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ASTRONOMY CLUB OF TULSA

# OBSERVER

## NOVEMBER 2016

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**THE ASTRONOMY CLUB TULSA  
IS A PROUD MEMBER OF**







**THE ASTRONOMICAL LEAGUE**

PHOTOS: Above, the Big Dipper over Black Mesa; Below: Orion and Friends at Okie-Tex Ridge. Both photos taken at the Okie-Tex Star Party, September 2016, by Tamara Green.

# NOVEMBER 2016

## MOON PHASES AND HOLIDAYS

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			







### UPCOMING EVENTS:

SIDEWALK ASTRONOMY	SAT NOV 5	5:00 PM	BASS PRO
DAYLIGHT SAVING TIME ENDS	SUN NOV 6		
ANNUAL DINNER MEETING**	SAT NOV 12	6:30 PM	JENKS HS PLANETARIUM
PUBLIC STAR PARTY	SAT NOV 19	5:15 PM	ACT OBSERVATORY
MEMBERS' NIGHT**	FRI NOV 25	5:15 PM	ACT OBSERVATORY
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

\*\*MEMBERS AND FAMILY ONLY PLEASE.

# DECEMBER 2016

## MOON PHASES & HOLIDAYS:

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



# ANNUAL DINNER MEETING

SAT NOV 12 6:30 PM

The Annual Dinner is on Saturday, November 12, 2016, 6:30 PM.

Jenks High School—Meeting Room down the hall from the Planetarium.

Each year we have an annual dinner during November, a time to get together with all our astronomical friends.

This year it will be on Saturday, Nov. 12 at 6:30-8:30 PM. Again this year it will be in the meeting room at the opposite end of the hallway from the Jenks Planetarium.

Catering will be provided by Albert G's this year. Dinner will include brisket, pulled pork, polish sausage, potato salad, baked beans and cole slaw. Drinks will be provided. We would like to have a pot-luck dessert table if enough people want to bring something.

The cost will be \$10 per person. The dinner is open to members and their families.

Please let our treasurer, Tim Davis, know how many will be there. Tim's email address is [astrotulsa.tres@gmail.com](mailto:astrotulsa.tres@gmail.com).

We will have a planetarium show afterwards.

If there is enough interest we will have an auction of items like we did a couple of years ago. If you would like to contribute something or be interested in bidding, please let Tamara Green know. Her email is [astrotulsa.vp@gmail.com](mailto:astrotulsa.vp@gmail.com).



# PRESIDENT'S MESSAGE

BY RICHARD BRADY



Hi everyone!

## Results of the election held last month

Congratulations to all those elected at the General Meeting last month. Everyone running was voted in. The officers and board for the next year are:

President - Richard Brady	
Vice President - Tamara Green	
Secretary - John Newton	
Treasurer - Tim Davis	
Board - Chris Proctor	Jerry Cassity
James Liley	James Taggart
John Land	Skip Whitehurst
Teresa Davis	Tony Blakesley

Our next board meeting will be sometime early next year.

## The Annual Dinner is Saturday, November 12

Each year we have an annual dinner during November, a time to get together with all our astronomical friends.

This year it will be on Saturday, Nov. 12 at 6:30-8:30 PM at the Jenks Planetarium. Again we will have it will be in the meeting room at the opposite end of the hallway from the Jenks Planetarium.

Catering will be provided by Albert G's this year. Dinner will include brisket, pulled pork, polish sausage, potato salad, baked beans, and coleslaw. Drinks will be provided. We would like to have a pot-luck dessert table if enough people want to bring something. Back by popular demand, we will have a silent auction again this year. We are still looking for items for the auction, so if you have anything astronomical you would like to donate, please let us know.

The cost will be \$10 per person. The dinner is open to members and their families.

If you haven't done so already, please let our treasurer, Tim Davis, know how many will be there. Tim's email address is [astrotulsa.tres@gmail.com](mailto:astrotulsa.tres@gmail.com).

We will have a planetarium show afterwards.

## Planets this month

Venus continues to be low in the southwest after sunset, hanging around through winter.

Saturn gets closer to the sun as the month goes by, becoming harder to find until lost in the sunset. Superior conjunction is December 10.

