Mercury (3.7 to -1.3) is in Leo and Virgo, Uranus (+5.7) is in Pisces, and Neptune (+7.8) is in Aquarius.

Mercury gets brighter throughout September as it approaches Superior Conjunction in early October. It is over 10° from the Sun on the 1st, increases to 17.9 at maximum western elongation on the 12th, then decreases to 6° on the 30th. Venus rises before 5:00AM EDT and is still above the horizon at sunrise. Mercury and Mars are in close proximity during the first half of the month and Venus joins in at mid-month after which the waning crescent Moon passes close to each. Uranus and Neptune rise in the evening and are in the southwestern sky before dawn. Both are near the Full Moon in early September.

Jupiter (-1.6 to -1.5) in Virgo and Saturn (+0.4 to +0.5) in Ophiuchus rise during the day and set in the evening. Jupiter is falling into the glow of sunset and will be lost from sight as it approaches conjunction with the Sun in late October. The waxing crescent Moon passes Jupiter on the 22nd and Saturn on the 26th.

| Planet | Constellation(s) | Magnitude | Planet Passages | Time | Date |
|---|---|---|---|---|---|
| Sun | Leo, Virgo | -26.8 | New Moon | 1:30AM EDT | 9/20 |
| Mercury | Leo, Virgo | +3.7 to -1.3 | Mars 3.2° NE | 8:00PM EDT | 9/4 |
| | | | Max West Elongation | 6:00AM EDT | 9/12 |
| | | | Venus 10.9° WNW | 8:00AM EDT | 9/14 |
| | | | Mars 0.06° SSW | 3:00PM EDT | 9/16 |
| Venus | Cancer, Leo | -3.8 | Mercury 10.9° ESE | 8:00AM EDT | 9/14 |
| Mars | Leo | +1.8 | Mercury 3.2° SW | 8:00PM EDT | 9/4 |
| | | | Mercury 0.06° NNE | 3:00PM EDT | 9/16 |
| Jupiter | Virgo | -1.6 to -1.5 | | | |
| Saturn | Ophiuchus | +0.4 to +0.5 | | | |
| Uranus | Pisces | +5.7 | | | |
| Neptune | Aquarius | +7.8 | Opposition | 1:00AM EDT | 9/5 |

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

Current information on solar system celestial bodies is posted at http://www.curtrenz.com/astronomy.html and http://nineplanets.org/

**Autumnal Equinox**

One month and one day after the 1st total Solar Eclipse to cross the entire USA since 1919, the Earth arrives at one of the two locations in its orbit where our axis is perpendicular to a line between Earth and Sun. The axis is also tipped toward the direction of orbital travel on the Sept. 22nd equinox at 4:02 PM EDT, marking the start of the autumn season and presaging the winter season in the northern hemisphere when the axis is tipped away from the Sun on the December solstice.

Fortunately, Earth is approaching perihelion on the solstice. It will be closest to the Sun in early January when warming rays make northern hemisphere winter less drastic than if we had to struggle with winter at aphelion like those poor folks in the southern hemisphere. To their benefit, southern hemisphere climate is moderated by large southern hemisphere water bodies which dominate minimal areas of southern hemisphere continents.
Both hemispheres share equal periods of light and darkness at the equinoxes when the main variance in solar intensity is related to latitude. Polar regions receive glancing tangential rays from a Sun barely above the horizon and equatorial regions bask in the direct rays of a high altitude Sun.

**Asteroids**

During the early part of September, asteroid **3122 Florence** heads rapidly northwestward through eastern Delphinus and Cygnus. It brightens to ninth magnitude as it passes within 4, 400,000 miles of the Earth on September 1st and dims to tenth magnitude by September 4th. The Amor asteroid will be traveling at about nine degrees per day at its closest approach. Asteroid 3122 Florence glides one degree west of the second-magnitude star Gamma Cygni on September 5th. Asteroid 89 Julia shines at magnitude +9.0 when it reaches opposition in Pegasus on September 8th. Consult http://heavens-above....aspx?desig=89 to generate a finder chart. Data on asteroid occultations taking place this month is available at http://www.poyntsour.../New/Global.htm and http://www.asteroido.../2017_09_si.htm

**Comets**

**Comet C/2015 ER61 (PanSTARRS)** passes southwestward through Taurus during September. The tenth-magnitude comet lies within three degrees of the bright open cluster M45 (the Pleiades) this month. For further information on comets visible in September, browse http://cometchasing.skyhound.com/ and http://www.aerith.ne...t/future-n.html

**Meteors**

The minor Meteor Showers of September include the Alpha Aurigids which peak at about 5 meteors per hour in dark skies on the 1st, the Delta Aurigids which start in mid-September and peak in early October, and the Epsilon Perseids which peak on the 9th. The Alpha Aurigid shower is typically the best but is competing with the gibbous Moon this year which sets around midnight leaving a sky free of lunar glare to observe the meteors when Auriga is higher in the sky. Comet Kiess (C/1911 N1) is the source of the material that causes the meteors. The Epsilon Perseids will have to deal with the waning gibbous Moon throughout the night.see https://www.amsmeteo...or-shower-list/

**Carbon Star**

Notable carbon star for September: **LW Cygni** Right Ascension: $21^h55^m11.78^s$, Declination: +50°30′02.1

