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ASTRONOMY CLUB OF TULSA

# OBSERVER

## MARCH 2016

Oh, SIRIUSly????

SIRIUSly!!!! This image is much better, you goofus!!

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THE ASTRONOMY CLUB TULSA  
IS A PROUD MEMBER OF



THE ASTRONOMICAL LEAGUE

Both photos taken at the ACT Observatory, Feb. 27, 2016 by Tamara Green.

# MARCH 2016

| SUN | MON | TUE  | WED  | THU  | FRI | SAT |
|-----|-----|--|--|--|-----|-----|
|     |     | 1   | 2  | 3  | 4   | 5   |
| 6   | 7   | 8   | 9  | 10   | 11  | 12  |
| 13  | 14  | 15  | 16   | 17   | 18  | 19  |
| 20  | 21  | 22   | 23  | 24   | 25  | 26  |
| 27  | 28  | 29   | 30   | 31  |     |     |

## MOON PHASES AND HOLIDAYS:

|                  |              |
|------------------|--------------|
| LAST QUARTER     | TUES MAR 1   |
| NEW MOON         | TUES MAR 8   |
| FIRST QUARTER    | TUES MAR 15  |
| FULL (Worm) MOON | WED MAR 23   |
| GOOD FRIDAY      | FRI MAR 25   |
| EASTER           | SUN MAR 27   |
| LAST QUARTER     | THURS MAR 31 |



## UPCOMING EVENTS:

|  |            |            |                      |
|--|------------|------------|----------------------|
| MEMBERS' NIGHT**                           | FRI MAR 4  | 6:30 PM    | ACT OBSERVATORY      |
| MESSIER MARATHON**                         | SAT MAR 5  | 3:00 PM*** | TUVA                 |
| GENERAL MEETING                            | FRI MAR 11 | 7:00 PM    | JENKS HS PLANETARIUM |
| SIDEWALK ASTRONOMY                         | SAT MAR 12 | 6:30 PM    | BASS PRO             |
| VERNAL EQUINOX/DAYLIGHT SAVING TIME BEGINS |            |            | SUN MAR 13           |
| PUBLIC STAR PARTY                          | SAT MAR 26 | 7:30 PM    | ACT OBSERVATORY      |
| MEMBERS' NIGHT**                           | FRI APR 1  | 7:45 PM    | ACT OBSERVATORY      |
| MESSIER BACKUP**                           | SAT APR 9  | 3:00 PM*** | TUVA                 |
| GENERAL MEETING                            | FRI APR 15 | 7:00 PM    | JENKS HS PLANETARIUM |
| SIDEWALK ASTRONOMY                         | SAT APR 16 | 7:00 PM    | BASS PRO             |
| PUBLIC STAR PARTY                          | SAT APR 30 | 8:00 PM    | ACT OBSERVATORY      |

\*\*MEMBERS AND FAMILY ONLY PLEASE. \*\*\*SEE INFO ON CARAVAN TO MESSIER MARATHON ON PAGE 9

# APRIL 2016

| SUN | MON | TUE | WED  | THU   | FRI  | SAT |
|-----|-----|-----|--|---|--|-----|
|     |     |     |  |   | 1  | 2   |
| 3   | 4   | 5   | 6  | 7  | 8  | 9   |
| 10  | 11  | 12  | 13  | 14  | 15   | 16  |
| 17  | 18  | 19  | 20   | 21  | 22  | 23  |
| 24  | 25  | 26  | 27   | 28  | 29  | 30  |

## MOON PHASES & HOLIDAYS:

|                  |             |
|------------------|-------------|
| APRIL FOOLS' DAY | FRI APR 1   |
| NEW MOON         | THURS APR 7 |
| FIRST QUARTER    | WED APR 13  |
| FULL (Pink) MOON | FRI APR 22  |
| EARTH DAY        | FRI APR 22  |
| LAST QUARTER     | FRI APR 29  |



# PRESIDENT'S MESSAGE

BY RICHARD BRADY



Hi everyone!

I hope you got to see the five naked eye planets in the morning sky in February. If you missed out, these planets will again be visible in August, this time in the west before sundown.

Mercury is now lost in the twilight glow, as it heads of superior conjunction on March 23<sup>rd</sup>. Venus is also heading to superior conjunction, and won't be visible much longer. It might still visible low in the east-southeast, right before sunrise, thanks to it being so bright. Saturn and Mars are in the south early in the morning. Mars rises at 12:23 AM and Saturn rises at 1:46 AM. Jupiter is at opposition on March 8<sup>th</sup>, so it is basically up all night. (Hooray! We now have a planet to show at Public Nights!)

Speaking of king of the planets, Brad Young posted on the club's Yahoo account (<https://groups.yahoo.com/neo/groups/AstroTulsa/info>) that Callisto, the farthest out of the four Galilean moons, will begin being occulted and eclipsed by Jupiter. (An occultation is when a moon goes behind its parent planet from our viewpoint on Earth. An eclipse is when the Jupiter's shadow blocks the sunlight from illuminating the moon. A transit and shadow transit are when the moon or its shadow crosses the face of Jupiter.) This is the first time this has happened in a while. This is because, even though Jupiter's equator is only tilted about 3 degrees, and the moons orbit Jupiter along the equator, Callisto is so far from Jupiter that for a time it goes above or below Jupiter, thus there are no occultations or eclipses, transits or shadow transits during this time.

This next occultation and eclipse will be on Friday, March 25<sup>th</sup>. The times of these first occultations and eclipses are listed below. If you miss these on the 25<sup>th</sup>, Callisto will be occulted and eclipsed regularly now. Sky & Telescope lists the occultations, eclipses, transits, and shadow transits of the Galilean moons every month. (Not all the ones listed are visible. Many are during the daytime here in Oklahoma.)

The times for the events on March 25<sup>th</sup>-26<sup>th</sup>:

9:04 PM CDT, Callisto enters occultation behind Jupiter.

11:18 PM CDT, Callisto exits occultation behind Jupiter.

