

INSIDE THIS ISSUE:

CALENDAR & EVENTS	2
ANNUAL DINNER MEETING INFO	3
PRESIDENT'S MESSAGE	4
TREASURER'S AND MEMBERSHIP REPORT	5
GENERAL MEETING MINUTES	7

IN PICTURES: OKIE-TEX STAR PARTY 2016, BY TAMARA GREEN AND JOHN LAND 8

"ONE INCREDIBLE GALAXY CLUSTER YIELDS TWO TYPES OF GRAVITATIONAL LENSES"; BY DR. ETHAN SIEGEL 12

NASA'S "SPACE PLACE" NEWSLETTER 14

WHERE WE MEET 16

OFFICERS, BOARD & STAFF 17

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ASTRONOMY CLUB OF TULSA

OBSERVER

OCTOBER 2016



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



THE ASTRONOMICAL LEAGUE

IMAGES OF THE MONTH: "Tulsa Scope Alley" and "Jack Eastman's Clark Refractor with Orion", taken at the Okie-Tex Star Party 2016 by John Land. See more great images by John in this edition of the newsletter! Thank you John for these nice images!

OCTOBER 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 SAT OCT 8
FULL (Hunter's) MOON SAT OCT 15
LAST QUARTER SAT OCT 22
NEW MOON SUN OCT 30
HALLOWEEN MON OCT 31

UPCOMING EVENTS:

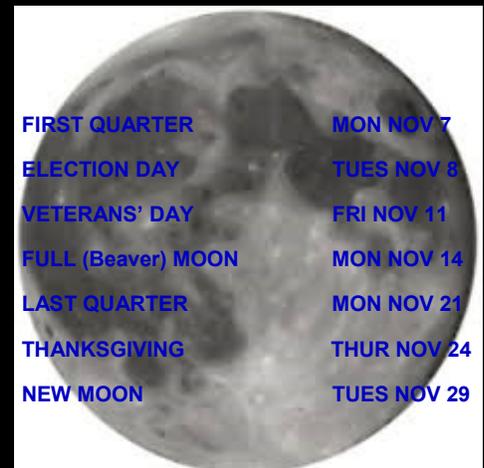
SIDEWALK ASTRONOMY	SAT OCT 8	6:30 PM	BASS PRO
GENERAL MEETING	FRI OCT 14	7:00 PM	JENKS HS PLANETARIUM
PUBLIC STAR PARTY	SAT OCT 22	6:30 PM	ACT OBSERVATORY
MEMBERS' NIGHT**	FRI OCT 28	6:30 PM	ACT OBSERVATORY
SIDEWALK ASTRONOMY	SAT NOV 5	5:00 PM	BASS PRO
DAYLIGHT SAVING TIME ENDS	SUN NOV 6		
ANNUAL DINNER 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

**MEMBERS AND FAMILY ONLY PLEASE.

NOVEMBER 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:



FIRST QUARTER MON NOV 7
ELECTION DAY TUES NOV 8
VETERANS' DAY FRI NOV 11
FULL (Beaver) MOON MON NOV 14
LAST QUARTER MON NOV 21
THANKSGIVING THUR NOV 24
NEW MOON TUES NOV 29

ANNUAL DINNER MEETING

SAT NOV 12 6:30 PM

The Annual Dinner is next month—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.

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.



PRESIDENT'S MESSAGE

BY RICHARD BRADY



Hi everyone!

October General Meeting

The General Meeting will be at the Jenks Planetarium Friday, October 14, at 7:00 PM. This month's speaker is Dennis Berney. He will talk about his night vision viewer and his FLUR system, and demonstrate them for us.

Elections at the General Meeting this month

We will be having elections for officers and the board this month. We need to have a quorum of at least 20 members.

The following are running for the various positions:

- President - Richard Brady - incumbent
- Vice President - Tamara Green - incumbent
- Secretary – open
- Treasurer - Tim Davis - incumbent
- Board - Chris Proctor - incumbent
 - James Liley - incumbent
 - James Taggart - incumbent
 - John Land - incumbent
 - Skip Whitehurst - incumbent
 - Teresa Davis - stepping down from secretary
 - Jerry Cassity
 - Tony Blakesley

We are still looking for someone willing to be the secretary next year. The duties include taking the minutes of Board Meetings (3-4 meetings each year) and General Meetings (each month during the school year), and preparing and counting the ballots from the yearly election. If you are interested in running for secretary, or any other position, please let me know. Any member can run as long as they have been a member for at least a year in good standing.