**ISS**

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

**The Deep Sky**

Forty-five deep-sky objects for September: M2, M72, M73, NGC 7009 (Aquarius); M30, NGC 6903, NGC 6907 (Capricornus); B150, B169, B170, IC 1396, NGC 6939, NGC 4343, B361, Ba6, Be87, Cr 421, Do9, IC 1369, IC 4996, IC 1516, LDN 906, M29, M39, NGC 6866, NGC 6871, NGC 6888, NGC 6894, NGC 6910, NGC 6960, NGC 6992, NGC 7000, NGC 7008, NGC 7026, NGC 7027, NGC 7039, NGC 7063, NGC 7086 (Cygnus); NGC 6891, NGC 6905, NGC 6934, NGC 7006 (Delphinus); NGC 7015 (Equuleus); M15 (Pegasus); NGC 6940 (Vulpecula)

Top ten binocular deep-sky objects for September: IC 1396, LDN 906, M2, M15, M29, M30, M39, NGC 6939, NGC 6871, NGC 7000

Top ten deep-sky objects for September: IC 1396, M2, M15, M30, NGC 6888, NGC 6946, NGC 6960, NGC 6992, NGC 7000, NGC 7009

Challenge deep-sky object for September: **Abell 78** (Cygnus) a planetary nebula made up of a fainter halo (mostly hydrogen) and an inner elliptical ring that is mostly made of helium. Right Ascension: $21^h\ 35^m\ 29.38^s$ Declination: +31° 41′ 45.3″.

Abell 78 Adam Block/Mount Lemmon SkyCenter/University of Arizona - http://www.caelumobservatory.com/gallery/abell78.shtml

# MARS

## Mars Landers

Opportunity is at "Perseverance Valley" on the western rim of "Endeavor Crater", the 14 mile wide crater located on "Meridiani Planum", the plain where the rover landed in January of 2004. Opportunity emerged from solar conjunction in late July after experiencing a warm reset on Sol 4795 (July 20, 2017) which stopped all sequencing and put the rover in a safe state called automode. Recovery action ensued after the solar conjunction communication blackout period ended. One sol before the official conclusion of conjunction on Sol 4807 (August 1, 2017), successful real-time commands were sent to the rover restoring master sequence control allowing Opportunity to resume normal operations. After conducting extensive imaging to determine the nature of the valley and to examine potential locations for spending the oncoming winter season, Opportunity drove for the first time since conjunction on Sol 4813 (August 7, 2017). During the next 3 weeks, the drive from one energy-favorable "lily pad" to the next tested locations with terrain sufficiently tilted to the north to maximize solar illumination on the rover's solar panels.

As of Sol 4834 (Aug. 29, 2017), the rover reached total travel on Mars of 27.97 miles (45.02 kilometers). Solar array energy production averaged 305 watt-hours per sol during the month. Examination of Martian rocks and sediments in a former lake bed in Gale Crater by Curiosity, the Science Lab rover revealed numerous simple organic molecules. On Earth, chains of these molecules form cell walls and other organic structures. Although Mars is now cold and dry, Curiosity also examined samples with abundant evidence of much warmer and wetter conditions. In addition, unusually high ratios of heavy isotopes of elements in the Martian atmosphere indicate that lighter isotopes once present in the atmosphere may have been lost to space, a circumstance thought to result from bombardment by solar winds after Mars lost its protective magnetic field. As the rover ventures higher in its ascent of Mt. Sharp, younger rocks dominated by hematite, clay, and sulfate may record details of the transition to cold and dry conditions.

## Introducing our Idaho Star Party™ Guest Speaker

I am currently the Director of Research for Arizona State University's Space Technology and Science ("NewSpace") Initiative. I work on commercial-academic space partnerships and Martian geomorphology research. I'm also a Science Team Collaborator on the Mars Exploration Rover (MER) Opportunity and the upcoming Mars 2020 sample caching rover.

I received my Ph.D. in Geology with a specialization in Planetary Science and Exploration from the University of Western Ontario's Centre for Planetary Science and Space Exploration (CPSX). From 2008 until 2012, I was on the science operations team for NASA's Mars Reconnaissance Orbiter (MRO) Context Camera (CTX) and Mars Color Imager (MARCI) at Malin Space Science Systems (MSSS). For CTX, I chose what the camera takes pictures of in a given week and then analyze those images from a geologist's standpoint. For MARCI, I wrote weather reports for the general public, as well as a few times for the Spirit and Opportunity rover teams to alert them of any impending storms that could threaten the rovers. I was also a science team collaborator for the Mars Science Laboratory (MSL) rover Mast Cameras (Mastcam), Mars Hand Lens Imager (MAHLI), and Mars Descent Imager (MARDI). While this work was exciting, I made the decision after 4 years to return to graduate school and get my Ph.D.

My undergraduate degree is in astronomy and physics from the University of Washington, and I did my graduate work in geology (well, "Earth and Environmental Sciences") at Wesleyan University. Areas of interest include Martian geomorphology and terrestrial analogues, spectroscopy, and glaciology. My work in astronomy has involved cooling mechanisms of interstellar dust clouds, diffuse interstellar bands, the metallicity of the old, metal-rich cluster NGC 6791, and the metallicity and lithium abundances of the recurrent novae T Coronae Borealis and RS Ophiuchi.

I have also been active in education and public outreach, getting involved with organizations such as The Planetary Society, Expanding Your Horizons, Girl Scouts, Norwescon, The Mars Society, and The National Space Society.

In my spare time, I am a professional photographer and the owner/photographer behind Station Toronto.

# Eclipse Stories

August 21, 2017 Solar Eclipse

My eclipse morning started about 3:30 AM when I woke up and knew I would not be getting any more sleep that night. I had been up till about midnight watching road reports and checking the Idaho Department of Transportation cameras around the state. I still had not decided where I was going to end up for the eclipse.

