

Cache Valley Clear Skies

The Journal of the Cache Valley Astronomical Society



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www.cvas-utahskies.org

Total Solar Eclipse Countdown: 31 days (as of July 21st)



Total Solar Eclipse Image courtesy NASA

The President's Corner By Dell Vance, CVAS President



No Meeting This Month – We are now in Star Party Mode!

There is no club meeting scheduled for July. We have a club star party scheduled for Friday, July 21st at Dell's house in Newton. Watch your email for further details about the location and other possible star parties.

We also have a solar party planned for August 5th at the Logan Library from 10:30am to noon.

June was a great month for Astronomy. We have had clear nights and many opportunities to see the skies. We have also had some great gatherings, such as the Annual CVAS Potluck Dinner, Nibley Pioneer Heritage Days, Cache Valley Youth Center Star Party, Young Women's Camp, and Summer Citizens Star Party. I am impressed at the great support that we have received in support of these events.

Following the Potluck Dinner, we observed the skies for a couple of hours. It was fun to see the enthusiasm of our guests there with us. In fact, I was so impressed that the following night I decided to get a photo of Saturn. I have tried this before, but they came out a bit over exposed. So I set up my system to see if I could get some of the bands across Saturn as well as the rings. I ended up with this photo. I am slowly learning more of the capabilities of my telescope and imaging processes. I also had a lot of fun doing it.



Tom Westre taught Astronomy to the Summer Citizens again this year. As usual he did a superb job of providing great information about the paradigm shifts in our understanding of the cosmos. The students were very receptive. They also enjoyed the Summer Citizens Star Party that CVAS put on for them. For many of them it was their first time to look through a telescope. CVAS had 5 telescopes working to provide them with exciting views of the heavens. Everyone did a great job of supporting this event.

Lyle Johnson also provided a Star Party for a Young Women's Camp the same night. I believe CVAS had 3 telescopes working at that event. That same night, Dale Hooper instructed some Boy Scouts on the Astronomy Merit Badge. It was certainly a busy night for us all.

It is exciting to see the activity of the club. You have really been reaching out to your friends and neighbors. We are receiving requests for more Star

Parties from Schools and Young Women's Camps. It is always great to provide these opportunities to the public. I am hoping to host a Star Party for the club at my house here in Newton on July 21st. We normally have very good skies for observing and should have plenty of room for all that want to come. I'll send out a map and instructions on how to get to our place.

July looks like a continuation of this summer season. Be sure to come out to our events and to check the website for updates on times and locations. Thanks for all your support.

Clear Skies!



CVAS Members and their Spouses at the Pot-luck Dinner, June 23rd - Image courtesy Tom Westre

July 2017 Sky Events By Tom Westre

Let's begin with two bright easy to find planets, Jupiter and Saturn. Jupiter dominates the western sky after sunset and Saturn controls the southern sky. A challenge near dusk is Mercury.

Jupiter moves eastward in Virgo in July in the western skies. The Galilean moons can be seen in small telescopes. Watch from night to night as the moons Io, Europa, Ganymede and Callisto orbit Jupiter. As a project keep a sketch of the moons each night or photograph them over a week or so.

Saturn is found in Ophiuchus the Serpent-Bearer, the 13th constellation of the modern zodiac. The rings are tilted 26 degrees towards earth making Saturn an awesome view in a telescope. We see the northern face until 2025 when the southern face will begin to become visible.

Elusive Mercury can be found west northwest low on the horizon. July 19th is the best date to view Mercury. You will need an unobstructed horizon to view the planet.

The thin crescent moon on July 24 and 25 will help you locate Mercury located to the upper right of the moon. Binoculars will help. Make sure your horizon is clear.

Venus is in Taurus and shines at magnitude -4.0 in the early morning sky as the 'morning star.' Venus is a waxing gibbous phase slowly growing to 75% illuminated by the end of the month.

Mars to in conjunction with the Sun in July and is not visible. It will be a superior conjunction on July 27th opposite the Sun from Earth.

Uranus is in Pisces, while Neptune is in Aquarius. Both planets can be seen after midnight.