The Annual Dinner is next month

Our annual club dinner is scheduled for next month. Please find the details elsewhere in this newsletter.

Planets this month

Venus continues to be low in the southwest after sunset. Saturn continues moving towards Venus as the month progresses. They will be about 3 degrees apart by month's end. Mars is in Sagittarius this month, starting above the Teapot and moving steadily east all month. Mercury is low in the eastern morning sky, on its way to superior conjunction on the 27th. Jupiter is continuing to rise earlier each day. By October 31st it will be coming up around 5:30 AM.

Clear skies!
Richard Brady

TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



Astronomy Club of Tulsa: 173 members, including 50 new members in 2016.

Welcome to our new members this month: Eric Clayton, Michelle Stoots, Scott Helton and Danny Tucker.



Club Accounts as of September 30, 2016:

Checking: 6,142.98; Savings: \$4,776.10; Investment accounts: \$19,672.73 (*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**

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

GENERAL MEETING MINUTES

SAT SEP 10, 2016

TAKEN BY TAMARA GREEN FOR TERESA DAVIS

PRESENT:

RICHARD BRADY, PRESIDENT

TAMARA GREEN, VICE PRESIDENT

TIM DAVIS, TREASURER

JOHN LAND, BOARD

JAMES LILEY, BOARD

SKIP WHITEHURST, BOARD

NOT PRESENT:

TERESA DAVIS, SECRETARY

JAMES TAGGART, BOARD

CHRIS PROCTOR, BOARD

Richard called the meeting to order at just a few minutes past 7:00 PM. There were approx. 20-25 attendees.

Richard talked about current events in astronomy and space science, then about upcoming club events. Following that, there were three presentations:

Tony White gave a brief talk on the Tulsa Rocketry Club and their upcoming event, "High Frontier", which will be on the weekend of Sep. 24 and 25, which conflicts with the first weekend of Okie-Tex. He then announced that next year's dates for High Frontier also conflict with next year's Okie-Tex. He said that all the people who normally volunteer to go out to the event with telescopes will be going to Okie-Tex, and asked for volunteers to go. He said anyone interested should contact him or the president of the rocketry club.

Tamara Green gave a presentation on Okie-Tex entitled "OTSP and You: An Okie-Tex Veteran's Guide to the Star Party", which covered everything from what the star party is to what to bring with you.

Skip Whitehurst gave a presentation on Grazing Occultations. He talked about his trip with John Land, John More, John Grismore and Bill Collier, in which they observed and took video of the occultation of the star Aldebaran by the Moon.

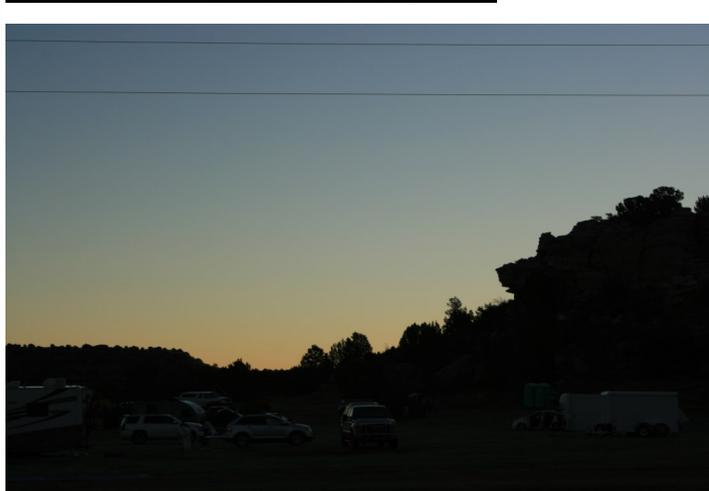
Following that, Richard adjourned the meeting at 9:00 PM.

IN PICTURES: OKIE-TEX STAR PARTY 2016

BY TAMARA GREEN







IN PICTURES PART 2: OKIE-TEX STAR PARTY 2016

BY JOHN LAND





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!

One Incredible Galaxy Cluster Yields Two Types of Gravitational Lenses

By Ethan Siegel

There is this great idea that if you look hard enough and long enough at any region of space, your line of sight will eventually run into a luminous object: a star, a galaxy or a cluster of galaxies. In reality, the universe is finite in age, so this isn't quite the case. There are objects that emit light from the past 13.7 billion years—99 percent of the age of the universe—but none before that. Even in theory, there are no stars or galaxies to see beyond that time, as light is limited by the amount of time it has to travel.