Mercury went through superior conjunction on October 27, but it will be less than 10 degrees high at the end of November, so it will be nearly impossible to spot even then.

Mars remains in the south all month, moving from Sagittarius to Capricornus.

Jupiter is continuing to rise earlier each day. On November 1 it will rise at 5:28 AM, over 2 hours before the sun. By the end in the month it will rise at 3:00 AM, over 4 hours before sunrise.

Clear skies!

Richard Brady

P.S. Don't eat too much turkey on Thanksgiving. Member Night is the next evening. (Anyone snoring too loudly will be expected to provide leftovers for everyone. ☺)

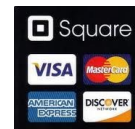
# TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



**Astronomy Club of Tulsa: 171 members, including 54 new members in 2016.**

**Welcome to our new members this month: John Cotrill, Keith Bohrer, Maria DeLong and Terry Davis.**



## **Club Accounts as of October 31, 2016:**

**Checking: 6,822.37; Savings: \$4,776.10; Investment accounts: \$19,455.91 (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

# 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](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. 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**



National Aeronautics and Space Administration



# NASA Space Place

## Educator Newsletter

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>



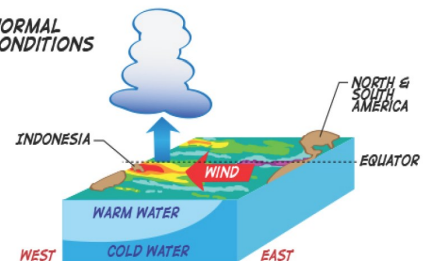
*New!*

### 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>

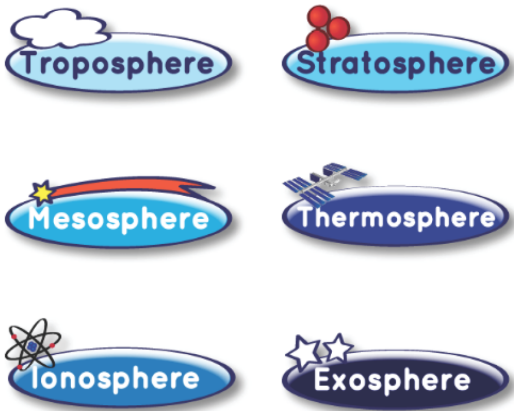
**NORMAL CONDITIONS**



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



### **Is Proxima Centauri's 'Earth-like' planet actually like Earth at all?**

By Ethan Siegel

Just 25 years ago, scientists didn't know if any stars—other than our own sun, of course—had planets orbiting around them. Yet they knew with certainty that gravity from massive planets caused the sun to move around our solar system's center of mass. Therefore, they reasoned that other stars would have periodic changes to their motions if they, too, had planets.

This change in motion first led to the detection of planets around pulsars in 1991, thanks to the change in pulsar timing it caused. Then, finally, in 1995 the first exoplanet around a normal star, 51 Pegasi b, was discovered via the "stellar wobble" of its parent star. Since that time, over 3000 exoplanets have been confirmed, most of which were first discovered by NASA's Kepler mission using the transit method. These transits only work if a solar system is fortuitously aligned to our perspective; nevertheless, we now know that planets—even rocky planets at the right distance for liquid water on their surface—are quite common in the Milky Way.

