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ASTRONOMY CLUB OF TULSA

OBSERVER

DECEMBER 2016

SOME HOLIDAY FUN!

Top photo: Guthrie Green, December 2015; Bottom photo: Rhema, December 2014. Both photos by Tamara Green.

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THE ASTRONOMY CLUB TULSA IS A PROUD MEMBER OF



THE ASTRONOMICAL LEAGUE

DECEMBER 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:




| | |
|----------------|------------|
| FIRST QUARTER | WED DEC 7 |
| FULL COLD MOON | TUE DEC 13 |
| LAST QUARTER | TUE DEC 20 |
| CHRISTMAS EVE | SAT DEC 24 |
| CHRISTMAS DAY | SUN DEC 25 |
| NEW MOON | THU DEC 29 |
| NEW YEAR'S EVE | SAT DEC 31 |

UPCOMING EVENTS:

| | | | |
|--------------------|------------|---------|----------------------|
| GENERAL MEETING | FRI DEC 2 | 7:00 PM | JENKS HS PLANETARIUM |
| SIDEWALK ASTRONOMY | SAT DEC 3 | 5:00 PM | BASS PRO |
| PUBLIC STAR PARTY | SAT DEC 17 | 5:15 PM | ACT OBSERVATORY |
| WINTER SOLSTICE | WED DEC 21 | | |
| MEMBERS' NIGHT** | FRI DEC 23 | 5:15 PM | ACT OBSERVATORY |
| GENERAL MEETING | FRI JAN 6 | 7:00 PM | JENKS HS PLANETARIUM |
| SIDEWALK ASTRONOMY | SAT JAN 7 | 5:00 PM | BASS PRO |
| PUBLIC STAR PARTY | SAT JAN 21 | 5:45 PM | ACT OBSERVATORY |
| MEMBERS' NIGHT** | FRI JAN 27 | 5:45 PM | ACT OBSERVATORY |

**MEMBERS AND FAMILY ONLY PLEASE.

JANUARY 2017

| 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:

| | |
|----------------|------------|
| NEW YEAR'S DAY | SUN JAN 1 |
| FIRST QUARTER | THU JAN 5 |
| FULL WOLF MOON | THU JAN 12 |
| LAST QUARTER | THU JAN 19 |
| NEW MOON | FRI JAN 27 |

PRESIDENT'S MESSAGE

BY RICHARD BRADY



Hi everyone!

December General Meeting

The General Meeting will be at the Jenks Planetarium Friday, December 2, at 7:00 PM. Speaking this month will be Lizz Whalen. She has been documenting the development of the James Webb Space Telescope. We will get to see a promo she's working on with the tentative title "Gazing into the Webb".

Parking notice: Jenks is hosting a 2A semi-final game the same night. The east parking lot will be reserved for one of the teams and their supporters. We need to park in the west oval lot.

Mars on NatGeo

There is an interesting mini-series on the National Geographic channel. It is on Monday nights at 8 PM. It is a combination of a dramatization of the first manned landing on Mars and interviews with current supporters of the mission to Mars including Elan Musk of SpaceX.

Work done on dome

We had some problems with the dome in the last month or two. James Taggart, Tony Blakesley and I have been working on getting it back into shape. We replaced one of the cables that lowers the dome shutter and plan to replace the one that opens it soon. We also put a strap around the outside of the dome to prevent loud bangs as the dome was rotated, along with some other maintenance. Thanks, James and Tony.

Next year's events

The event schedule has been created for next year. Like this year, public night will be near the third quarter moon on Saturdays, members night will be near new moon on Friday evenings with back-up night the next evening, and general meetings on Fridays and Sidewalk Astronomy at Bass Pro on Saturdays near first quarter.

Upcoming meteor showers

Geminids - This shower is usually pretty good, but this year the peak on December 13th is also the night of the full moon. You may be able to see a few before and after the peak date. Look to the northeast.

Quadrantids - The peak for this shower is on January 3rd. The moon will be a 5 day old waxing crescent. The radiant is in the north-northeast in Bootes.

Planets this month

Venus gets higher in the southwest, not setting until 3 hours after sunset (8:09 PM) on the first of December and 3 ¼ hours (9:02 PM) by months end.

Mercury starts off only 10° up at sunset on the 1st and get a little higher at mid-month, only to sink quickly afterwards. Mercury goes through inferior conjunction on the 28th.