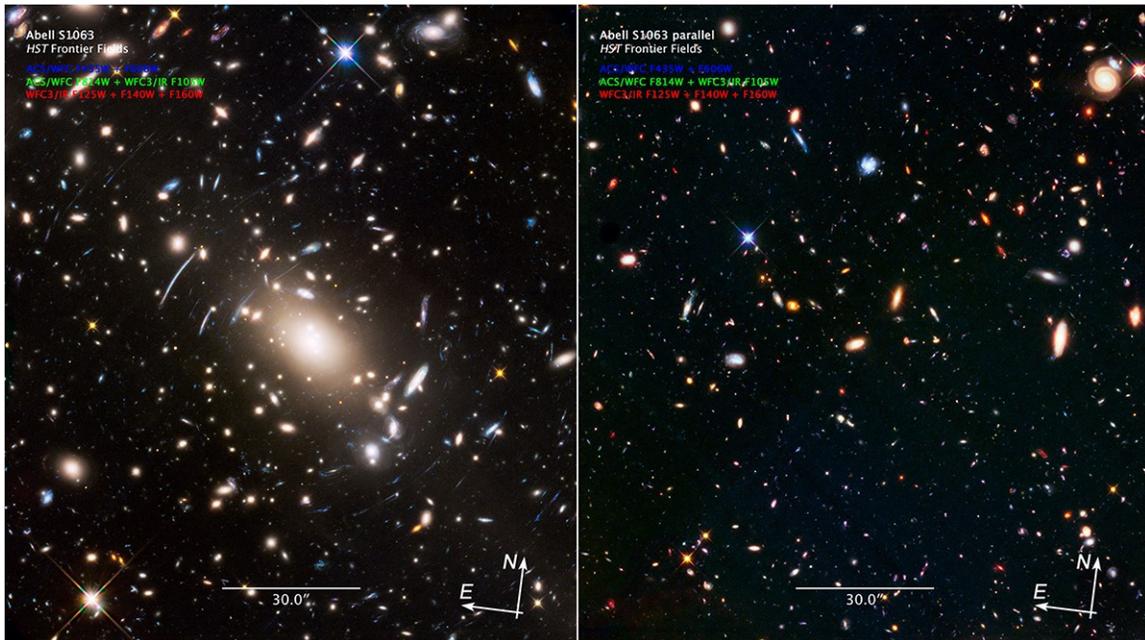
But with the advent of large, powerful space telescopes that can collect data for the equivalent of millions of seconds of observing time, in both visible light and infrared wavelengths, we can see nearly to the edge of all that's accessible to us.

The most massive compact, bound structures in the universe are galaxy clusters that are hundreds or even thousands of times the mass of the Milky Way. One of them, Abell S1063, was the target of a recent set of Hubble Space Telescope observations as part of the Frontier Fields program. While the Advanced Camera for Surveys instrument imaged the cluster, another instrument, the Wide Field Camera 3, used an optical trick to image a parallel field, offset by just a few arc minutes. Then the technique was reversed, giving us an unprecedentedly deep view of two closely aligned fields simultaneously, with wavelengths ranging from 435 to 1600 nanometers.

With a huge, towering galaxy cluster in one field and no comparably massive objects in the other, the effects of both weak and strong gravitational lensing are readily apparent. The galaxy cluster—over 100 trillion times the mass of our sun—warps the fabric of space. This causes background light to bend around it, converging on our eyes another four billion light years away. From behind the cluster, the light from distant galaxies is stretched, magnified, distorted, and bent into arcs and multiple images: a classic example of strong gravitational lensing. But in a subtler fashion, the less optimally aligned galaxies are distorted as well; they are stretched into elliptical shapes along concentric circles surrounding the cluster.

A visual inspection yields more of these tangential alignments than radial ones in the cluster field, while the parallel field exhibits no such shape distortion. This effect, known as weak gravitational lensing, is a very powerful technique for obtaining galaxy cluster masses independent of any other conditions. In this serendipitous image, both types of lensing can be discerned by the naked eye. When the James Webb Space Telescope launches in 2018, gravitational lensing may well empower us to see all the way back to the very first stars and galaxies.