The waxing gibbous moon will join Saturn on the evenings of July 5, 6, and 7. Just above Scorpius and Sagittarius. While the moon is about 240,000 miles away Saturn is 847 million miles beyond the moon.

The moon moves past Venus on the mornings of July 19, 20, and 21 giving an appealing conjunction with Venus on July 19th with the moon and the star Aldebaran and the Pleiades above them.

Look to the west at sunset on the evenings of July 24 and 25 to view the thin crescent moon in conjunction with Mercury and the star Regulus in the constellation Leo. You will need a clear western horizon and binoculars to view this sky event.

You will also see the moon, Venus and Mercury on August 21st during the Great Solar Eclipse of 2017.

On the evening of July 28th the crescent moon will pass above Jupiter making an appealing conjunction with the moon and the star Spica to the east of Jupiter.

On July 3rd the Earth reaches aphelion the farthest distance from the Sun in its elliptical orbit at 94.5 million miles. At perihelion, its closest approach the Earth is 91.5 million miles from the Sun.

Late July we have the Delta Aquarid Meteor shower which peaks July 27 and 28 with about 10-20 meteors per hour. You should be able to view meteors a week or so on either side of these dates. The best time is from midnight to sunrise. On the peak night the waxing crescent moon will set by midnight and should not interfere with viewing the meteors.

This month's evening constellations looking south include Cygnus, Lyra, Hercules, Corona Borealis, Bootes, Aquila, Ophiuchus, Sagittarius, and Scorpius.

The Summer Triangle makes its appearance with the stars Deneb, Altair, and Vega. Deneb in the tail of Cygnus the Swan is 1,500 light years away, Altair is 16.7 light years away, and Vega is 25 light years away. Looking to the west the bright star Arcturus lies in Bootes at a distance of 36.6 light years.

Popular deep sky targets include the globular cluster Messier 13 in Hercules, the planetary nebula Messier 57 in Lyra, another planetary nebula Messier 97 the Owl Nebula in Ursa Major and the beautiful double star Albireo in Cygnus. Finally the great Whirlpool Galaxy Messier 51 is near the star Alkaid, the end star in the Big Dipper, at a distance of 37 million light years.

Double Star Favorite

By Tom Westre

61 Cygni. This double star is not the brightest but is important as it has one of the largest proper motions (sideways motion to our line of sight) of any star in the sky. This has given it its nickname the "Flying Star" because it is near the Earth at 11.4 light years, which makes it the fourth closest star visible to the

unaided eye after Alpha Centauri, Sirius, and Epsilon Eridani.

Brad can be contacted by email at brad.kropp@usu.edu.



Figure 1 - Image by Tom Westre, 8" SCT, Canon T3i

The German astronomer F.W. Bessel used 61 Cygni as the first star to have its distance measured by observation. It's sometimes called "Bessel's Star." 61 Cygni is a binary star. They orbit in a period of 659 years



Figure 2 - Courtesy of Sky and Telescope

CVAS Loaner Telescope

CVAS provides a 10 inch Dobsonian telescope to club members. Contact Brad Kropp to make arrangements to use this telescope.



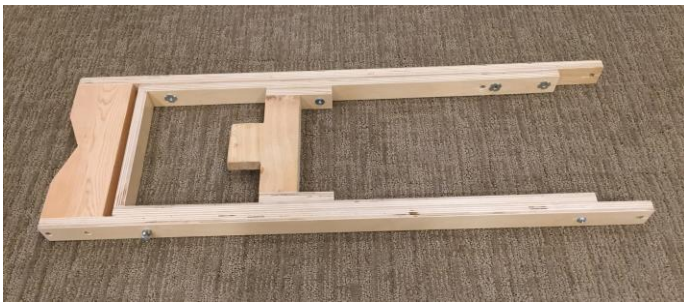
Binocular Supports

The club now has available a number of mostly completed binocular supports. These supports are being sold to club members at cost. These supports just need the binocular attachment – which is tailored to the type of binocular being mounted.

