

Cache Valley Clear Skies

The Journal of the Cache Valley Astronomical Society



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www.cvas-utahskies.org

Total Solar Eclipse Countdown:
89 days (as of May 24th)



Total Solar Eclipse Image courtesy NASA

Meeting Announcement

This month we will be meeting on **Wednesday, May 24th at 7pm in room 171E of the main BATC campus.** Enter on the **south** side of the building located at 1301 North 600 West. Please see the partial map on page 2.

This month our discussion topic will be star parties and stargazing. This topic will help us all be better prepared to enjoy public and private club star parties this year. We will also be discussing several benefits that are available to club members.

The President's Corner By Dell Vance, CVAS President



The year is gaining momentum. We are now into May and the constellations are different from those in winter. I realized today I didn't take a single photo of Orion through my telescope. It must have been a busy winter. I did get a chance to capture a few photos of the Orion Nebula with my camera on a tripod. There are many ways to enjoy our hobby. I also took some pictures of the full moon and used Photo Shop Elements 14 to stack a few of them together. Here is how that turned out.



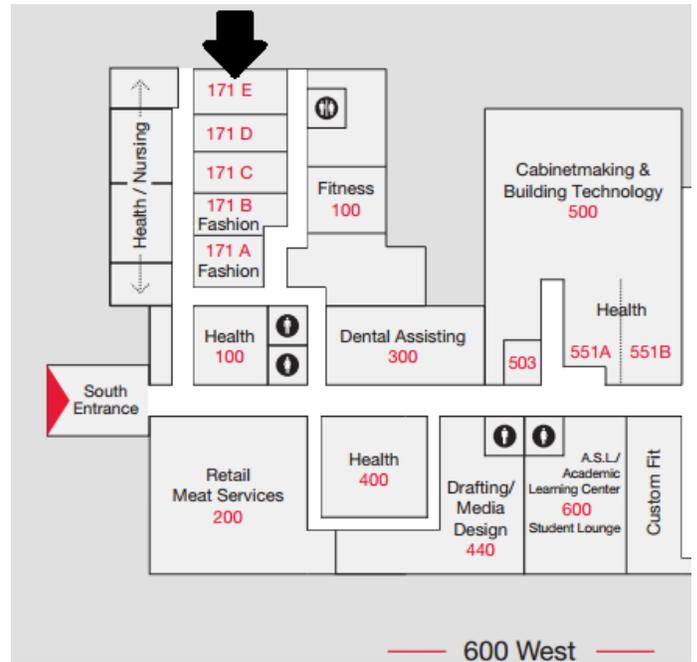
Surprisingly, it wasn't all that hard to do. This adds even more opportunities to develop new talents. Astronomy is loaded with opportunities.

We had a very interesting CVAS meeting this month. Tom Westre, former CVAS President, presented a great deal of information about Exoplanets and the potential for life on worlds other than Earth. It was filled with current observations and data about planets that are indeed revolutionary. No longer is our solar system an anomaly. Tom presented data that there are about 1.6 planets for every star. It was fun to let the mind dwell on that fact.

This month our meeting will be on May 24th at BATC room 171E. The topic will be about star parties and how astronomy clubs can help amateur astronomers develop new skills and enjoy the hobby. We have many new opportunities to become better at what we do. It should be of interest for those that are new to astronomy as well as our seasoned astronomers. Be sure to come join us.

We will also be starting our star party season this month, so be sure to watch the website for information as it becomes available. Things are always looking up.

Clear Skies!