I got up and checked the car, and got everything loaded. Checking the roads at about 4:30 AM there was still no heavy traffic. I finally decided to go for the Galena Summit outlook about 30 miles south of Stanley, and about 25 miles south of the center line of the eclipse. My plan was to set up a camera watching the Salmon River valley in hope of seeing a shadow line.

I texted my sister to let her know I was planning on leaving about 7:30 AM, and was surprised to get an immediate response. Just before seven, I made one final check of the roads and saw a few areas of congestion in the Midwest, but nothing in any of the states around Idaho. I was thinking there might be some traffic on I15 in Utah from people heading north at the last minute, but there were no slowdowns on the freeways. Where were the predicted traffic jams?

I picked up my sister right at 7 AM, and went to check on our 89 year old mother. I was surprised how little argument she put up before deciding to join us for the eclipse. We got loaded into the car and headed north. I took Falls Avenue into Twin Falls then turned north onto Eastland Drive to Blue Lakes Blvd. We only saw three other cars before we got to Blue Lakes. The trip to Bellevue was uneventful, and we only saw four out of state cars on the road.

We passed my sister's kids at a gas station in Bellevue, and stopped for gas at another that I used to stop at almost every day when I was working in Hailey. Sorry I don't remember the name. It is now part of the Oasis chain, but still looks about the same on the inside. I topped off the gas tank, and got a bag of ice for the cooler and water jug. Just as we were finishing, my sister's kids passed us on the way to someplace north of Ketchum. I am so glad they decided to do so, their original plans were to stay at a friends' home in Bellevue. (Well outside of the totality zone.)

Our next stop was Atkinson's in Hailey where we picked up breakfast and lunch at the deli. Breakfast was sausage, egg and cheese croissants. Lunch was going to be fried chicken, but we were too early for that, so we had to settle for chicken tenders instead. (They turned out to be quite good, and probably not as messy as what we had planned.) We passed my sister's kids again at a day use area north of Ketchum. So happy they decided to pick a site inside the zone of totality, even if it wasn't as close to the center line as I was aiming for. We made a final pit stop at the Sawtooth National Recreation Area headquarters. The parking lot was almost full, but there was still a little room for more cars. Luckily we had mom's handicapped placard, so we could park near the entrance of the building.

As we climbed the south side of Galena Summit every turnout had cars in it. In almost every case there was still room for another car or two, but they were all near capacity. I was a little worried about what I would find at the overlook. Part way up the south side I noticed that everyone we passed seemed to be looking through their eclipse glasses. I made a crude pinhole projector with my fingers and the top of the car door, yep there was the moon shadow. First contact had already happened. The long parking area just before the summit was quite full. Not good. As I expected the overlook parking lot was full, so I continued on to the second small turnout. I was originally thinking about turning around and seeing if I could get a parking space at the overlook. Once I turned in I found that there was only one other vehicle there. I asked if we could join them and they said yes.

We got parked, set up our chairs and I setup the video camera looking down into the valley, and got it recording. We had a good view of the sun, just above the trees to the south, and a limited view into the valley. We had trees all around, and enough shade I did not bother with sunscreen. The temperature was probably in the high 60s. There wasn't a single cloud visible, but there was enough smoke in the air that I could not see the distant mountains that usually make this such a beautiful view.

Our hosts were a couple from Bellevue, and their daughter who had driven from Seattle for the eclipse. Like the kids, they were planning on watching from home until they saw how light the traffic was on eclipse morning. They were planning on having more people from Seattle that decided not to come. That was lucky for us because they had extra glasses, and my mom did not have any. I ended up trading a short talk on what to expect during the eclipse for mom's glasses.

I brought my ham radio along, and set it to monitor the repeater on the top of Galena Summit. We heard status reports from Petit lake, Smiley Creek Airport, Stanley, somewhere at a primitive campsite on top of a mountain, and someone in

Bellevue, and I made a couple from my site on the top of Galena Summit. Smiley Creek had about 60 aircraft, about all that would fit. I believe the contact at Pettit Lake was in a boat out on the lake.

Even at about 50% coverage there was a noticeable temperature drop. I did not have any way to measure it. I decided before I left that I was not going to do anything but watch my first total eclipse. I know it was enough that my mom was wearing a coat and under a sleeping bag, but still watching her first total eclipse intently. Personally I loved the cool temperature! At about 90% coverage we got a report from Pettit Lake that the insects were out and the fish were jumping. The birds around us were quite restless, likely looking for a place to nest for the night. Seconds before totality on the mountain we heard a report about cheers heard across the lake. There was also a report of cows falling down, but I believe that one was a joke.

I did not see Bailey's Beads. I'm not sure if I missed them or if I need glasses. The corona was much larger than I expected, and much larger than I see in most photos. We had 1 minute and 57.5 seconds of totality. I spent that time alternating between the corona and the valley below, which looked like sunset even though it was to our north. I was unable to see the effect all around because of the mountain and trees.

I saw two planes flying during totality off to the east of us. I hope they were something like Civil Air Patrol or someone who was working during the eclipse. I would sure hate to worry about keeping a plane in the air while I was watching the eclipse. Maybe if I had a supersonic plane, and was flying along with totality, it might be cool.

The diamond ring effect at the end of totality was awesome. Too bad our eyes weren't dark adapted at the start of the eclipse, I'm sure you would be able to see a similar effect at the beginning of the eclipse too. The key to the diamond ring as I see it is that your eyes are somewhat dark adapted and able to see the corona, which forms the ring as the sun starts peeking around the moon, creating the diamond. No matter how it happens it is an awesome thing to see with your own eyes. Photographs don't have the dynamic range to see all that the eye can capture. (I wonder what we could capture using the Shotwell camera with its 16 bit dynamic range?)