Mars is still fairly high in the south all month, moving from Capricornus to Aquarius around December 14th.

Jupiter is still continuing to rise earlier each day. On December 1st it will rise around 3 AM, over 4 hours before the sun. By the end in the month it will rise at 1:19 AM.

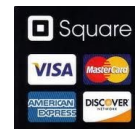
Saturn passes through superior conjunction is December 10, so it won't be visible until late December. By the end of the month it will rise roughly 1 ½ hours before sunrise.

The sun will be at the winter solstice on December 21st at 4:44 AM.

Happy Christmas and a Merry New Year!
Richard Brady

TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



Astronomy Club of Tulsa: 172 members, including 62 new members in 2016.

Welcome to our new members this month: Marcus Gaskamp, Jim Hanlon, Lizz Whalen, Sheldon Padawer, Jerica Sivadon, Jerry Fisher, Kenneth Stern and Kayla Brasel.

Club Accounts as of November 30, 2016:

Checking: 7,269.25; Savings: \$4,776.10; Investment accounts: \$20,001.70 (*Value Fluctuates with Market*)

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

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



Sky & Telescope is \$33 per year 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

2017 Wall Calendar

The 2017 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, 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. Calendars are available for \$10.00 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



NASA Space Place

Educator Newsletter

National Aeronautics and
Space Administration



November-December 2016 / Vol. 9, Issue 5

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, Earth science, and technology.

Don't forget to subscribe to our monthly e-newsletter, the NASA Space Place Gazette!

<http://spaceplace.nasa.gov/subscribe>

New!

Planet Masks

Our solar system has eight unique and special planets. This fun, simple activity for kids will allow them to explore and learn about what makes each planet different!

<http://spaceplace.nasa.gov/planet-masks>



For Halloween:

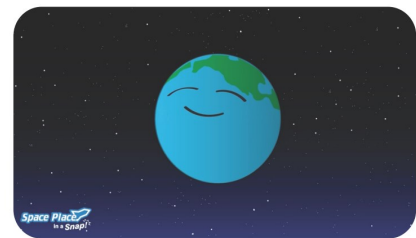
These masks make great Halloween costumes! We encourage you to share your own masks on social media and tag #NASACostume. Follow us on Facebook and Twitter @nasaspaceplace.

New!

How Much Water is on Earth?

Earth has a lot of water. But exactly how much? Check out our new educational video and poster for kids:

<http://spaceplace.nasa.gov/water>

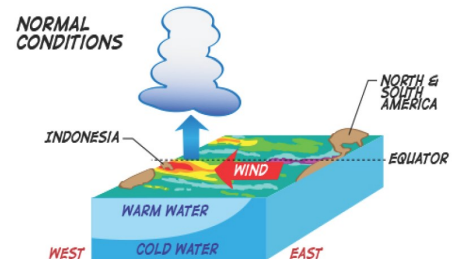


New!

What is La Niña?

This is a weather pattern that begins in the Pacific Ocean. Learn all about La Niña and how it differs from El Niño in our new article for kids.

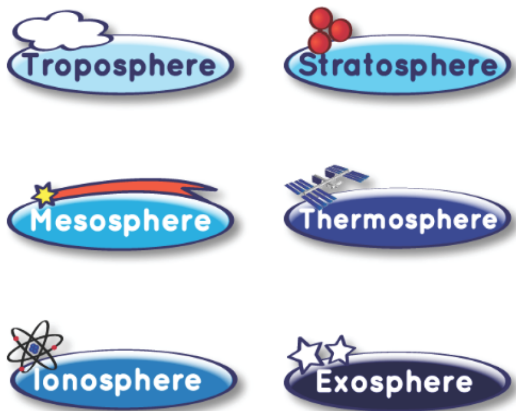
<http://spaceplace.nasa.gov/la-nina>



Explore Earth and space at spaceplace.nasa.gov

Earth's Atmosphere

Earth has a wonderful atmosphere. It keeps us warm and gives us oxygen to breathe. But did you know that our atmosphere has six layers? Each one is unique! Teach kids about our different atmospheric layers in this article series. <http://spaceplace.nasa.gov/atmosphere>



Make Pumpkin Stencils!

Celebrate the fall season by making space pumpkins! This activity is simple, fun and educational. Your kids will love it! <http://spaceplace.nasa.gov/pumpkins>



Special Days

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

Nov. 8 - X-rays were discovered on this day in 1895.