Map of south end of BATC Main Campus (The black arrow points to Room 171E)

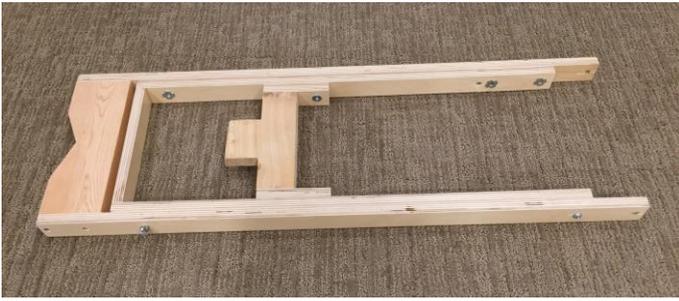
Binocular Supports

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

CVAS Loaner Telescope

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

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



CVAS Supports Zootah Submitted by Lyle Johnson

On April 21st CVAS members Lyle Johnson, Tom Westre and Ned Miller shared views of the Sun with the public at the Earth Day celebration at Willow Park Zoo. Lyle had the following comments, “Once people started arriving, we were kept busy talking

and adjusting the telescopes to keep them pointed at the Sun. Considering the weather that we have been having and the relatively quiet state of the Sun, we were extremely lucky to have a clear sky and sunspots to observe!”



CVAS Booth at the Zootah Event

Spotlight on Canes Venatici, The Hunting Dogs By Dale Hooper

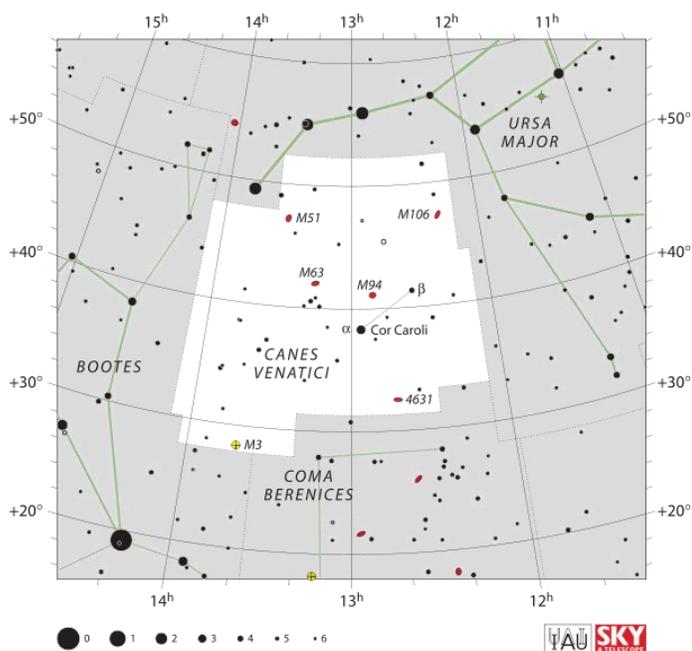
Admittedly, for me, this is a constellation that I identify with the deep sky objects it contains rather than its visible star pattern. It is sandwiched between Ursa Major and Bootes as seen in the diagram on the next page. Each hunting dog essentially consists of one star. But, Canes Venatici makes up for it with a number of great galaxies and a fine globular. This includes four Messier galaxies (M51, M106, M63 and M94) plus the globular cluster M3. The most famous object is most likely M51, the Whirlpool Galaxy.

Objects which rank at least four stars in *The Night Sky Observer's Guide* (Canes Venatici is in Volume 2) have been included. As usual, the table is organized according to increasing Right Ascension values.

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Whirlpool Galaxy, Messier 51 - Courtesy NASA



IAU and Sky & Tel - Roger Sinnott & Rick Fienberg.