Please contact Ned Miller or Dell Vance if you are interested in purchasing a binocular support. The images below show what they look like with binoculars attached as well as an image showing them folded for storage.



Completed Binocular Support (with binos attached) - Courtesy Ned Miller



Binocular support (folded for storage) - Courtesy Ned Miller

Spotlight on Sagittarius, the Archer

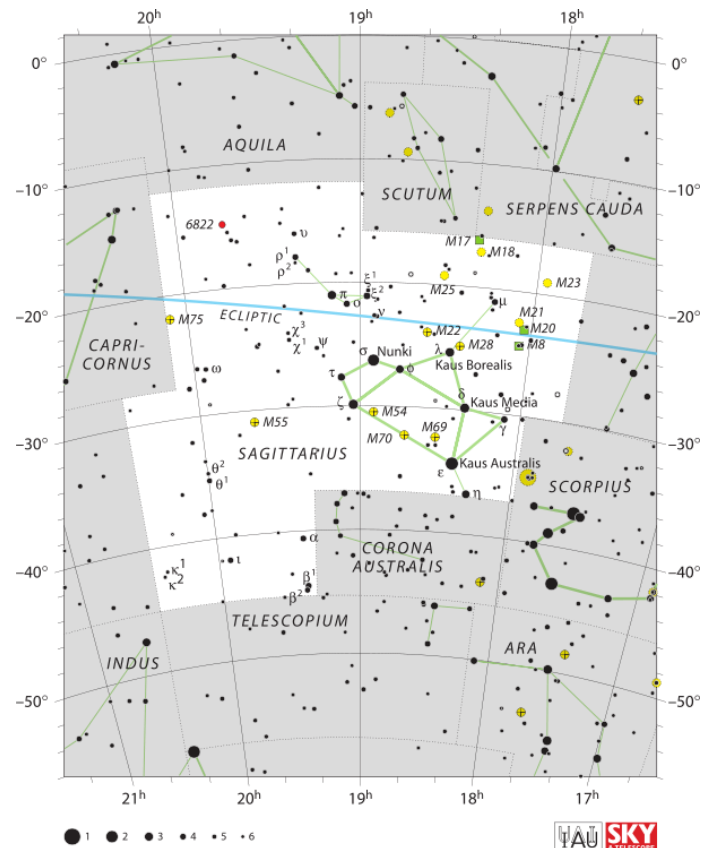
By Dale Hooper

Sagittarius is arguably the best constellation for deep sky objects in the northern sky. It has great globular clusters, dark nebulae, planetary nebulae, double stars, open clusters, emission and reflection nebulae, and star clouds. All it lacks are galaxies and a more northerly position. Certainly there are galaxies opposite Sagittarius but their light is blocked because we are looking toward the center of our Milky Way galaxy.

Officially, Sagittarius is the archer, but in modern times it is probably better known by the teapot asterism. The “steam” from the spout of the teapot becomes the mist of our beautiful home galaxy.

This is my favorite summer constellation and as mentioned, I just wish that it was further north. Can you imagine how beautiful the globular cluster M22 would be if it was at the same declination as M13? Of course, the same could also be said for the rest of the showpiece objects in this constellation.

Objects which rank at least three stars in *The Night Sky Observer's Guide* (Sagittarius is in Volume 2) which can be observed with an eight inch scope, have been included. As usual, the table is organized according to increasing Right Ascension values.