If you're interested in teaching kids about how these large telescopes "see," be sure to see our article on this topic at the NASA Space Place: <http://spaceplace.nasa.gov/telescope-mirrors/en/>



Galaxy cluster Abell S1063 (left) as imaged with the Hubble Space Telescope as part of the Frontier Fields program. The distorted images of the background galaxies are a consequence of the warped space due to Einstein's general relativity; the parallel field (right) shows no such effects. Image credit: NASA, ESA and Jennifer Lotz (STScI)



National Aeronautics and Space Administration



NASA Space Place

Educator Newsletter

September-October 2016 / Vol. 9, Issue 4

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!

Galactic Explorer

A galaxy is a huge collection of gas, dust, and billions of stars all held together by gravity. Visit as many galaxies as possible in Galactic Explorer, our new NASA Space Place game!

<http://spaceplace.nasa.gov/galactic-explorer>



New!

Sun Comparison

Our sun is a bright, hot ball of hydrogen and helium at the center of our solar system. So hot, that it's actually 10,000 degrees Fahrenheit at the surface and 27 million degrees Fahrenheit in the core! But how does our sun compare to other stars?

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

New!

Sunscreen Activity

The sun sends energy toward Earth in the form of ultraviolet light. We can't see UV light with our eyes, but we are still affected by it. Make handprint art using UV light!

<http://spaceplace.nasa.gov/sunscreen-activity>



New!

NASA Space Place Calendar

Looking for some hands-on activities and fun facts to use in the classroom? Check out our 2016-2017 NASA Space Place Calendar! This calendar includes many noteworthy space dates and links to related content on our website.

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

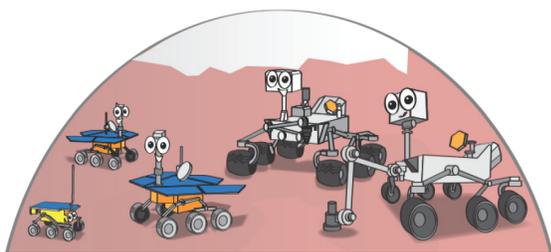


Explore Earth and space at spaceplace.nasa.gov

New!

Rovers on Mars!

Over the years, we've sent four rovers to study the cold, red planet we call Mars. We even plan to send another one in just a few years! Meet the team of rovers and discover what we've learned from each one.



Sojourner

<http://spaceplace.nasa.gov/mars-sojourner>

Spirit & Opportunity

<http://spaceplace.nasa.gov/mars-spirit-opportunity>

Curiosity

<http://spaceplace.nasa.gov/mars-curiosity>

Mars2020

<http://spaceplace.nasa.gov/mars-2020>

Back to School

Summer is almost over, and that means it's time to head back to the classroom! Here are some helpful resources:

Math-related Activities

<http://spaceplace.nasa.gov/math-activities>



Social Media

To keep up with the latest, follow us on Facebook and Twitter [@nasaspaceplace](https://twitter.com/nasaspaceplace).

www.nasa.gov

Special Days

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

Sept. 1 — Pioneer 11 made the first flyby of Saturn on this day in 1979.

Five spacecraft, including this one, have been to Saturn so far. Learn more about this beautiful planet!

<http://spaceplace.nasa.gov/all-about-saturn>

Sept. 18 — Voyager 1 took the first photo of Earth and the moon together in 1977.

Find out what this spacecraft is doing now:

<http://spaceplace.nasa.gov/voyager-to-planets>

Sept. 23 — Neptune was discovered on this day in 1846.

Neptune is dark, cold, and very windy. What else do we know about this planet?

<http://spaceplace.nasa.gov/all-about-neptune>

Oct. 1 — Happy Birthday, NASA!

Today, NASA opened its doors for the first time. But did you know there are also other agencies in space?

<http://spaceplace.nasa.gov/other-agencies>

Oct. 15 — Today, Uranus will be at its closest approach to Earth.

Fun Fact: Uranus actually has faint rings!

<http://spaceplace.nasa.gov/all-about-uranus>

Oct. 21 — Get ready for the peak of the Orionid meteor shower!

What causes a meteor shower?

<http://spaceplace.nasa.gov/meteor-shower>



@nasaspaceplace



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/

We hope to see you there!

MEMBERSHIP INFORMATION

ASTRONOMY CLUB OF TULSA OFFICERS:

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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

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!



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
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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

JOHN LAND

RICHARD BRADY

TIM DAVIS

TAMARA GREEN



PHOTOS: Top: Sagittarius on a Cloudy Night;

Bottom: Cygnus Setting. Both by John Land, taken at the Okie-Tex Star Party,
2016.