12:52 AM CDT on the 26<sup>th</sup>, Callisto enters eclipse by Jupiter's shadow.

3:38 AM CDT, Callisto exits eclipse by Jupiter's shadow.

Weather permitting, the Messier Marathon will be held this Saturday, March 5<sup>th</sup>, at TUVa. Look elsewhere in this newsletter for more information. If we are clouded/rained/flooded out, we have scheduled a backup night for Saturday, April 9<sup>th</sup>.

At the General Meeting on Friday, March 11<sup>th</sup>, we will be critiquing the Jenks Planetarium's new show "My House Has Stars". We will be the first to see it. We did this last year for Dan Zielinski and the Jenks Planetarium. Please come out and let Dan know what you think of their new show.

## PRESIDENT'S MESSAGE

BY RICHARD BRADY, CT'D.

At the end of the telecon, they advertised the next one. Also, I was on the NSN website and saw that they have several more telecons scheduled.

The upcoming telecons are

Wednesday, March 16 – New Horizons and Pluto

– Dr. Orkan Umurhan, NASA Ames Research Center

Sunday, April 18 - Updates from Mercury Messenger

Wednesday, May 11 - Juno

Wednesday, June 22 - Mars Trek

Tuesday, August 23 - Lunar Science and IOMN (International Observe the Moon Night)

Wednesday, October 26 - Citizen Science with Pamela Gay

The start times weren't posted, but all the previous ones started at 8:00 PM.

The transit of Mercury is coming up Monday, May 9 from 6:12 AM (9 minutes before sunrise in Tulsa) to 1:42 PM. The club will be hosting an event at the Jenks Planetarium. Anyone who can come and help out will be greatly appreciated.

Clear Skies!

Richard Brady

## TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



**Astronomy Club of Tulsa: 168 members, including 16 new members in 2016.**

**Welcome to our new members this month:** Mark Ford, Ryan Clark, Wade Zickefoose, Erick Hill, Jacob Bradley, Jason Rogles, Mike Burgess, Orion Burgess, Ryan Thompson, Ryan Krumm, Jennifer Cornett and Robert Ward.



### Club Accounts as of February 28, 2016:

Checking: \$6,564.90; Savings: \$4,775.20; Investment accounts: \$17,624.91 (*Value Fluctuates with Market*); PayPal: \$ 0.00

The club now has PayPal available for you to start or renew memberships and subscriptions using your credit or debit cards. Fill out the registration form at <http://astrotulsa.com/page.aspx?pageid=16> Click Submit and you will be given the choice of either mailing in your dues with a check or using PayPal which accepts most major credit cards. A modest processing fee is added to PayPal transactions.

You may also renew your membership or join at one of our club events using your credit card by seeing one of our officers. We can take payments with the Square card reader. A small fee is also added on to these transactions.

**ALSO NOTE:** For our current members who are renewing their memberships, you can now go to a new link on the website to start your renewal process. On the home page, hover over the "Member" tab on the ribbon menu near the top of the page. Then select the "Membership Renewal" link and this will take to a page to fill out your information. Fill this out, submit it, then pay your dues by whatever method you choose.

**NEWS NOTE:** Both Sky & Telescope and Astronomy have free Digital subscriptions available with print subscriptions, or Digital subscriptions may be purchased separately. Contact their websites for details.

### Membership rates for 2016 are as follows:

**Adults: \$45.00 per year, includes Astronomical League Membership.**

**Sr. Adult: \$35.00 per year for those 65 or older, includes Astro League Membership.**

**Students: \$30.00 with League membership; Students: \$25.00 without League membership.**

**Additional Family membership: \$20.00 with voting rights and League membership, \$15.00 with voting rights but without League Membership.**

The regular membership allows all members in the family to participate in club events, but only ONE Voting Membership and one Astronomical League membership.

**Join Online – Add or renew magazine subscriptions. <http://www.astrotulsa.com/page.aspx?pageid=16>**

**Magazine Subscriptions:** If your magazines are coming up for renewal, try to save the mailing label or renewal form you get in the mail. Forms are available on the club website.



**Astronomy is \$34 for 1 year, or \$60 for 2 years. [www.astronomy.com](http://www.astronomy.com)**

To get the club discount you must go through the club group rate.



**Sky & Telescope is \$33 per year [www.skyandtelescope.com](http://www.skyandtelescope.com)**

Sky & Telescope also offers a 10% discount on their products.

Note: You may renew your Sky & Telescope subscription directly by calling the number on the renewal form, be sure to ask for the club rate.

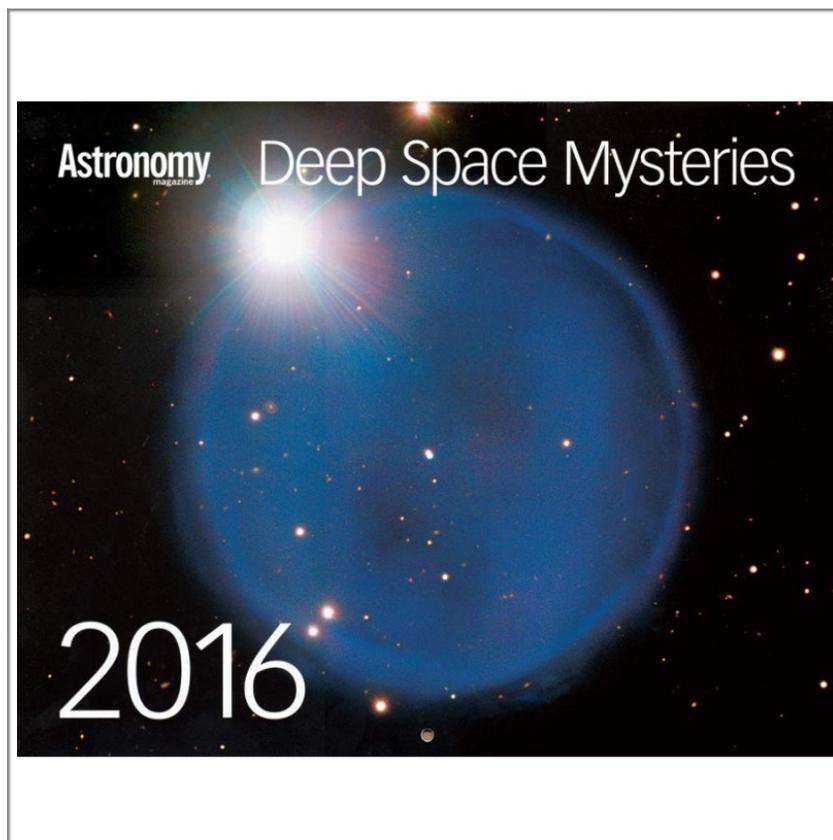
NEW SUBSCRIPTIONS must still be sent to the club