Explore X-rays with our Cosmic Colors viewer! <http://spaceplace.nasa.gov/cosmic-colors>

Nov. 17 — Leonid meteor shower at maximum.

Learn about meteor showers and tips on how to get the best view! <http://spaceplace.nasa.gov/meteor-shower>

Nov. 20 — Happy Birthday to astronomer Edwin Hubble (1889)!

The Hubble Space Telescope was named after him. Learn all about this amazing telescope! <http://spaceplace.nasa.gov/hubble-wfpc>

Dec. 3 — Pioneer 10 flew past Jupiter on this day in 1973.

Jupiter is the biggest planet in our solar system. It has big storms like the Great Red Spot, which has been going on for hundreds of years. <http://spaceplace.nasa.gov/all-about-jupiter>

Dec. 11 — The first Aurora Borealis sighting was recorded on this day in 1719.

Make a pastel aurora to learn more about these beautiful light displays. <http://spaceplace.nasa.gov/pastel-aurora>

Dec. 21 — Today is the first day of winter!

Why do we have seasons here on Earth? <http://spaceplace.nasa.gov/seasons>



This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit spaceplace.nasa.gov to explore space and Earth science!



Dimming stars, erupting plasma, and beautiful nebulae

By Marcus Woo

Boasting intricate patterns and translucent colors, planetary nebulae are among the most beautiful sights in the universe. How they got their shapes is complicated, but astronomers think they've solved part of the mystery—with giant blobs of plasma shooting through space at half a million miles per hour.

Planetary nebulae are shells of gas and dust blown off from a dying, giant star. Most nebulae aren't spherical, but can have multiple lobes extending from opposite sides—possibly generated by powerful jets erupting from the star.

Using the Hubble Space Telescope, astronomers discovered blobs of plasma that could form some of these lobes. "We're quite excited about this," says Raghvendra Sahai, an astronomer at NASA's Jet Propulsion Laboratory. "Nobody has really been able to come up with a good argument for why we have multipolar nebulae."

Sahai and his team discovered blobs launching from a red giant star 1,200 light years away, called V Hydrae. The plasma is 17,000 degrees Fahrenheit and spans 40 astronomical units—roughly the distance between the sun and Pluto. The blobs don't erupt continuously, but once every 8.5 years.

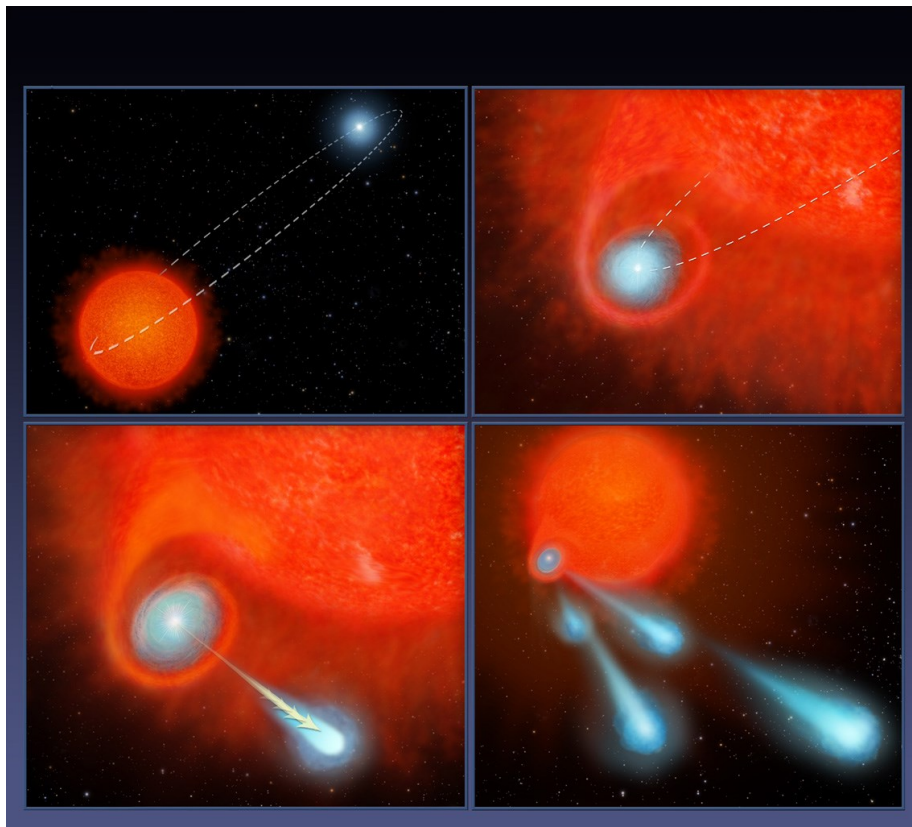
The launching pad of these blobs, the researchers propose, is a smaller, unseen star orbiting V Hydrae. The highly elliptical orbit brings the companion star through the outer layers of the red giant at closest approach. The companion's gravity pulls plasma from the red giant. The material settles into a disk as it spirals into the companion star, whose magnetic field channels the plasma out from its poles, hurling it into space. This happens once per orbit—every 8.5 years—at closest approach.