Soon after the end of totality we got a report that pilots were leaving the airport as fast as they could. I can't blame them because we started packing and hit the road soon after the end of totality too. I decided that I could head south into a traffic jam, or head north and get a look at my favorite part of the state before going home.

Easy decision! We headed north and made a pit stop at Smiley Creek where planes were still leaving as fast as they could. The next stop was Stanley where I tried to find the Boise Astronomical Society group.
I never did, but we got coffee and started back south. We went into Redfish Lake hoping to see the lake, but they have done a very good job of hiding the roads from the lake which means that you can't see the lake from the roads either.

We did stop at the stable and found out that a horse my sister used to own had already retired from there and was living a good life with a family somewhere. We finally hit bumper to bumper traffic about three miles north of Ketchum. I'm glad we stayed up north as I am sure the traffic jam was much larger and slower earlier in the day. Once we got through Ketchum it wasn't bad the rest of the way home. There was some congestion entering each of the towns down to Shoshone, but not a long stretch of 15 MPH stop and go traffic. We got ice cream cones at the Snack Bar in Shoshone and made it back home with heavy traffic, but normal speeds.

Rick Widmer

Some people reported seeing flowers close and then reopen. Others reported bugs coming out and landing on them and then going back into hiding after. Others saw horses run inside. A friend heard humans fire guns into the air. Another couple filmed a shadow come across the valley towards them, with a distinctive line. My friend and I did not see any stars, though maybe the brightest ones were behind us. We only saw planets. A friend of mine showed it for ten seconds each to many people in the 130 mm scope I gave him, at 26x. Some people at 99% zones thought they could see the corona in their solar glasses, but I think that was light scatter. One grandmother told her grandkids to never look at the total eclipse unfiltered. One took a few short looks, and learned afterward that is was safe to look the whole 2 minutes. Many people could not get the day off and had to leave the camp site on Sunday. Everyone I spoke to who went to western Idaho said traffic was no where near as bad as expected. My roommate hitch hiked up the day before. There was a one hour traffic delay on the way back.

Aaron Solt

For me and Ellen, it was a wonderful experience. We traveled with the CSI Bus Tour to Rigby to witness the eclipse. Traffic was light as we went through Carey and Arco instead of the interstate. As we had plenty of time to set up, I had two tripods, one for my solar tracking mount, camera and 400mm lens. The other with a camera and wide angle lens only to shoot during totality. For the longer lens, I set up my laptop to control the camera and shoot images during all the phases.

As totality neared, the sky grew darker and temperature dropped at least 10 degrees or so. Chris Anderson, our CSI host, was our official countdown caller. He periodically shouted out time intervals so we knew when totality was to begin and when we could remove our eclipse glasses. As one using a solar filter on my 400mm lens, I needed remove the filter at T minus 30 seconds to start shooting Baily's Beads and the Diamond Ring. As the time was announced, I quickly removed the filter and looked through my viewfinder to witness the Beads glowing on the edge of the eclipsing moon while my camera control software was firing away. I can't describe the feeling other than total exhilaration and a huge feeling of accomplishment. As an observer, the eclipse far exceeded all expectations. And as a photographer, this was one of the most fulfilling events since my intern days at KSL-TV in an earlier professional life. Such as this being my first total solar, I was completely blown away. Because we really didn't get back into town until late, was able to only do a quick overview, but was pleased so far with everything I saw.

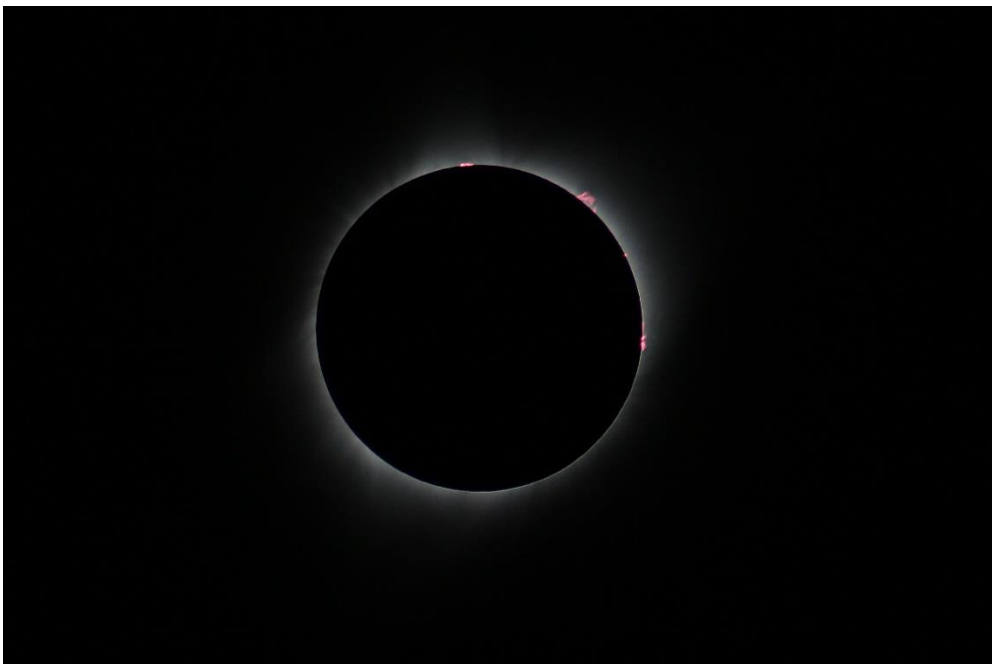
Gary Leavitt The pictures below are from Gary Leavitt

The following pictures are from Eric Spaulding

A report from Jay Naegele: At our maximum eclipse about 97% I was able to pick up A. M. radio station KTWO from Casper WY. They were in the line of totality. Casper is 588 miles from Twin Falls. So it was dark enough to get the signal all the way over here in town. I was hoping and was pleasantly surprised. I can't always get them, even at night. Their frequency is 1030 that was the only clear channel station I tried.

