ASTRONOMY CLUB OF TULSA

OBSERVER

DECEMBER 2018

Bringing Stars to the eyes of Tulsa since 1937

2018 Annual Club Dinner and Photo

Top: Club members present Bottom Left: 2019 Board & Officers Right: Attendees

In this Issue

Astronomy Club Events

Details at **http://astrotulsa.com/Events.aspx**

	EVENT DATE	START TIME	LOCATION
DECEMBER			
PUBLIC NIGHT	SAT DEC 1	4:30 PM	OBSERVATORY
MEMBER'S NIGHT	FRI DEC 7	5:00 PM	OBSERVATORY
MEMBER'S back up night	FRI DEC 8	5:00 PM	OBSERVATORY
GENERAL MEETING	FRI DEC 14	7:00 PM	JENKS PLANETARIUM
SIDEWALK ASTRONOMY	SAT DEC 15	4:30 PM	BASS PRO
WINTER SOLSTICE	FRI DEC 21		
PUBLIC NIGHT	SAT DEC 29	4:45 PM	OBSERVATORY
JANUARY			
NEW YEARS' DAY	TUES, JAN 1		
MEMBERS' NIGHT	FRI JAN 4	5:30 PM	OBSERVATORY
TELESCOPES 101 WORKSHOP	SAT JAN 5	11 AM- 2 PM	TASM
MEMBERS' BACKUP NIGHT	SAT, JAN 5	5:30 PM	OBSERVATORY
GENERAL MEETING	FRI, JAN 11	7:00 PM	JENKS PLANETARIUM
SIDEWALK ASTRONOMY	SAT, JAN 12	4:30 PM	BASS PRO
PUBLIC NIGHT	SAT JAN 26	5:15 PM	OBSERVATORY

Mark your calendar for Sunday night Jan 20, 2019

TOTAL LUNAR ECLIPSE of the MOON

Partial phase begins at 9:44 PM

Totality from 10:41PM to 11:43 PM

Details in January Newsletter See **Eclipse Animation**

Telescope 101 Workshop

Got a New Telescope ?
(Or an old one gathering dust)
Want some help learning to use it?
Bring your telescope and let us help you.

The Astronomy Club of Tulsa and Tulsa Air and Space Museum are hosting a Telescope Workshop.

Saturday Jan 5, 2019 from 11 AM to 2 PM
At the Tulsa Air & Space Museum Planetarium

RSVP Registration Required -
Sign Up Today to reserve your time
Registration ONLINE at
TulsaMuseum.org

***Please bring telescope, user manual and accessories if you have them**
Note: Registration is by telescope group not individuals in that group.

Registrants will have an opportunity to view a planetarium show after their session.

Thinking about Buying a Telescope? See Choosing or Gifting a Telescope

Volunteers needed for the Telescope 101 Workshop at TASM

We need at least 10 to 12 volunteers to help our guests. Our guests will be bringing in their telescope. Our members will be helping answer questions about their telescopes. Showing them how to set up a telescope. Explain the eyepieces and general telescope basics. We'll need 2 or 3 people to greet guests and hand out club brochures and info. You don't have to be an expert just willing to share your knowledge.

To Volunteer send in your NAME – Phone # and Email with Subject Line **TASM Volunteer** to John Land – **Tulsaastrobiz@gmail.com** or Tamara Green – **Astrotulsa.pres@gmail.com**

For a glimpse of the January 2018 Telescope workshop go to the **Feb 2018 Newsletter**

PRESIDENT'S MESSAGE

BY TAMARA GREEN

Hey Y'all!

I hope you all had a wonderful Thanksgiving!

The Dinner Meeting in November was tons of fun! The food was wonderful, and the raffle was a great way to raise money for the club, and a fun addition to the festivities. Thank you all for coming and helping to make it a success!

We have one more month left in 2018. This year has flown by! The club events calendar for 2019 is in progress and has just been sent to the Board for review and approval. Hopefully it will be finalized very soon. I hope that next year will be even better than this year was.

I wish all of you a safe and happy holiday season. Be careful fighting traffic and crowds and all that. As for me, well, one thing I am thankful for this holiday season is Amazon Prime! I don't have to go anywhere except to my postal box for my packages!

The first big event for 2019 is a proposed Telescopes 101 at TASM. We are looking at having it on Saturday, January 5 from 11:00 AM to 2:00 PM, so we will need volunteers for that. See Details later in newsletter. We will plan a Messier Marathon for March, with a backup date in April. We will also plan a summer star party with TUVA. If both the March and April dates get rained out again, I now have the year-round Messier Marathon book, so I will try to put a Fall marathon together. That would be fun! We are also still working on doing an event, or even a few events at the Gathering Place. I have not yet heard back from them on when a good date would be, so I will be contacting them again after the holidays. I am also planning for quarterly star parties at TASM. We will have some nice events next year, so stay tuned!