IAU and Sky & Tel - Roger Sinnott & Rick Fienberg

| Object | R.A. | Dec. |
|--|----------|---------|
| NGC 6445 (Planetary Nebula) | 17h49.2m | -20°01' |
| NGC 6469 (Open Cluster) | 17h52.9m | -22°21' |
| Messier 23 (Open Cluster) | 17h56.8m | -19°01' |
| h5003 (Triple Star) | 17h59.1m | -30°15' |
| Messier 20 (Emission & Reflection Nebula) | 18h02.3m | -23°02' |
| Barnard 86 (Dark Nebula) | 18h03.0m | -27°53' |
| NGC 6520 (Open Cluster) | 18h03.4m | -27°54' |
| Messier 8 (Emission Nebula, Lagoon Nebula) | 18h03.8m | -24°23' |
| Barnard 87 (Dark Nebula) | 18h04.3m | -32°30' |
| Messier 21 (Open Cluster) | 18h04.3m | -22°30' |
| NGC 6530 (Open Cluster) | 18h04.8m | -24°20' |
| NGC 6546 (Open Cluster) | 18h07.2m | -23°20' |
| Barnard 90 (Dark Nebula) | 18h10.2m | -28°19' |
| NGC 6565 (Planetary Nebula) | 18h11.9m | -28°11' |
| NGC 6563 (Planetary Nebula) | 18h12.0m | -33°52' |
| NGC 6567 (Planetary Nebula) | 18h13.7m | -19°05' |
| Markarian 38 (Open Cluster) | 18h15.2m | -19°00' |
| Barnard 92 (Dark Nebula) | 18h15.5m | -18°14' |
| NGC 6583 (Open Cluster) | 18h15.8m | -22°08' |

| | | | | |
|---|----------|---------|--------|--|
| Messier 24 (Small Sagittarius Star Cloud) | 18h16.5m | -18°50' | | Deep Impact smashes into Comet 9P/Tempel (2005) |
| Barnard 93 (Dark Nebula) | 18h16.9m | -18°04' | 09 Jul | Full Moon |
| NGC 6596 (Open Cluster) | 18h17.5m | -16°40' | | Voyager 2 flies past Jupiter (1979) |
| η Sagittari (Quadruple Star) | 18h17.6m | -36°46' | 10 Jul | Pluto at Opposition (magnitude 14.2) |
| NGC 6603 (Open Cluster) | 18h18.4m | -18°25' | | Ed White, first American to walk in space (1965) |
| Messier 18 (Open Cluster) | 18h19.9m | -17°08' | | Neptune 0.9° north of Moon |
| Messier 17 (Emission Nebula – Omega or Swan Nebula) | 18h20.8m | -16°11' | 13 Jul | Mariner 4, first Mars flyby (1965) |
| NGC 6624 (Globular Cluster) | 18h23.7m | -30°22' | | New Horizons flies past Pluto (2015) |
| Messier 28 (Globular Cluster) | 18h24.5m | -24°52' | 16 Jul | Last Quarter Moon |
| 21 Sagittari (Double Star) | 18h25.3m | -20°32' | | Comet Shoemaker-Levy 9 smashes into Jupiter (16-22 July 1994) |
| NGC 6629 (Planetary Nebula) | 18h25.7m | -23°12' | | First photograph of a star [Vega] (1850) |
| NGC 6638 (Globular Cluster) | 18h30.9m | -25°30' | 17 Jul | Apollo/Soyuz space link up (1975) |
| Messier 69 (Globular Cluster) | 18h31.4m | -32°21' | | Aldebaran 0.3° south of Moon |
| Messier 25 (Open Cluster) | 18h31.6m | -19°15' | 19 Jul | Apollo 11 lands on Moon, “That’s one small step for [a] man, one giant leap for mankind” – the late Neil Armstrong (1969) |
| NGC 6642 (Globular Cluster) | 18h31.9m | -23°29' | 20 Jul | Viking 1 lands on Mars (1976) |
| NGC 6645 (Open Cluster) | 18h32.6m | -16°54' | | Friedrich Bessel born (1784) |
| Messier 22 (Globular Cluster) | 18h36.4m | -23°54' | | New Moon |
| Messier 70 (Globular Cluster) | 18h42.2m | -32°18' | | Mercury 0.9° south of Moon |
| NGC 6716 (Open Cluster) | 18h54.6m | -19°53' | | Regulus 0.07° south of Moon |
| NGC 6717 (Globular Cluster) | 18h55.1m | -22°42' | 22 Jul | First photograph of a total solar eclipse (1851) |
| Messier 54 (Globular Cluster) | 18h55.1m | -30°29' | 23 Jul | NASA founded (1958) |
| NGC 6723 (Globular Cluster) | 18h59.6m | -36°38' | 25 Jul | Delta Aquarid meteors |
| H N 119 (Double Star) | 19h29.9m | -26°59' | | |
| Messier 55 (Globular Cluster) | 19h40.0m | -30°58' | 28 Jul | |
| h 599 (Triple Star) | 19h40.7m | -16°18' | | |
| NGC 6818 (Planetary Nebula) | 19h44.0m | -14°09' | 29 Jul | |
| Messier 75 (Globular Cluster) | 20h06.1m | -21°55' | | |