Object	R.A.	Dec.
NGC 4111 (Galaxy mag 10.7)	12h07.1m	+43°04'
NGC 4138 (Galaxy mag 11.3)	12h09.5m	+43°41'
NGC 4143 (Galaxy mag 10.7)	12h09.6m	+42°32'
NGC 4244 (Galaxy mag 10.4)	12h17.5m	+37°49'
M 106 (Galaxy mag 8.4)	12h19.0m	+47°18'
NGC 4449 (Galaxy mag 9.6)	12h28.2m	+44°06'
NGC 4490 (Galaxy mag 9.8)	12h30.6m	+41°38'
NGC 4618 (Galaxy mag 10.8)	12h41.5m	+41°09'
NGC 4631 (Galaxy mag 9.2)	12h42.1m	+32°32'
NGC 4656-57 (Gal. m 10.5)	12h44.0m	+32°10'
M 94 (Galaxy mag 8.2)	12h50.9m	+41°07'
Cor Caroli (Double Star)	12h56.0m	+38°19'
NGC 4861 (Galaxy mag 12.3)	12h59.0m	+34°52'
NGC 4868 (Galaxy mag 12.2)	12h59.1m	+37°19'
NGC 5005 (Galaxy mag 9.8)	13h10.9m	+37°03'
NGC 5033 (Galaxy mag 10.2)	13h13.4m	+36°36'
M 63 (Sunflower Galaxy mag 8.6)	13h15.8m	+42°02'
M 51 (Whirlpool Galaxy mag 8.4)	13h29.9m	+47°12'
NGC 5198 (Galaxy mag 11.8)	13h30.2m	+46°40'
25 CVn (Triple Star)	13h37.5m	+36°18'
NGC 5273 (Galaxy mag 11.6)	13h42.1m	+35°39'
M 3 (Glob Cluster mag 5.9)	13h42.2m	+28°23'
NGC 5297 (Galaxy mag 11.8)	13h46.4m	+43°52'
NGC 5301 (Galaxy mag 12.7)	13h46.4m	+46°06'
NGC 5326 (Galaxy mag 11.9)	13h50.8m	+39°34'

CVAS Minutes – April 2017

The meeting was held on April 26th in room 824 in the Main Campus building of BATC. Dale Hooper discussed current sky events. It was announced that the meeting topic next month will be star parties and stargazing. Time was then turned over to Blaine Dickey who was giving away several astronomy books. Any unclaimed books would be added to the club library. Tom Westre also added some books.

The remaining time was then turned over to Tom Westre for the main presentation concerning Exoplanets and Earth 2.0.

Tom explained that exoplanets is a field that is expanding rapidly. There is a lot of information that is becoming available quickly. He stated that science

fiction writers gave us our initial foundation concerning what to expect.



Tom Westre's discussion of Exoplanets - Photo courtesy Dell Vance

Tom then discussed several paradigm shifts which have occurred:

- Geocentric to heliocentric
- Universe had a beginning
- Universe is expanding
- Other solar systems and exoplanets

He shared that planets are the rule rather than the exception. He also explained that one in five stars may have a planet with some similarities to Earth. The Kepler probe has really opened the field up.

Tom stated that in our own solar system water is fairly common and that a number of moons in the outer solar system contain oceans under ice crusts.

Tom further stated that there are 200 to 400 billion stars in the Milky Way giving a total of 400 billion to possibly over a trillion exoplanets in our galaxy.

Tom shared that there are several mechanisms used for exoplanet discovery, namely:

- Transit (78% of discoveries)
- Radial velocity (18% of discoveries)
- Imaged (1% of discoveries)

He also shared that there are many varied planetary configurations which have been discovered.

Tom then shared several additional resources which club members may use to pursue additional information about exoplanets:

1. Kepler Orrery:
<https://apod.nasa.gov/apod/ap151205.html>
2. Exoplanet Observing for Amateurs (downloadable PDF). See: brucegary.net/book_EOA/x.htm
3. Explore Planets Project – Zooniverse, see zooniverse.org/projects/ianc2/exoplanet-explorers
4. Best transiting exoplanet for amateurs: HD 189733 in Vulpecula. Hot Jupiter which transits in 2 hours with a 3% light drop.

Upcoming Star Parties

There are currently no CVAS star parties planned for May 2017.

Upcoming Events

01 May	Gerard Kuiper discovers Neptune's moon Nereid (1949)
02 May	First quarter Moon
04 May	Regulus 0.5° north of Moon
05 May	Alan Shepard, first American in space (1961) Eta Aquarid meteors
06 May	Eta Aquarid meteors
07 May	Jupiter 2° south of Moon
10 May	Full Moon
14 May	Mother's Day Skylab launched (1973)
15 May	Nicolas Lacaille born (1713)
18 May	Last quarter Moon Jupiter double shadow transit event (begins @ 9:54 PM MDT)
20 May	Neptune 0.5° north of Moon Armed Forces day
24 May	CVAS Meeting, 7pm room 171E of Main BATC Campus
25 May	New Moon
26 May	Jupiter double shadow transit event (begins @ 11:47pm MDT)
29 May	Memorial Day
31 May	Regulus 0.3° north of Moon

Cassini Finds 'The Big Empty' Close to Saturn

As NASA's Cassini spacecraft prepares to shoot the narrow gap between Saturn and its rings for the second time in its [Grand Finale](#), Cassini engineers are delighted, while ring scientists are puzzled, that the region appears to be relatively dust-free. This assessment is based on data Cassini collected during its first dive through the region on April 26.