I look forward to serving you again in 2019 as your President. I hope we can all have a fun year together.

Clear Skies! *Tamara*

SECRETARY'S MESSAGE

BY JESS CAGNOLLATI

Hello Everyone!

Hope everyone is having a fantastic holiday season! The annual holiday dinner was held on Saturday, November 10th, and it was a great time! 56 members and guests were present at the dinner. Peggy Walker from The Astronomical League gave a brief presentation on Amateur Telescope Making (ATM) and the outreach provided by AL to families and children. She is selling calendars with the proceeds going toward the ALCon Jr. Conference in 2020. See purchase link below

After a delicious meal from Carrabba's, we got to the real business – the raffle! The raffle raised $ 477 toward the future purchase of a solar telescope. A variety of autumn themed décor items were raffled at the club dinner.

The grand prize winner of the telescope was our newer member Ashton Yarbrough! Ashton is a senior at Keifer high school and has been accepted at OU this fall where she is thinking about studying meteorology.

At the end of the raffle, we all said "cheese" for the group picture and then headed into the planetarium for a showing of *"The Sky We Don't See."* It was a wonderful production by the Jenks Planetarium about the southern hemisphere, including constellations and tales that we might not be as familiar.

Thank you to everyone who helped put on a wonderful evening!

Here's to the New Year !

Jess Cagnollati

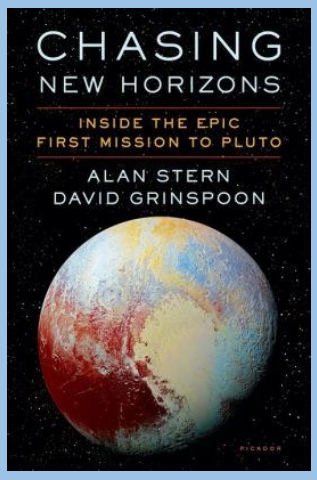
Link here to Order Page Cost is $13 plus shipping

Images and sketches from AL Members
Monthly moon phases
Planetary oppositions
Meteor showers
Eclipses
Transits
Major US Star Parties
Astro/space trivia
ALCon 2019 Conference information
AL Executive Committee and Regional information
AL Observing Program Progression Guide

Our Tulsa Astronomy Club has a supply on hand of the **2019 Astronomy Magazine Calendars for $10 each**

Contact our treasurer John Newton at **AstroTulsa.tres@gmail.com** to reserve your copy.

Calendars are available on first come, first served basis and must be picked up in person at a club event.



Book Review – by John Land

Chasing New Horizons

Inside the Epic FIRST MISSION to PLUTO
By Alan Stern and David Grinspoon

I strongly recommend reading this book to any young person dreaming of a career in the sciences, whether it be space or other endeavors. It will give you a realistic view of the kind of preparation, persistence and planning it will take to achieve your goals.

If you were anywhere on planet earth July 14, 2015 all the news and social media were abuzz with the images coming back from the PLANET PLUTO.
Yes, I said PLANET. For once the images and data came streaming in it was hard to deny that this tiny world at the edge of the Solar System was an amazing complex dynamic world beyond anything scientist or artist had imagined !

For those of us who call ourselves amateur astronomers, the story of Pluto's discovery has a special ring of familiarity to it. The story of a young farm boy, **Clyde Tombaugh**, growing up under the dark skies of Kansas with a curiosity about the stars. Walking to town to find books on astronomy, peering through a tiny Sears telescope that lead to the passion to build his own larger telescope, Carefully drawing his observations of the planet Mars then sending them off to Lowell Observatory in Flagstaff, AZ. Much like the dreams we all may have had as we marvel at the expanse of the night sky.

At the age of 22 Clyde got a job at Lowell Observatory photographing the large plates of the sky and tediously searching tens of thousands star images looking for the mysterious Planet X. Then on Feb 18, 1930 (just after his 24th birthday) he found that special object with just the right motion to be orbiting well beyond Neptune! He had found a new planet that later got the name Pluto. But what was this distant world like. For remainder of the 20th century it held its secrets closely. Even the Hubble Space Telescope could barely make out its disk and give vague hints at its color.

Jump forward to 1980 and the Voyager I & II spacecraft where making a grand tour of the outer planets. Each time they reached a new world scientist were astonished at the new discoveries. Often having finding wonders that completely confounded their expectations. Volcanoes of a Moon of Jupiter, Tiny Shepherding moons within Saturn's rings, Rings around all the outer planets. A moon of Uranus that looked like it had been broken apart and randomly put back together. Supersonic winds on the cold world of Neptune. By August 1989 Voyager II had flown by all the outer giant planets. But sadly, tiny Pluto was not near its pathway out of the solar system.