J.N.

Editor's note: This was something I was going to try, but I ran out of time. Maybe next time in about 6.575 years or 78.9 months. Where will you be? Maybe on the beach at Mazatlán, Mexico?



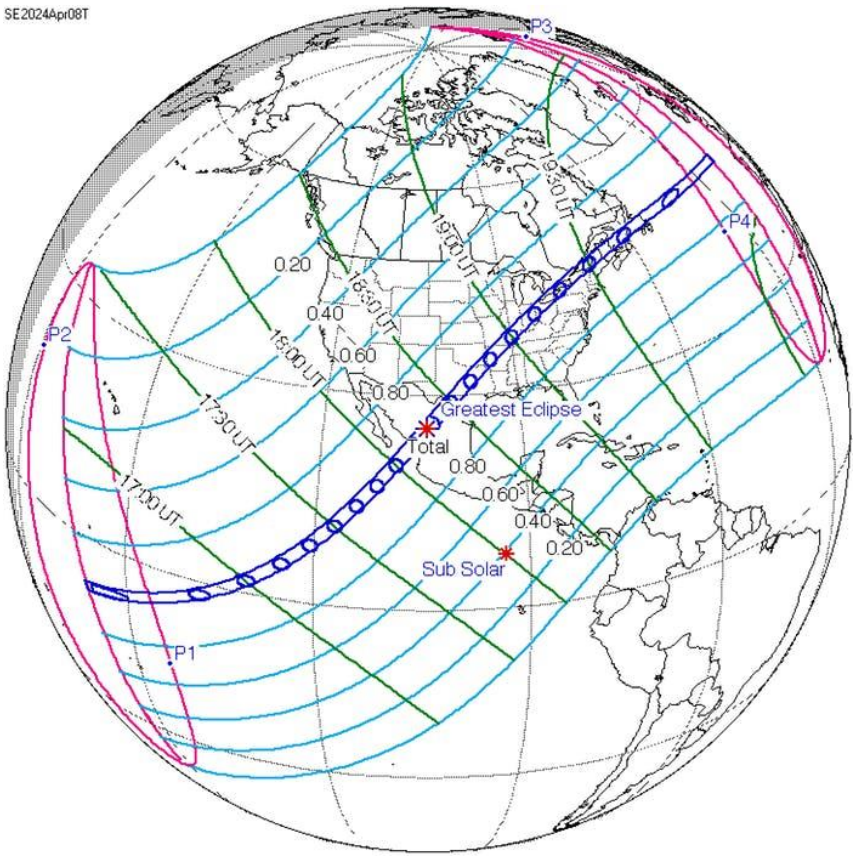
***The Next U.S. Total Eclipse Is in 2024. Here's Where to See It. It's good news for Texas and New England.*** *By Jacqueline Ronson on August 21, 2017 Inverse.com*

Did you watch the NASA live stream from Monday's total solar eclipse and just wish you had made the trek to the path of totality?

You blew it this time, but the good news is that you'll get another chance. Although the United States hadn't seen a total eclipse before this one since 1979, the next one is relatively soon - on April 8, 2024.
You'll want to start booking accommodations and stockpiling eclipse glasses soon if you're going to avoid the inevitable last-minute madness of sky-high prices and shortages. Here's where to catch the best views:

**Mazatlán, Mexico**
The 2024 eclipse will touch the North American continent on the west coast of Mexico. The popular tourist town Mazatlan is nearly in the center line of the path of totality, so if you like beach lounging with your astronomical events, this is where you want to be.

**Eagle Pass, Texas**
The eclipse will hit American soil at Eagle Pass, Texas, just across the Mexican border from Piedras Negras. This town of 28,000 will certainly be host to some pretty good parties in April 2024, when the shadow of the moon will leave the region in darkness for more than four minutes.



The eclipse on April 8, 2024, will span parts of Mexico, the United States, and Canada.

**Dallas, Fort Worth, and Waco, Texas**
These cities are all within the path of totality, with Waco getting the longest spot in the sun. San Antonio and Austin are on the edge of totality, too, which means the majority of Texans will have to travel just a short distance, or not at all, to take part in this incredible event.

**Little Rock, Arkansas**
The eclipse will hit southeast Oklahoma and much of Arkansas next. Little Rock is within the path of totality, though a little south of the center line. However, this eclipse will cover a wider swath of the Earth than the recent one, which means that you won't have to travel so close to the center of the totality to get a solid minute or two of full coverage.

**Southeast Missouri and South Illinois**
If you're an outdoorsy type, you may want to plan to head to this region. The eclipse will miss major cities in Missouri and Illinois but will hit some great parks, including Mark Twain National Forest and Shawnee National Forest. This area also boasts the only section of the country to see totality in 2017 and again in 2024.

People watch the solar eclipse at Saluki Stadium on the campus of Southern Illinois University on August 21, 2017, in Carbondale, Illinois. Carbondale will see another total eclipse on April 8, 2024.

**Indianapolis, Indiana**
The eclipse hits Indiana next, and Indianapolis residents will be treated to about three and an half minutes in the shadow of the moon.

**Cleveland, Ohio**
Cleveland sits near the center of the line of totality and will offer spectacular views to residents and visitors alike.