CVAS Minutes – June 2017

There was no meeting in June.

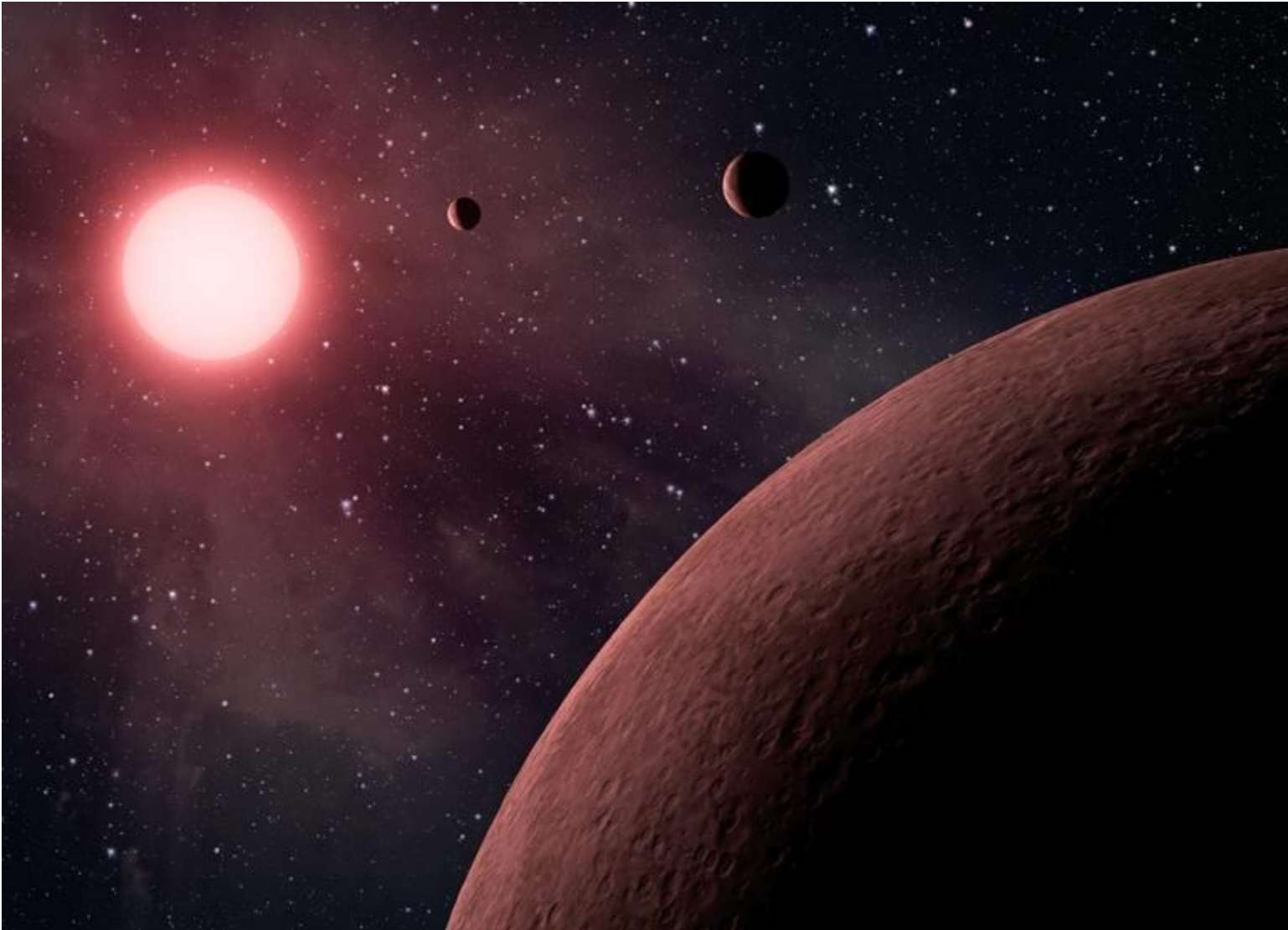
Upcoming Star Parties

- 21 July Club Star Party – Dell Vance’s House in Newton (details coming)
- 05 Aug Solar Party, Logan Library 10:30 am to noon
- 12 Aug Public Star Party (details coming)

Upcoming Events

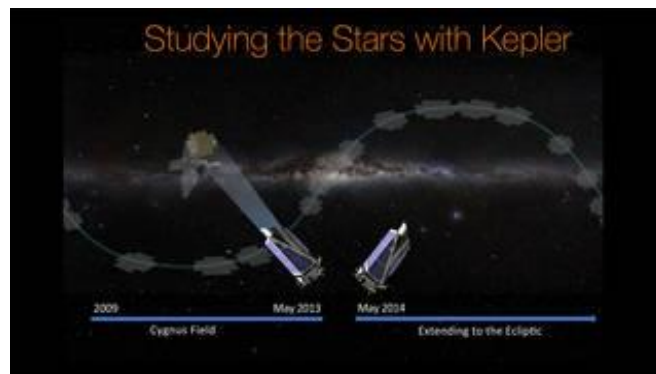
- 04 Jul Independence Day
- Crab Nebula first seen (1054)
- Mars Pathfinder lands on Mars (1997)

NASA Releases Kepler Survey Catalog with Hundreds of New Planet Candidates



NASA's Kepler space telescope team has identified 219 new planet candidates, 10 of which are near-Earth size and in the habitable zone of their star.

Credits: NASA/JPL-Caltech



NASA's Kepler space telescope was the first agency mission capable of detecting Earth-size planets using the transit method, a photometric technique that measures the minuscule dimming of starlight as a planet passes in front of its host star. For the first four years of its primary mission, the space telescope observed a set starfield located in the constellation Cygnus (left). New results released from Kepler data June 19, 2017, have implications for understanding the frequency of different types of planets in our galaxy and the way planets are formed. Since 2014, Kepler has been collecting data on its second mission, observing fields on the plane of the ecliptic of our galaxy (right).

Credits: NASA/Wendy Stenzel

NASA's Kepler space telescope team has released a mission catalog of planet candidates that introduces 219 new planet candidates, 10 of which are near-Earth size and orbiting in their star's habitable zone, which is the range of distance from a star where liquid water could pool on the surface of a rocky planet.