## 2016 Wall Calendar

The 2016 Astronomy Magazine Wall Calendars are here and are now available. If you would like to reserve one, send me an email at [astrotulsa.tres@gmail.com](mailto:astrotulsa.tres@gmail.com), or call me at 918-665-8134 and let me know how many you would like. Otherwise, they will be available on a first come, first served basis at our upcoming events. We still have some available for \$8.00 each, cash, check or credit cards accepted.

Calendars must be picked up in person at a club event, we can not ship these to you. If you reserve one, just let me know at which event you will pick it up.

Get yours while they last!



Tim Davis

Act Treasurer

# SECRETARY'S CORNER

BY TERESA DAVIS



Public Meeting for ACT  
Friday, February 12, 2016

There were 30 people present. Richard began the meeting at 7:10 pm  
He mentioned the planets and shared slides of how they will be in alignment in the morning skies.

Richard has been visiting with the Bartlesville Astronomy Society and shared ideas about dark sights from there. The BAS have meetings once a month on the first Monday at 7 pm in the public library. We are invited to any of their meetings.

News from Sky and Telescope - James Web telescope is getting closer to being launched next month. The segments are all put together, and is bigger than the Hubble. The plan is to launch it on October 2018. The primary mirror is 6.5 meters vs. 2.4 for Hubble.

An APOD from Jan 25, 2016 was "Where Your Elements Came From." Ricard shared this on a slide and a discussion of where the elements originated: large stars, super novae, and cosmic rays.

AAS, American Astronomical Society will be sponsoring the Worldwide Telescope. This is software that provides a window into the multi-wave length universe. Basically a virtual observatory.

[www.worldwidetelescope.org](http://www.worldwidetelescope.org) Links to articles in S&T news.

Breaking News... Gravity Waves Found. Just announced yesterday, observed 5:51 (EDT) on September 14, 2015, At LIGO (Laser Interferometer Gravitational-Wave Observatory) in Hanford, Washington, and another near Livingston. Gravity Waves Found! Detectors were altered by 1/1,000 the width of a proton. The passing gravitational waves slightly altered the path lengths in the arms of both detectors by that amount. The colliding black holes had the masses of about 36 and 29 suns, respectively. Afterward the combined black hole had a mass of 62 solar masses. 3 solar masses of mass converted to energy. At its peak, the merging black holes were putting out 50 times more energy than the rest of the universe.

The Messier Marathon Presented by Tamara Green Charts and log sheets at [www.okmcd.com/pub/MessierMarathonCharts.pdf](http://www.okmcd.com/pub/MessierMarathonCharts.pdf)  
This year the Messier Marathon is planned for Saturday, March 5<sup>th</sup>. A caravan will be meeting up at the Burger King in B.A. and will leave at 3pm sharp. We will have pot luck, so you can bring food if you want, or just eat with us anyway. Warning: it is an all-night event and it will be very cold. Bring a dew shield or a blow dryer and very long extension cord. Email Tamara if you are going to join the caravan. Pictures of past messier marathons were shown.

Richard then posted the Upcoming Events for the club.

Upcoming speaker: March 11 – Dan will have us critique a new planetarium show

The Jenks Planetarium Shows are all on Tuesdays. See the website for Jenks planetarium for the dates and subjects. Volunteers needed for Special Upcoming Events. How to use my telescope Tuesday, April 12 at 8:30pm here at Jenks, The Transit of Mercury will be Monday, May 9<sup>th</sup> starting at 6:12am at Jenks.

The 9<sup>th</sup> grade astronomy class will be at this event for the Transit of Mercury that Monday very early in the morning.

A few members made public announcements:

John Land brought in books, he is cleaning out some of his collection. Several old astronomy books are included in those he is giving away.

Tony White shared that Nita Apple's younger son is getting his Eagle Scout award next week.