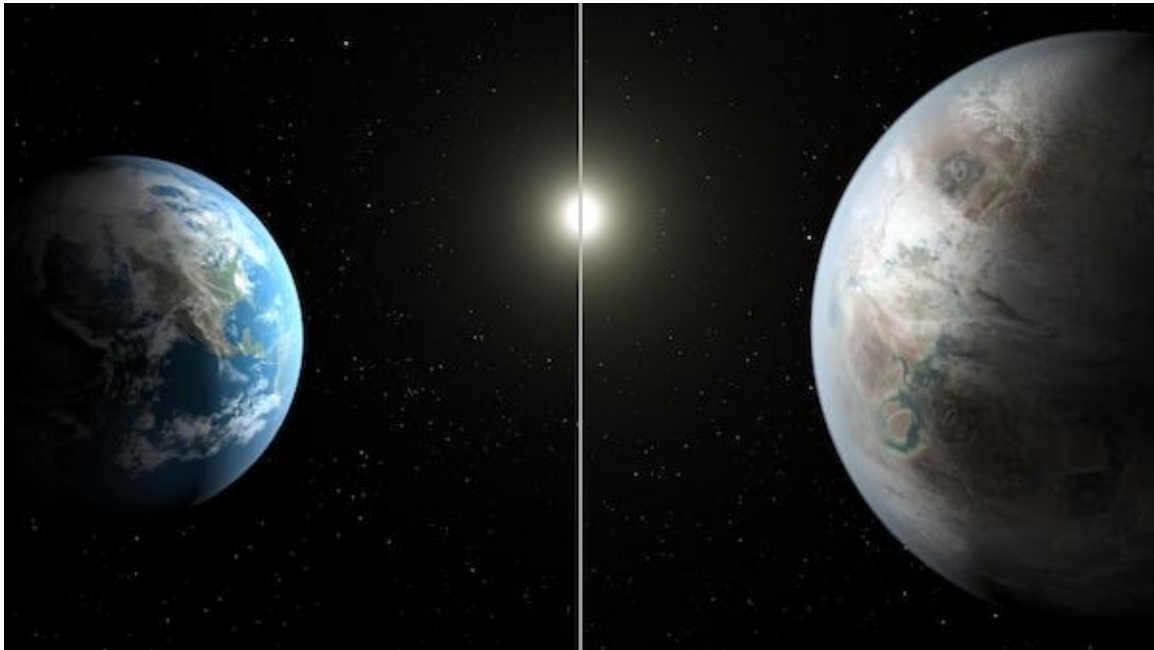
On August 24, 2016, scientists announced that the stellar wobble of Proxima Centauri, the closest star to our sun, indicated the existence of an exoplanet. At just 4.24 light years away, this planet orbits its red dwarf star in just 11 days, with a lower limit to its mass of just 1.3 Earths. If verified, this would bring the number of Earth-like planets found in their star's habitable zones up to 22, with 'Proxima b' being the closest one. Just based on what we've seen so far, if this planet is real and has 130 percent the mass of Earth, we can already infer the following:

- It receives 70 percent of the sunlight incident on Earth, giving it the right temperature for liquid water on its surface, assuming an Earth-like atmosphere.
- It should have a radius approximately 10 percent larger than our own planet's, assuming it is made of similar elements.
- It is plausible that the planet would be tidally locked to its star, implying a permanent 'light side' and a permanent 'dark side'.
- And if so, then seasons on this world are determined by the orbit's ellipticity, not by axial tilt.

Yet the unknowns are tremendous. Proxima Centauri emits considerably less ultraviolet light than a star like the sun; can life begin without that? Solar flares and winds are much greater around this world; have they stripped away the atmosphere entirely? Is the far side permanently frozen, or do winds allow possible life there? Is the near side baked and barren, leaving only the 'ring' at the edge potentially habitable?

Proxima b is a vastly different world from Earth, and could range anywhere from actually inhabited to completely unsuitable for any form of life. As 30m-class telescopes and the next generation of space observatories come online, we just may find out!

Looking to teach kids about exoplanet discovery? NASA Space Place explains stellar wobble and how this phenomenon can help scientists find exoplanets: <http://spaceplace.nasa.gov/barycenter/en/>



*An artist's conception of the exoplanet Kepler-452b (R), a possible candidate for Earth 2.0, as compared with Earth (L). Image credit: NASA/Ames/JPL-Caltech/T. Pyle.*

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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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](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.

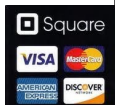
*IF YOU ARE AN EXISTING S&T SUBSCRIBER, YOU CAN RENEW DIRECTLY WITH S&T AT THE SAME CLUB RATE. BOTH S&T AND ASTRONOMY NOW HAVE DIGITAL ISSUES FOR COMPUTERS, IPADS AND SMART PHONES.*

### 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 FALL 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>



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  
TAMARA GREEN



PHOTOS: Above, Star Swirls over Black Mesa; Below, The Northern  
Cross over the Western Ridge. Both taken at the Okie-Tex Star Party,  
September 2016, by Tamara Green.