**Niagara Falls, U.S. or Canada**
Here's one that's sure to sell out before the rest: The romantic and spectacular Niagara Falls falls close to the centerline of the eclipse path. Expect huge crowds and huge-er prices if you don't book years in advance.

**Buffalo and Rochester, New York**
Or, skip the tourist traps and head to Buffalo or Rochester instead. The view will be just as good and the crowds potentially less overwhelming.

**Burlington, Vermont**
Northern bits of Vermont, including the quaint town of Burlington, will get a chance to get in on the eclipse action in 2024.

**Northern Maine**
A good chunk of Maine, north of Bangor, will see totality in 2024, hopefully making up for the fact that this was the only part of the continental U.S. that saw less than 50 percent totality in 2017.

**Various bits of Canada**
If you're into a cross-border vacation to the north, Canada will have plenty to offer eclipse chasers in 2024. A few bits of southern Ontario and Quebec will see totality; the city of Montreal falls close to the edge but within it. Swaths of New Brunswick, Prince Edward Island, and Newfoundland will be equally blessed.

# Centennial Observatory and Faulkner Planetarium

| Event | Place | Date | Time | Admission |
|---|---|---|---|---|
| Monthly Free Star Party | Centennial Observatory | Saturday, September 9th, 2017 | 8:45 PM to midnight | FREE |
| Astronomy Talk: "Introduction Sagittarius: The Centaur Archer" | Faulkner Planetarium | Wednesday, September 20th, 2017 | 7:30 to 8:30 PM | Adults: $2.50<br>Children (7-17) & CSI students, faculty, and staff: $1.50<br>Ages 0-6: FREE |
| Astronomy Talk<br>Night Telescope Viewing | Centennial Observatory | Wednesday, September 20th, 2017 | 8:30 to 10:30 PM | Free with Astronomy Talk admission |

**CSI Centennial Observatory / Faulkner Planetarium Herrett Center**
**College of Southern Idaho Campus Twin Falls, ID**
**Faulkner Planetarium / Show Times**
http://herrett.csi.edu/astronomy/planetarium/showtimes.asp
Now Showing

# Cassini NOOOOOOOOOOOO!!!

Editor's Note: Sadly, I open the 2017 Idaho Star Party™ with the news that the NASA spacecraft Cassini ends it mission on September 15, after spending 20 years in space and capturing over half a million images of Saturn and beyond. *

One image in particular over its double-decade career managed to really captivate the interest of Earthlings the world over — in part because they were in on the joke. "The Day the Earth Smiled," taken on July 19, 2013, was Cassini's big group photo of Earth from behind the glowing rings of Saturn.

Calling it "the first interplanetary photo bomb," NASA encouraged everyone everywhere to take a moment on July 19 to go outside and wave at Saturn. As Carolyn Porco, leader of the Cassini imaging team who conceived of the idea, wrote just prior to the event:

I hope, at the appropriate time, regardless where or on which side of the planet you are, that you stop what you're doing, go outside, gather together with friends and family, contemplate the utter isolation of our world in the never-ending blackness of space, relish its lush, life-sustaining beauty, appreciate the rarity it is among the Sun's Planets and marvel at your own existence and that of all life on planet Earth.

The result was a gorgeous image of Earth below the rings of Saturn; a tiny dot 898.414 million miles away. It was an awe-inspiring example of space's vastness, not to mention the incredible fact that within that tiny dot, space nerds the world over were grinning up at the sky.

Saturn, from Cassini's perspective, along with a tiny bright dot below the rings that is Earth.

Among its list of accomplishments, "The Day the Earth Smiled" was an especially rare feat for Cassini. The spacecraft was in the perfect position to photograph Saturn as it eclipsed the sun, brightening the eight planet's rings and allowing the spacecraft get that crucial view of Earth. Several photos were taken using red, green and blue spectral filters, and then combined to create the natural color view we see in the image.

Cassini was responsible for a number landmark events during its 20 year mission. It landed the Huygens probe onto Saturn's Titan moon, and its flybys helped scientists discover geyser-like jets of water vapor and ice particles that come from an underground ocean on Enceladus. In its final act on September 15, Cassini will descend into Saturn's atmosphere, transmitting data until it eventually disintegrates.