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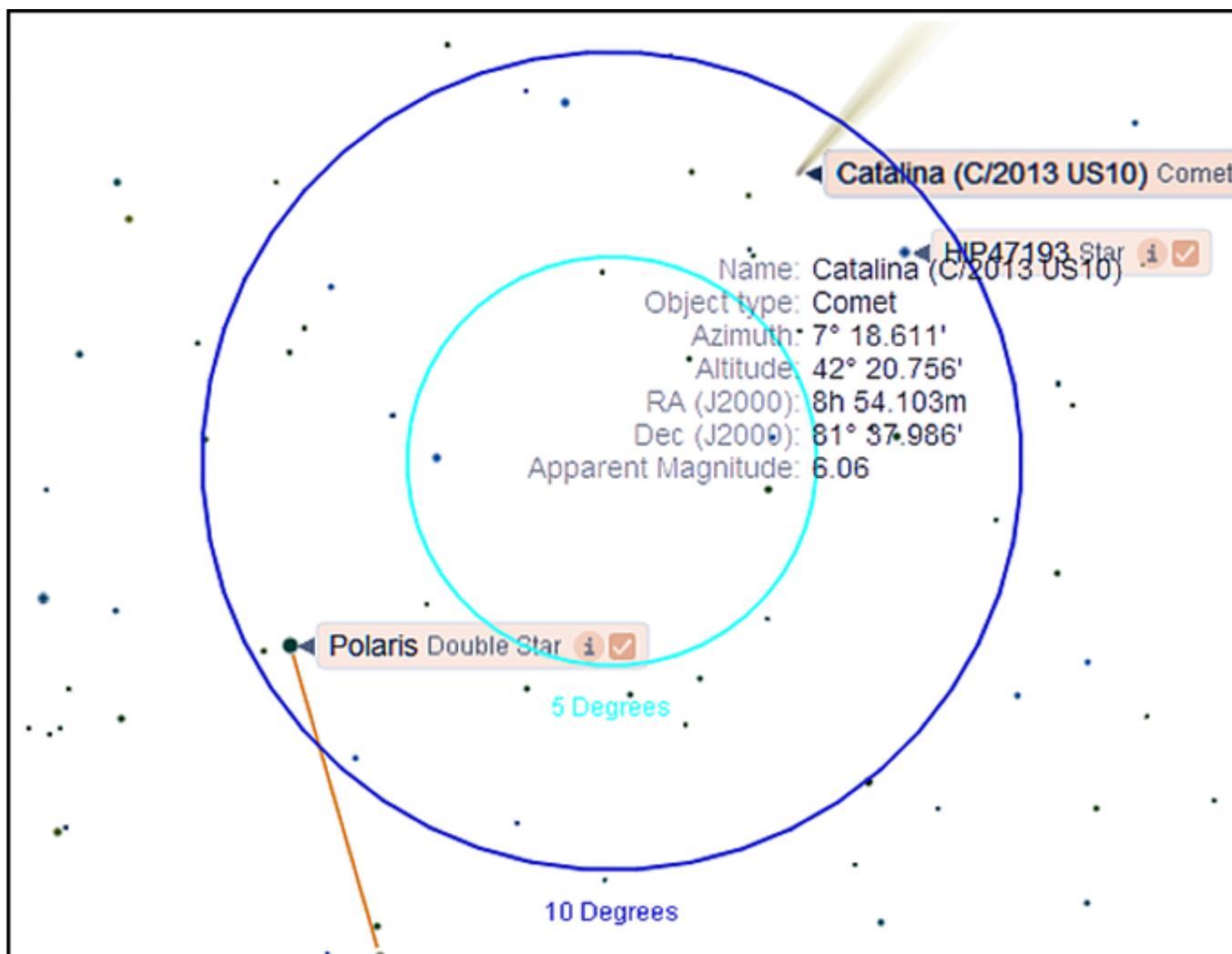
Ron Wood was our formal speaker for the evening. He spoke on the moon in a talk entitled: Title forces  
Explaining how to determine the tidal force with a formula that blew us away. What a challenge we had wrapping our minds around the idea of the forces between the Moon and the Earth.

9:05 pm Richard ended the meeting.

# A FINDER CHART FOR COMET CATALINA

SUBMITTED BY JOHN LAND

Below is a finder chart that John Land emailed to me. I thought I would use it in the newsletter, as many of us will be wanting to look for it in the upcoming weeks.

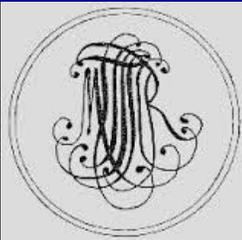


Also, there is a very good article with more finder charts from Sky and Telescope!

<http://www.skyandtelescope.com/observing/comet-catalina-sails-into-northern-skies111120151111/>

IT'S (almost) MESSIER MARATHON TIME!!!

BY TAMARA GREEN



The Astronomy Club of Tulsa and TUVA Astronomy Club cordially invite you to our **MESSIER MARATHON!**

**Saturday, March 5, 2016—4:00 PM-ish (Backup date Saturday, April 9)**

Caravan to TUVA leaves Burger King, 1600 N. Elm Pl., Broken Arrow at 3:00 pm **SHARP!**

Come join us at our annual Messier Marathon to see how many of Charles Messier's 110 beautiful deep-sky objects you can find on the night of Saturday, March 5! There will be a potluck dinner before dark so you can bring a dish or dessert or beverages to share if you wish. We also plan to take a group photo before the marathoning begins.

Please keep in mind that this is an ALL-NIGHT event and is expected to be cold, so don't let the afternoon temps fool you. You might be in your shorts and t-shirt in the afternoon, but you will need your thermals and parka that night for sure!!! And there should be plenty of coffee to keep us going! (If you have children who are not yet old enough to participate in a Messier Marathon, this would be a good weekend for them to visit Grandma.) Please plan on bringing your cold weather gear.

**There will be a caravan going to TUVA.** The caravan will be led by Club Vice President Tamara Green. It will meet in the parking lot at the Burger King on North Elm Place (1600 N. Elm Pl.) in Broken Arrow. It is across the street from the Ferguson Kia/Subaru dealership. A map to Burger King is on page 9 of this newsletter. **THE CARAVAN LEAVES BURGER KING AT 3:00 PM SHARP!!!!** This is because it takes about an hour-ish to get to TUVA from Broken Arrow, and we want time to get down there, get set up, and enjoy dinner before dark. So, if you are interested in joining the caravan, please be there **BEFORE 3:00 PM!!** Also, please contact me at [astrotulsa.vp@gmail.com](mailto:astrotulsa.vp@gmail.com) and let me know you are joining, and what kind of vehicle you drive so I can keep track of everyone along the way. Please note that the caravan is only going TO TUVA on Saturday but there is no caravan going from TUVA back to town on Sunday, due to people leaving at different times throughout the night and early morning. There is a map to TUVA on page 10 of this newsletter.

*Please note that due to limited space at TUVA, this event is MEMBERS ONLY (ACT and TUVA). Thank you for your understanding and cooperation.*

In the event of a cancellation due to weather, there will be a contingency plan for that evening, and our backup date for the marathon itself will be Saturday, April 9.

Will YOU be the winner of the David Stine award this year? We look forward to seeing you there!