By the end of the Voyager epic many of the scientist and engineers of Apollo and pioneers of solar system exploration were aging out and a new generation of explorers where entering the work force.
Enter **Alan Stern** a space enthusiast since the age of eight. Stern had dreamed of becoming an astronaut but found himself between the end of the Apollo era and before the Space Shuttle era. So he began to think in terms of exploring space by means of instrumentation. At the May 1989 meeting of the American Geophysical Union ***(AGU)*** he and a group of Pluto enthusiast began the "*Pluto Underground"* to gain public and scientific support of a mission to Pluto.

SIDE NOTE: *If you read the book "Chasing New Horizons" keep a notepad handy to write down the names of all the acronyms of the various agencies and space missions that appear in the book.*

In 1989 Pluto was approaching its nearest approach to the Sun in its 248-year orbit. Spectroscopic examination revealed it had a thin atmosphere and other observations gave hints as to the types of ices that may be on its surface. Due to it highly elliptical orbit, it was imperative that a mission of Pluto be designed and executed before it receded to the far reaches of its orbit and its atmosphere froze again for another two centuries. By 1990 the team had come up with the plan for a "*Pluto 350"* spacecraft. A 350 Kg (770 lb.) craft capable of reaching Pluto in 15 years. The science was good but how could they get it approved by NASA and funded by Congress?

When we read about or watch the successful completion of a space mission, we are only seeing a microcosm of the real struggles it takes to succeed. Politics and Interagency competition threatened to scrap the mission numerous times. At one point a bureaucratic political appointed NASA administrator said he would approve a plan if they go build a craft to go to Pluto, Land and Return a sample within just **10 years** and a budget of only $ 400 Million.

Alan Stern eventually became the Principal Investigator for the New Horizons mission to Pluto using a fairly new player in the space game. The Applied Physics Laboratory **APL** out of John's Hopkins University. They faced stiff competition with JPL and other well established – politically connected agencies that tried of divert funding or promote their own Pluto missions or other projects.

In 2002, having finally overcome all the bureaucratic obstacles and overcome the project being cut completely from the proposed NASA budget the race was on to complete the spacecraft. To get to Pluto the craft must use a gravitational boost from Jupiter. Jupiter and Pluto are only lined up well for a short time once every 12 years. That launch window was closing in early 2006. Reading the account of the long days, weeks and months of testing retesting and overcoming setbacks will give you a greater appreciation of the success of the final mission.

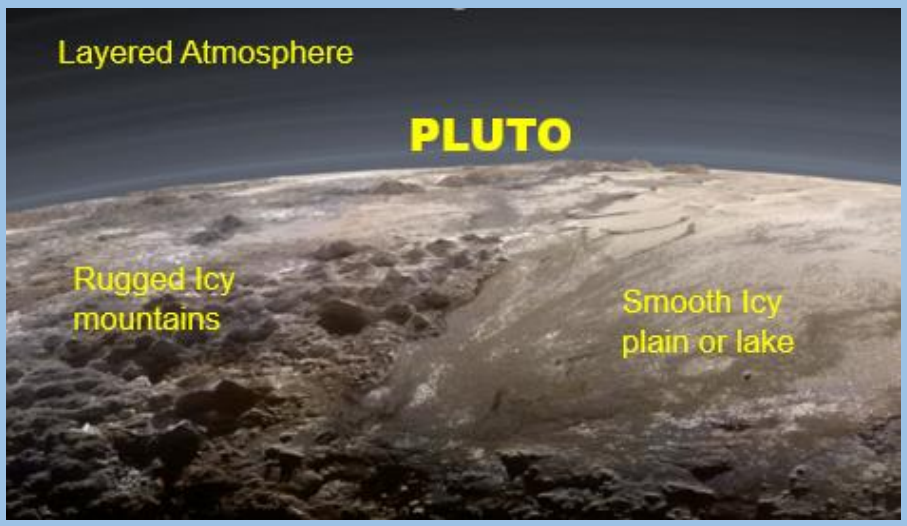
New Horizons was launched Jan 19, 2006 the fastest spacecraft to ever leave earth. It passed the moon's distance in only 9.5 hours. The next target was a Jupiter flyby in Spring 2007 then the spacecraft would go into hibernation for long periods until Dec 2014. There had been 2,500 people working on all the systems prior to launch. After launch only, a small team remained for the long trip to Pluto. Extensive back up plans had to be made to archive all the critical systems design planning details. Many of the original designers may not be around for the next phase of the mission.

One surprising thing to me was that the details of the mission encounter software had not been written at launch. They were written tested and retested on simulators during the course of the next 7 years. As we know the mission was successful beyond all expectations but even the final hours before encounter were packed with high tension drama. But to avoid further "Spoiler Alerts" you'll have to read the book.