When the red giant exhausts its fuel, it will shrink and get very hot, producing ultraviolet radiation that will excite the shell of gas blown off from it in the past. This shell, with cavities carved in it by the cannon-balls that continue to be launched every 8.5 years, will thus become visible as a beautiful bipolar or multipolar planetary nebula.

The astronomers also discovered that the companion's disk appears to wobble, flinging the cannonballs in one direction during one orbit, and a slightly different one in the next. As a result, every other orbit, the flying blobs block starlight from the red giant, which explains why V Hydrae dims every 17 years. For decades, amateur astronomers have been monitoring this variability, making V Hydrae one of the most well-studied stars.

Because the star fires plasma in the same few directions repeatedly, the blobs would create multiple lobes in the nebula—and a pretty sight for future astronomers.

If you'd like to teach kids about how our sun compares to other stars, please visit the NASA Space Place: <http://spaceplace.nasa.gov/sun-compare/en/>



This four-panel graphic illustrates how the binary-star system V Hydrae is launching balls of plasma into space. Image credit: NASA/ESA/STScI

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 3rd floor.

Meetings begin at 7:00 PM

**Printable Detailed map available at [http://astrotulsa.com/cms_files/
Directions_JenksPlanetarium.pdf](http://astrotulsa.com/cms_files/Directions_JenksPlanetarium.pdf)**

We hope to see you there!

MEMBERSHIP INFORMATION

ASTRONOMY CLUB OF TULSA OFFICERS:

PRESIDENT RICHARD BRADY

astrotulsa.pres@gmail.com

VICE PRESIDENT TAMARA GREEN

astrotulsa.vp@gmail.com

SECRETARY JOHN NEWTON

astrotulsa.sec@gmail.com

TREASURER TIM DAVIS

astrotulsa.tres@gmail.com

BOARD MEMBERS-AT-LARGE:

JOHN LAND

CHRISTOPHER PROCTOR

JAMES TAGGART

SKIP WHITEHURST

JAMES LILEY

TONY BLAKESLEY

JERRY CASSITY

TERESA DAVIS

STAFF:

NEWSLETTER EDITOR TAMARA GREEN

astrotulsa.vp@gmail.com

WEBMASTER JENNIFER JONES

jjones@seedtechnologies.com

MEMBERSHIP CHAIRMAN JOHN LAND

astroclubbiz@windstream.net

OBSERVING CHAIRS OWEN AND TAMARA GREEN

darthnewo@yahoo.com, astrotulsa.vp@gmail.com

SIDEWALK ASTRONOMY OWEN GREEN

darthnewo@yahoo.com

PR AND OUTREACH OWEN GREEN

darthnewo@yahoo.com

GROUP DIRECTOR OWEN GREEN

darthnewo@yahoo.com

NIGHT SKY NETWORK RICHARD BRADY

astrotulsa.pres@gmail.com

FACILITIES MANAGER JAMES TAGGART

astrotulsa.obs@gmail.com

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

SKY & TELESCOPE IS \$33 PER YEAR.

WEBSITE: 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!



*Wishing You and Yours
Happy Holidays!*



*Photo: Christmas lights at Rhema, taken in December 2014 by
Tamara Green.*

THE ASTRONOMY CLUB OF
TULSA INVITES YOU TO MAKE
PLANS THIS WINTER 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 MEM-
BER.



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:

MARCUS WOO
RICHARD BRADY
TIM DAVIS
TAMARA GREEN

MORE HOLIDAY FUN!!

Top and Bottom Photos: "Lights on the Hill" at Chandler Park, November
2016, taken by Tamara Green. HAPPY HOLIDAYS!!