IT'S (almost) MESSIER MARATHON TIME!!!, CT'D.  
BY TAMARA GREEN

Print - Maps

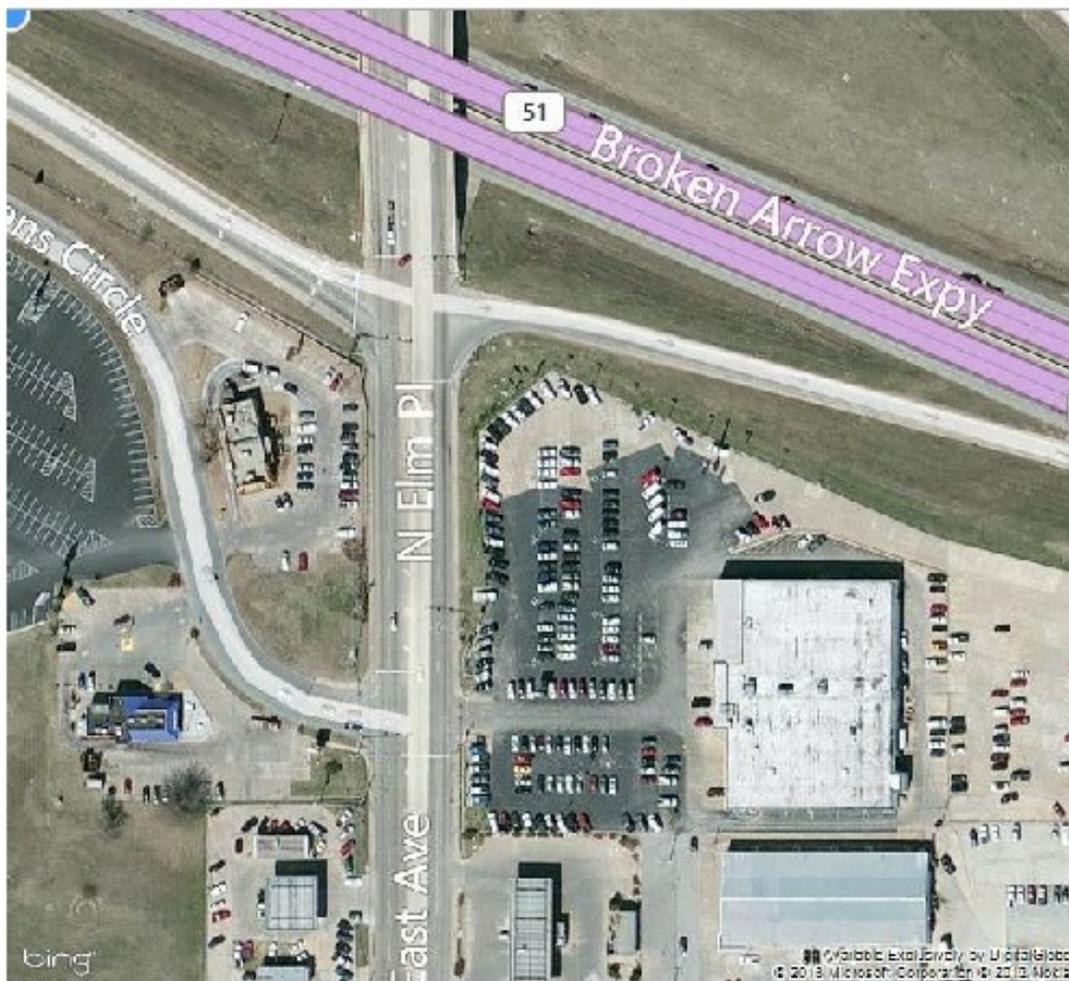
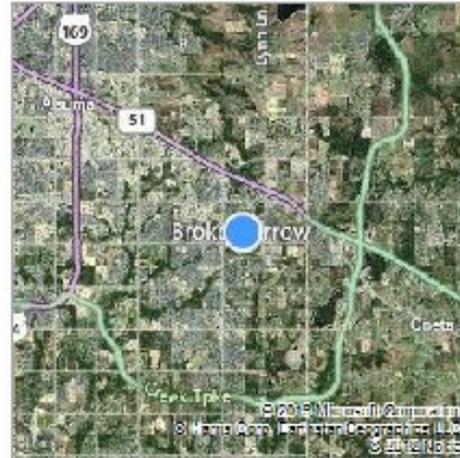
Page 1 of 1

bing Maps

Broken Arrow, OK

Burger King on N. Elm Pl., Broken Arrow.  
Building is on the Left side the map, blue roof.

On the go? Use [m.bing.com](http://m.bing.com) to find maps, directions, businesses, and more