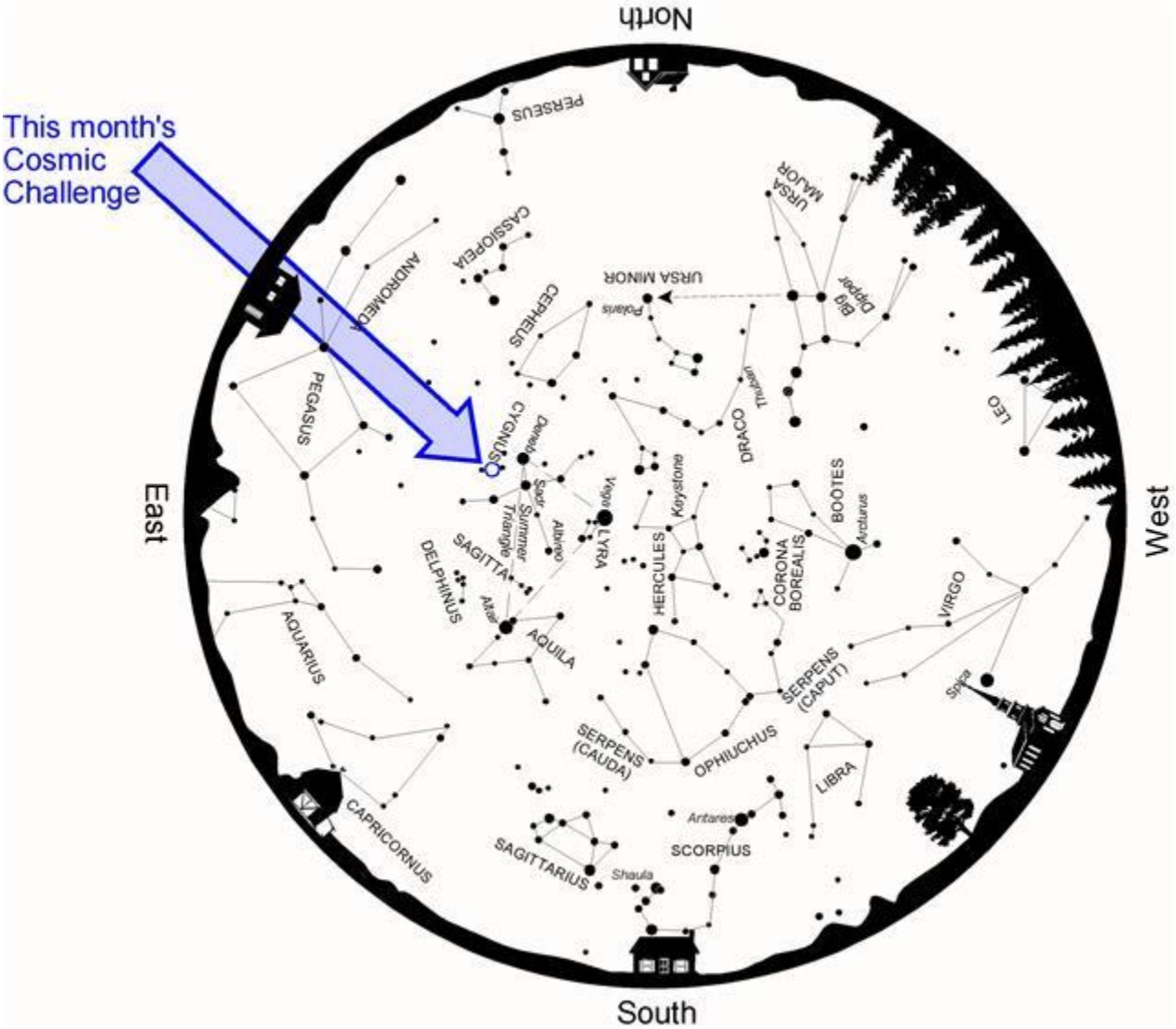
* Editor is the President of The Boise Astronomical Society

## Cosmic Challenge

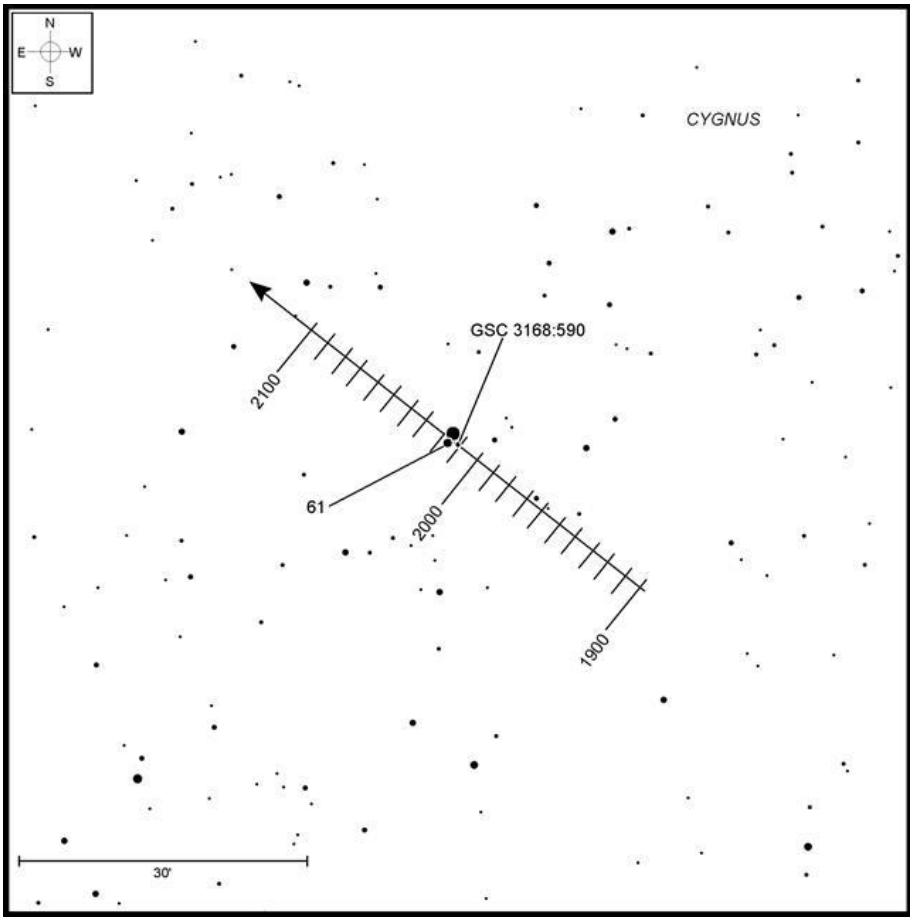
This month's suggested aperture range is: Giant Binoculars and 3-5 inch telescopes.

| Target | Type | RA | DEC | Constellation | Magnitude |
|---|---|---|---|---|---|
| **61 Cygni** | **Binary star** | **21 06.9** | **+38 44.8** | **Cygnus** | **5.2, 6.0** |

The star 61 Cygni is not bright, nor is it visually distinctive. To the eye alone, it looks just like any other 5th-magnitude point of light deep in the Milky Way flowing through the Swan.
But looks can be deceiving! This unremarkable looking star is indeed quite remarkable for its unusually high rate of proper motion. By watching and plotting it against the backdrop of stars over the course of relatively few years, its position shifts at an extraordinarily fast pace. At present, 61 Cyg has a proper motion of more than 5 arc-seconds per year.