With this information in hand, the Cassini team will now move forward with its preferred plan of science observations.

"The region between the rings and Saturn is 'the big empty,' apparently," said Cassini Project Manager Earl Maize of NASA's Jet Propulsion Laboratory in Pasadena, California. "Cassini will stay the course, while the scientists work on the mystery of why the dust level is much lower than expected."

A dustier environment in the gap might have meant the spacecraft's saucer-shaped main antenna would be needed as a shield during most future dives through the ring plane. This would have forced changes to how and when Cassini's instruments would be able to make observations. Fortunately, it appears that the "plan B" option is no longer needed. (There are 21 dives remaining. Four of them pass through the innermost fringes of Saturn's rings, necessitating that the antenna be used as a shield on those orbits.)

Based on images from Cassini, models of the ring particle environment in the approximately 1,200-mile-wide (2,000-kilometer-wide) region between Saturn and its rings suggested the area would not have large particles that would pose a danger to the spacecraft.

But because no spacecraft had ever passed through the region before, Cassini engineers oriented the spacecraft so that its 13-foot-wide (4-meter-wide) antenna pointed in the direction of oncoming ring particles, shielding its delicate instruments as a protective measure during its April 26 dive.

Cassini's [Radio and Plasma Wave Science](#) (RPWS) instrument was one of two science instruments with sensors that poke out from the protective shield of the antenna (the other being Cassini's [magnetometer](#)). RPWS detected the hits of hundreds of ring particles per second when it crossed the ring plane just outside of Saturn's main rings, but only detected a few pings on April 26.

When RPWS data are converted to an audio format, dust particles hitting the instrument's antennas sound like pops and cracks, covering up the usual whistles and squeaks of waves in the charged particle environment that the instrument is designed to detect. The RPWS team expected to hear a lot of pops and cracks on crossing the ring plane inside the gap, but instead, the whistles and squeaks came through surprisingly clearly on April 26.

"It was a bit disorienting -- we weren't hearing what we expected to hear," said William Kurth, RPWS team lead at the University of Iowa, Iowa City. "I've listened to our data from the first dive several times and I can probably count on my hands the number of dust particle impacts I hear."



Cassini Project Manager Earl Maize waits for Cassini's signal with the spacecraft's operations team in mission control at JPL on April 26, 2017.
Credits: NASA/JPL-Caltech

The team's analysis suggests Cassini only encountered a few particles as it crossed the gap -- none larger than those in smoke (about 1 micron across).

Cassini will next cross through the ring plane Tuesday, May 2, at 12:38 p.m. PDT (3:38 p.m. EDT) in a region very close to where it passed on the previous dive. During [this orbit](#), in advance of the crossing, Cassini's cameras have been looking closely at the rings; in addition, the spacecraft has rotated (or "rolled") faster than engineers have ever allowed it to before, in order to calibrate the magnetometer. As with the first finale dive, Cassini will be out of contact during closest approach to Saturn, and is scheduled to transmit data from this dive on May 3.

More information about Cassini's Grand Finale, including images and video, is available at:

<https://saturn.jpl.nasa.gov/grandfinale>

The Cassini-Huygens mission is a cooperative project of NASA, ESA (European Space Agency) and the Italian Space Agency. NASA's Jet Propulsion Laboratory, a division of Caltech in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington. JPL designed, developed and assembled the Cassini orbiter.

More information about Cassini:

<http://www.nasa.gov/cassini>

<http://saturn.jpl.nasa.gov>

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Written by Jia-Rui Cook and Preston Dyches

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.