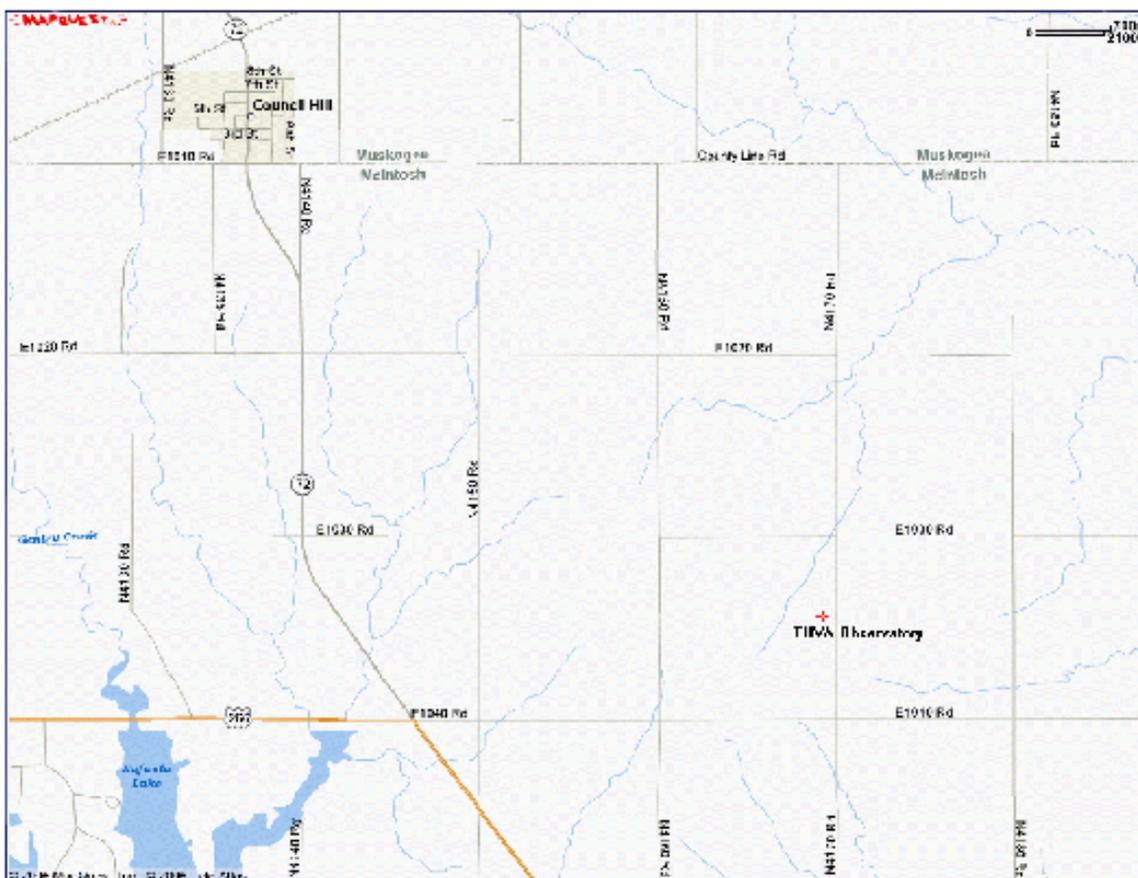
<http://www.bing.com/maps/print.aspx?mkt=en-us&z=18&s=h&cp=36.070022,-95.796987...> 2/26/2013

# IT'S (almost) MESSIER MARATHON TIME!!!, CT'D. BY TAMARA GREEN

## Astronomy Club Of Tulsa - TUVA Observatory - Checotah, OK

1. From the Broken Arrow Expressway going east, exit at 81st St. which is also Highway 51 (last exit before the Muskogee Turnpike).
2. Go about nine miles to Coweta. Watch for Wal-Mart on the left, go under the railroad bridge and through downtown Coweta on Highway 72.
3. Continue on Hwy 72 through Haskell, Boynton, and Council Hill. (Watch speed traps through these little towns).
4. About 3½ miles after you go through Council Hill, Hwy 72 ends. Watch for signs that say this and "Junction 266". To the right is 266 west to Henryetta and straight ahead is 266 to Checotah.
5. At this junction turn left (east) onto a county road.
6. Go ¼ mile to a stop sign, past a white church. Continue two miles east to another stop sign and a white two-story house on your left.
7. Turn left (north) and go ¼ mile to a silver and red gate on your left (west).
8. There is a black mailbox and white Muskogee Phoenix box at the entrance of the site. Turn in and you are at TUVA.

Option: You can also bypass Coweta by going south on Memorial through Bixby, make the big curve to the east and go through Leonard to Haskell and follow the directions starting at step 3.



NASA Space Place Astronomy Club Article

**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](http://spaceplace.nasa.gov) to explore space and Earth science!



## The Closest New Stars To Earth

By Ethan Siegel

When you think about the new stars forming in the Milky Way, you probably think of the giant star-forming regions like the Orion Nebula, containing thousands of new stars with light so bright it's visible to the naked eye. At over 400 parsecs (1,300 light years) distant, it's one of the most spectacular sights in the night sky, and the vast majority of the light from galaxies originates from nebulae like this one. But its great luminosity and relative proximity makes it easy to overlook the fact that there are a slew of much closer star-forming regions than the Orion Nebula; they're just much, much fainter.

If you get a collapsing molecular cloud many hundreds of thousands (or more) times the mass of our sun, you'll get a nebula like Orion. But if your cloud is only a few thousand times the sun's mass, it's going to be much fainter. In most instances, the clumps of matter within will grow slowly, the neutral matter will block more light than it reflects or emits, and only a tiny fraction of the stars that form—the most massive, brightest ones—will be visible at all. Between just 400 and 500 light years away are the closest such regions to Earth: the molecular clouds in the constellations of Chamaeleon and Corona Australis. Along with the Lupus molecular clouds (about 600 light years distant), these dark, light-blocking patches are virtually unknown to most sky watchers in the northern hemisphere, as they're all southern hemisphere objects.

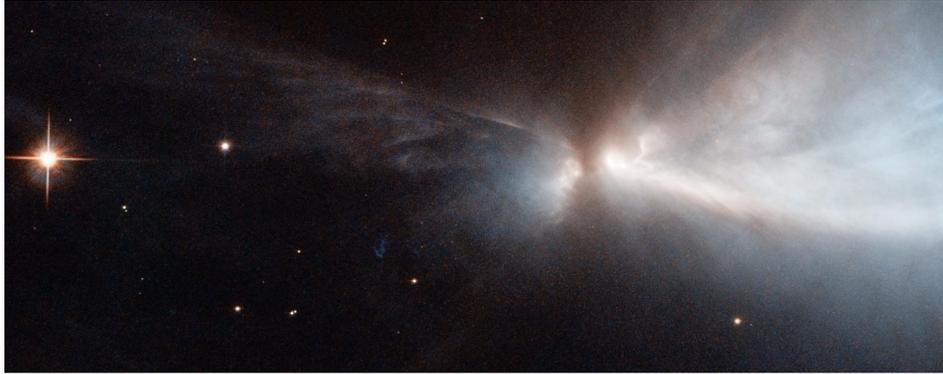
In visible light, these clouds appear predominantly as dark patches, obscuring and reddening the light of background stars. In the infrared, though, the gas glows brilliantly as it forms new stars inside. Combined near-infrared and visible light observations, such as those taken by the Hubble Space Telescope, can reveal the structure of the clouds as well as the young stars inside. In the Chameleon cloud, for example, there are between 200 and 300 new stars, including over 100 X-ray sources (between the Chamaeleon I and II clouds), approximately 50 T-Tauri stars and just a couple of massive, B-class stars. There's a third dark, molecular cloud (Chamaeleon III) that has not yet formed any stars at all.