This is the most comprehensive and detailed catalog release of candidate exoplanets, which are planets outside our solar system, from Kepler's first four years of data. It's also the final catalog from the spacecraft's view of the patch of sky in the [Cygnus constellation](#).

With the release of this catalog, derived from data publicly available on the [NASA Exoplanet Archive](#), there are now 4,034 planet candidates identified by Kepler. Of which, 2,335 have been verified as exoplanets. Of roughly 50 near-Earth size habitable zone candidates detected by Kepler, more than 30 have been verified.

Additionally, results using Kepler data suggest two distinct size groupings of small planets. Both results have significant implications for the search for life. The final Kepler catalog will serve as the foundation for more study to determine the prevalence and demographics of planets in the galaxy, while the discovery of the two distinct planetary populations shows that about half the planets we know of in the galaxy either have no surface, or lie beneath a deep, crushing atmosphere – an environment unlikely to host life.

The findings were presented at a news conference Monday at NASA's Ames Research Center in California's Silicon Valley.

"The Kepler data set is unique, as it is the only one containing a population of these near Earth-analogs – planets with roughly the same size and orbit as Earth," said Mario Perez, Kepler program scientist in the Astrophysics Division of NASA's Science Mission Directorate. "Understanding their frequency in the galaxy will help inform the design of future NASA missions to directly image another Earth."