*Above: Summer star map from **Star Watch** by Phil Harrington.*



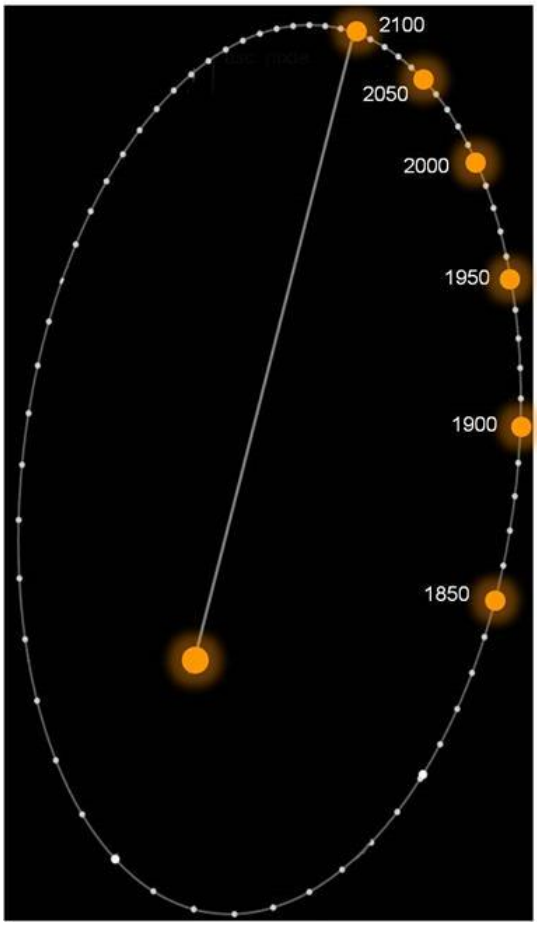

*Above: Finder chart for this month's Cosmic Challenge.*
*Chart adapted from **Cosmic Challenge** by Phil Harrington.*
*Click on the chart to open a printable PDF version in a new window.*

Why so fast? For one, it's nearby. At just 11.4 light years away, 61 Cyg is the 4th closest naked eye star (albeit only from under dark skies) to our solar system. The three closer stars - Alpha Centauri, Sirius, and Epsilon Eridani - don't show such a high rate of motion, however. So again, why 61 Cyg? While those others may be closer, 61's velocity is higher. The system has a net space velocity of 108 km/s relative to the Sun. That causes 61 to really hit the gas and go!

The Italian astronomer Giuseppe Piazzi (1746-1826), who is also credited with discovering the first asteroid (excuse me, "dwarf planet"), Ceres, was also the first to notice 61 Cyg's rapid motion after completing a 10-year study in 1804. Piazzi called it the "Flying Star," a name that sticks to this day. Curiously, Piazzi made no mention of the fact that 61 Cyg is a binary star, however, even though both stellar members must have been visible through his telescope. It wasn't until 1830 that German astronomer Friedrich von Struve (1793-1864) announced that 61 Cyg was a binary system.

Eight years after Struve, another German astronomer, Friedrich Bessel (1784-1846), measured 61 Cyg's parallax shift, becoming the first to use that trigonometric method to calculate a star's distance. His estimate of 10.4 light years is impressively close to the modern value of 11.4 light years. We now know that 61 Cygni is a pair of orange (type K) main sequence stars, both of which are smaller, cooler, and older than our Sun. The primary sun, 61 Cygni A, shines at magnitude 5.2, while 61 Cygni B shines at magnitude 6.0. Each is separated from the other by about 30 arc-seconds. I can just make out that 61 is "oval" through my 8x40s, but resolve them in my 10x50s. Others, apparently with sharper eyes and/optics than mine, have reported a clean separation at 8x. Give it a go and post your experiences in this article's discussion forum. If you can't quite resolve the pair just yet, take comfort in knowing that time is on your side. As the two stars continue in their 650-year orbit of each other, the gap between 61 Cyg A and B will continue to widen from our perspective. As the diagram below shows, the pair will be at their widest in about the year 2100, when the apparent separation will be 34".

The real challenge presented by 61 Cygni is not in splitting the binary, however. Rather, it's monitoring and detecting their collective proper motion over the course of several years. The chart below shows the pair's path from 1900 to 2100. Notice how 61 Cygni A and B passed to either side of an 11th-magnitude field star between 2010 and 2015. That star, GSC 3168:590, actually appeared to lie between the 61 components back in 2011. For a moment, 61 Cyg was a faux triple star system.




*Above: The apparent path of 61 Cyg B around 61 Cyg. The pair is heading toward widest separation in approximately 83 years.*

Above: 61 Cygni showing proper motion at one year intervals. Photo credit: By IndividusObservantis (Own work) [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0)], via Wikimedia Commons.

The 61 pair has continued on by now, leaving GSC 3168:590 behind. Use the finder chart above to follow the stars' progress by marking their precise locations every year or so. Doing so will let you see for yourself, just as Piazzi saw more than 200 years ago, that 61 Cygni truly is the flying star. Have a favorite challenge object of your own? I'd love to hear about it, as well as how you did with this month's test. Contact me through my web site or post to this e-column's discussion forum. Remember, half of the fun is the thrill of the chase. Game on!

## 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 circa 1980.