While the majority of new stars form in large molecular clouds, the closest new stars form in much smaller, more abundant ones. As we reach out to the most distant quasars and galaxies in the universe, remember that there are still star-forming mysteries to be solved right here in our own backyard.

## THE CLOSEST NEW STARS TO EARTH

BY DR. ETHAN SIEGEL, CT'D.

NASA Space Place Astronomy Club Article



*Image credit: NASA and ESA Hubble Space Telescope. Acknowledgements: Kevin Luhman (Pennsylvania State University), and Judy Schmidt, of the Chamaeleon cloud and a newly-forming star within it—HH 909A—emitting narrow streams of gas from its poles.*



National Aeronautics and  
Space Administration



# NASA Space Place

## Educator Newsletter

March-April 2016/Vol. 9, Issue 2

### NEWS AND NOTES FOR FORMAL AND INFORMAL EDUCATORS

Space Place is a NASA website for elementary school-aged kids, their teachers, and their parents.

It's colorful!  
It's dynamic!  
It's fun!  
It's rich with science, technology, engineering, and math content!  
It's informal.  
It's meaty.  
It's easy to read and understand.  
It's also in Spanish.  
And it's free!

It has over 150 separate modules for kids, including hands-on projects, interactive games, animated cartoons, and amazing facts about space and Earth science and technology.

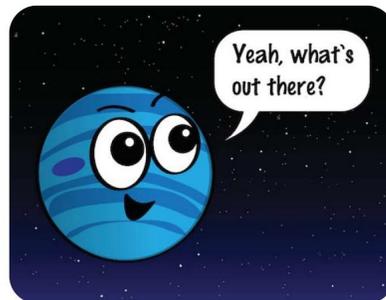
NASA Space Place has a new look! We've now made our content more accessible – check it out here: [www.spaceplace.nasa.gov](http://www.spaceplace.nasa.gov). To keep up with all the latest, follow us on Facebook and Twitter @nasaspaceplace. If you'd like to be added to our e-newsletter, email us at [info@spaceplace.nasa.gov](mailto:info@spaceplace.nasa.gov).

*New!*

#### What is the Kuiper Belt?

Explore what else is out there past Neptune! The Kuiper Belt, a ring of icy bodies where you'll find dwarf planet Pluto and other interesting objects like Eris and Haumea, is still a mysterious place. The New Horizons spacecraft will continue to explore this belt in the near future!

<http://spaceplace.nasa.gov/kuiper-belt/>



*New!*

#### Stretchy Universe Slime

Our universe has been stretching out in all directions ever since it began about 13.8 billion years ago, which can be seen through telescopes! In fact, the

farthest galaxies are actually moving faster than those near us. Make your own stretchy universe slime and hold the universe in the palm of your hand! <http://spaceplace.nasa.gov/universe-slime/>



#### Out-of-School Time

Are you stuck inside because of bad weather, or are you simply staying home for



the weekend? Why not try some of our make-and-do activities! Here is one of our favorites: Earth Fan - Did you know that there is a lot going on beneath the surface of Earth? We pretty much spend all our time on Earth's crust, but if you dig deeper you'll find the mantle, the outer core and the inner core. Learn more about Earth's layers by making an Earth fan!

<http://spaceplace.nasa.gov/earth-fan/>

Explore Earth and space at [spaceplace.nasa.gov](http://spaceplace.nasa.gov)



### Science Fair Project Ideas

It's that time of year again! Are your students looking for project ideas? Do they know the necessary steps to follow? Here are a few suggestions for where to start!

<http://spaceplace.nasa.gov/science-fair/>

### Educational Posters

NASA Space Place has downloadable posters featuring brief summaries and graphics of popular space topics. Click on the "download the poster" link on each page!

#### Where does the solar system end?

<http://spaceplace.nasa.gov/oort-cloud/>

#### What is a black hole?

<http://spaceplace.nasa.gov/black-holes/>

#### How did the solar system form?

<http://spaceplace.nasa.gov/solar-system-formation/>

#### Where does the sun's energy come from?

<http://spaceplace.nasa.gov/sun-heat/>

### Tectonic Forces

<http://spaceplace.nasa.gov/tectonics-snap/>

### GPS and the Quest for Pizza

<http://spaceplace.nasa.gov/gps-pizza/>

### Special Days

Noteworthy days in NASA and space history you can observe in your classroom.

#### March 5 – In 1979, the Voyager 1 spacecraft flew past Jupiter.

Learn more fun facts about Jupiter, like how this gas giant has rings that are very hard to see.  
<http://spaceplace.nasa.gov/all-about-jupiter/>

#### March 13 – Uranus was discovered this day in 1781.

Did you know that Uranus rotates on its side?  
<http://spaceplace.nasa.gov/all-about-uranus/>

#### March 18 – In 1965, the first walk in space took place!

Hopefully there was no bad weather up there. Protect Earth's satellites from harmful space weather in our Shields Up game.  
<http://spaceplace.nasa.gov/shields-up/>

#### April 9 – In 1959, the first group of astronauts was announced.

Check out our gallery of astronauts.  
<http://spaceplace.nasa.gov/gallery-technology/>

#### April 11 – Apollo 13, the third mission intended to land on the moon, was launched on this day in 1970.

Why is the Moon so scarred with craters anyway?  
<http://spaceplace.nasa.gov/craters/>

#### April 22 – Happy Earth Day!

Earth has many different layers in its atmosphere. Explore them all!  
<http://spaceplace.nasa.gov/atmosphere/>



WHERE WE MEET

JENKS HS PLANETARIUM



**Our Club General meetings are held at the  
Jenks Public Schools Planetarium  
105 East B St, Jenks, OK**

**When you enter the building lobby, take the elevator to the 3<sup>rd</sup> floor.**

**Meetings begin at 7:00 PM**

**Printable Detailed map available at [http://astrotulsa.com/cms\\_files/](http://astrotulsa.com/cms_files/)**

**We hope to see you there!**

## MEMBERSHIP INFORMATION

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### MEMBERSHIP RATES FOR 2016 WILL BE AS FOLLOWS:

ADULTS - \$45 PER YEAR. INCLUDES ASTRONOMICAL LEAGUE MEMBERSHIP.