The Kepler space telescope hunts for planets by detecting the minuscule drop in a star's brightness that occurs when a planet crosses in front of it, called a transit.

This is the eighth release of the Kepler candidate catalog, gathered by reprocessing the entire set of data from Kepler's observations during the first four years of its primary mission. This data will enable scientists to determine what planetary populations – from rocky bodies the size of Earth, to gas giants the size of Jupiter – make up the galaxy's planetary demographics.

To ensure a lot of planets weren't missed, the team introduced their own simulated planet transit signals into the data set and determined how many were correctly identified as planets. Then, they added data that appear to come from a planet, but were actually false signals, and checked how often the analysis mistook these for planet candidates. This work told them which types of planets were overcounted and which were undercounted by the Kepler team's data processing methods.

"This carefully-measured catalog is the foundation for directly answering one of astronomy's most compelling questions – how many planets like our Earth are in the galaxy?" said Susan Thompson, Kepler research scientist for the SETI Institute in Mountain View, California, and lead author of the catalog study.

One research group took advantage of the Kepler data to make precise measurements of thousands of planets, revealing two distinct groups of small planets. The team found a clean division in the sizes of rocky, Earth-size planets and gaseous planets smaller than Neptune. Few planets were found between those groupings.

Using the W. M. Keck Observatory in Hawaii, the group measured the sizes of 1,300 stars in the Kepler field of view to determine the radii of 2,000 Kepler planets with exquisite precision.

“We like to think of this study as classifying planets in the same way that biologists identify new species of animals,” said Benjamin Fulton, doctoral candidate at the University of Hawaii in Manoa, and lead author of the second study. “Finding two distinct groups of exoplanets is like discovering mammals and lizards make up distinct branches of a family tree.”

It seems that nature commonly makes rocky planets up to about 75 percent bigger than Earth. For reasons scientists don't yet understand, about half of those planets take on a small amount of hydrogen and helium that dramatically swells their size, allowing them to "jump the gap" and join the population closer to Neptune's size.

The Kepler spacecraft continues to make observations in new patches of sky in its extended mission, searching for planets and studying a variety of interesting astronomical objects, from distant star clusters to objects such as the [TRAPPIST-1](#) system of seven Earth-size planets, closer to home.

Ames manages the Kepler missions for NASA's Science Mission Directorate. NASA's Jet Propulsion Laboratory in Pasadena, California, managed Kepler mission development. Ball Aerospace & Technologies Corporation operates the flight system with support from the Laboratory for Atmospheric and Space Physics at the University of Colorado in Boulder.

For more information on this catalog release, to include briefing materials, audio and video, go to:

<https://www.nasa.gov/ames/kepler/briefing-materials-final-kepler-survey-catalog-of-planet-candidates-in-the-cygnus-field>

For more information about the Kepler mission, visit:

<https://www.nasa.gov/kepler>

CACHE VALLEY ASTRONOMICAL SOCIETY MEMBERSHIP APPLICATION FORM

Member # _____

NAME: _____
First Middle Initial Last

Address: _____
Street City State Zip Code

Home Phone: _____ Cell Phone: _____

Work Phone : _____ Occupation : _____

Email Address: _____

How did you learn about CVAS

____ Website ____ Star Party ____ CVAS Member ____ Other _____

Membership: \$20 a year

Tell us about yourself: Do you have a special interest in astronomy? Do you have special skills? Are you willing to volunteer on CVAS projects or attend public outreach star parties? Astro equipment owned.

By signing this application, I acknowledge I have access to the CVAS website, cvas-utahskies.org, and the CVAS Constitution. I agree to abide by the constitution.

Signature: _____ Date: _____

Bring this form to the meeting or Mail Application to:

Ned Miller, CVAS Treasurer
480 N 400 E
Providence, Utah 84332

For any questions contact our Treasurer at nedmiller2008@gmail.com or our Secretary Dale Hooper at dchooper5@gmail.com.