SENIOR ADULTS - \$35 PER YEAR. **FOR THOSE AGED 65 AND OLDER.** INCLUDES ASTRONOMICAL LEAGUE MEMBERSHIP.

STUDENTS - \$30 PER YEAR. INCLUDES ASTRONOMICAL LEAGUE MEMBERSHIP.

STUDENTS - \$25 PER YEAR. **DOES NOT INCLUDE ASTRONOMICAL LEAGUE MEMBERSHIP.**

THE REGULAR MEMBERSHIP ALLOWS ALL MEMBERS OF THE FAMILY TO PARTICIPATE IN CLUB EVENTS, BUT ONLY ONE VOTING MEMBERSHIP AND ONE ASTRONOMICAL LEAGUE MEMBERSHIP PER FAMILY.

ADDITIONAL FAMILY MEMBERSHIP - \$15 WITH ASTRONOMY CLUB OF TULSA VOTING RIGHTS, \$20 WITH CLUB VOTING RIGHTS AND ASTRONOMICAL LEAGUE MEMBERSHIP.

*THOSE WISHING TO EARN ASTRONOMICAL LEAGUE OBSERVING CERTIFICATES NEED TO HAVE A LEAGUE MEMBERSHIP.*

### MAGAZINE SUBSCRIPTIONS:

ASTRONOMY IS \$34 FOR ONE YEAR OR \$60 FOR 2 YEARS.

WEBSITE: [www.astronomy.com](http://www.astronomy.com)

SKY & TELESCOPE IS \$33 PER YEAR.

WEBSITE: [www.skyandtelescope.com](http://www.skyandtelescope.com)

SKY & TELESCOPE OFFERS A 10% DISCOUNT ON THEIR PRODUCTS.

*IF YOU ARE AN EXISTING S&T SUBSCRIBER, YOU CAN RENEW DIRECTLY WITH S&T AT THE SAME CLUB RATE. BOTH S&T AND ASTRONOMY NOW HAVE DIGITAL ISSUES FOR COMPUTERS, IPADS AND SMART PHONES.*

### ONLINE REGISTRATION

WE NOW HAVE AN AUTOMATED ONLINE REGISTRATION FORM ON THE WEBSITE FOR NEW MEMBERSHIPS, MEMBERSHIP RENEWALS AND MAGAZINE SUBSCRIPTIONS. JUST SIMPLY TYPE IN YOUR INFORMATION AND HIT "SEND" TO SUBMIT THE INFORMATION. YOU CAN THEN PRINT A COPY OF THE FORM AND MAIL IT IN WITH YOUR CHECK, OR USE OUR CONVENIENT PAYPAL OPTION. .

LINK: <http://www.astrotulsa.com/Club/join.asp>

OR, IF AT A STAR PARTY OR MEETING, SIMPLY FIND A CLUB OFFICER TO ASK ABOUT JOINING OR RENEWING WITH YOUR DEBIT OR CREDIT CARD THROUGH OUR CONVENIENT SQUARE OPTION!



THE ASTRONOMY CLUB OF  
TULSA INVITES YOU TO MAKE  
PLANS THIS SPRING TO JOIN US  
AT A STAR PARTY!

OPEN TO THE PUBLIC

FOR MORE INFORMATION  
PLEASE VISIT  
WWW.ASTROTULSA.COM.

THE OBSERVER IS A PUBLICATION BY  
THE ASTRONOMY CLUB OF TULSA. THE  
ASTRONOMY CLUB OF TULSA IS A 501C  
3 NON-PROFIT ORGANIZATION OPEN TO  
THE PUBLIC. THE CLUB STARTED IN  
1937 WITH THE SINGLE MISSION TO  
BRING THE JOY AND KNOWLEDGE OF  
ASTRONOMY TO THE COMMUNITY OF  
TULSA, OK AND THE SURROUNDING  
AREA. TODAY OUR MISSION REMAINS  
EXACTLY THE SAME. WE TRAVEL TO  
LOCAL SCHOOLS, CHURCHES AND  
MANY OTHER VENUES WITH SCOPES  
AND PEOPLE TO TEACH. OUR  
OBSERVATORY IS LOCATED IN MOUNDS  
AND MANY PUBLIC PROGRAMS ARE  
OFFERED THERE. TO JOIN THE  
ASTRONOMY CLUB OF TULSA, PLEASE  
VISIT WWW.ASTROTULSA.COM WHERE  
YOU WILL FIND ALL THE INFORMATION  
NECESSARY TO BECOME A MEMBER.



Also find us on Facebook!

[https://www.facebook.com/  
AstronomyClubofTulsa](https://www.facebook.com/AstronomyClubofTulsa)



WE ALSO ARE A PROUD PARTICIPANT IN NASA'S NIGHT SKY  
NETWORK.

THE EDITOR WISHES TO THANK THE FOLLOWING FOR  
THEIR CONTRIBUTIONS TO "THE OBSERVER" FOR  
THIS ISSUE:

DR. ETHAN SIEGEL

RICHARD BRADY

TIM DAVIS

TERESA DAVIS

JOHN LAND

TAMARA GREEN



Photo: Winter stars in the Southern Sky, taken at the Astronomy Club of  
Tulsa Observatory, Jan 30, 2016. **Photo by Tamara Green.**



PHOTO: The Great Square of Pegasus setting. Taken at the Astronomy  
Club of Tulsa Observatory Jan 30, 2016. **Photo by Tamara Green.**