On to Ultima Thule – Jan. 1, 2019

The Path to Jupiter was so successful that enough fuel was left to reach an as yet undiscovered target beyond Pluto. New Horizons has traveled another Billion miles ot reach its next target on Jan 1, 2019 the *"Kuiper Belt object (KBO) 2014 MU69, nicknamed **Ultima Thule**. That name, pronounced **"Ultima Tooly,"** is Latin for "beyond the farthest frontiers" and was chosen in a public naming contest because its meaning represents what we are doing: exploring the farthest (and likely the most primitive) object ever visited in space."* See S&T Article

One of our own Tulsa Club members, John Moore, participated in two NASA missions to observe occultations of stars by this tiny distant object to collect orbital and size details.



TREASURER'S and MEMBERSHIP Report

BY JOHN NEWTON

As of November 27th, the Astronomy Club of Tulsa has held steady at 175 members, including 50 new members that joined us in 2018.
New members in November are Mark Wilson, Craig Deisenroth, and Jim Norwood.

Accounts as of November 27th, 2018 -
Checking: $ 5,127.05
Savings: $ 5,779.71
Investments: $ 22,569.48 (Values tend to fluctuate with market changes).

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 **2018** are as follows:
Adults: $ 45 per year, includes Astronomical League Membership.
Sr. Adult: $ 35 per year for those 65 or older, includes Astro League Membership.
Students: $ 30 with League membership; Students: $ 25 without League membership.
Additional Family membership: $ 20 with voting rights and League membership.
$ 15 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

This article is distributed by NASA Night Sky Network
The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit **nightsky.jpl.nasa.org** to find local clubs, events, and more!

NSN Night Sky Planner page has interactive tools to enhance your observing experience.
https://nightsky.jpl.nasa.gov/planner.cfm

NASA Night Sky Notes:
Observe Apollo 8's Lunar Milestones
By David Prosper

December marks the **50th anniversary of NASA's Apollo 8 mission**, when humans first orbited the Moon in a triumph of human engineering. The mission may be most famous for ***"Earthrise,"*** the iconic photograph of Earth suspended over the rugged lunar surface. "Earthrise" inspired the imaginations of people around the world and remains one of the most famous photos ever taken. This month also brings a great potential display of the Geminid meteors and a close approach by Comet 46P/Wirtanen

You can take note of Apollo 8's mission milestones while observing the Moon this month. Watch the nearly full Moon rise just before sunset on December 21, exactly 50 years after Apollo 8 launched; it will be near the bright orange star Aldebaran in Taurus. The following evenings watch it pass over the top of Orion and on through Gemini; on those days five decades earlier, astronauts Frank Borman, Jim Lovell, and Bill Anders sped towards the Moon in their fully crewed command module. Notice how the Moon rises later each evening, and how its phase wanes from full on Dec 22 to gibbous through the rest of the week. Can you imagine what phase Earth would appear as if you were standing on the Moon, looking back? The three brave astronauts spent 20 sleepless hours in orbit around the Moon, starting on Dec 24, 1968. During those ten orbits they became the first humans to see with their own eyes both the far side of the Moon and an Earthrise! The crew telecast a holiday message on December 25 to a record number of Earthbound viewers as they orbited over the lifeless lunar terrain; ***"Good night, good luck, a merry Christmas and God bless all of you - all of you on the good Earth."***
50 years later, spot the Moon on these holiday evenings as it travels through Cancer and Leo. Just two days later the astronauts splashed down into the Pacific Ocean after achieving all the mission's test objectives, paving the way for another giant leap in space exploration the following year.

The **Geminid meteor shower**, an excellent annual meteor shower, peaks the evening of December 13 through the morning of the 14th. They get their chance to truly shine after a waxing crescent Moon sets around 10:30 pm on the 13th. Expert Geminid observers can spot around 100 meteors per hour under ideal conditions. You'll spot quite a few meteors by avoiding bad weather and light pollution if you can, and of course make sure to bundle up and take frequent warming breaks. The Geminids have an unusual origin compared to most meteor showers, which generally spring from icy comets. The tiny particles Earth passes through these evenings come from a strange "rock comet" named asteroid 3200 Phaethon. This dusty asteroid experiences faint outbursts of fine particles of rock instead of ice.

Editor Note: *The Geminid meteors are visible for several nights between Dec 10th to Dec 16th with peak activity the night of Dec 13/14. Gemini rises in the NE around 7:30 PM and will be well placed by 9:00 PM The waxing moon will be a factor in the evening until it sets. In suburban areas you should still see few dozen in an hour. The numbers of 100+ are for are dark skies and experienced observers. Plan to spend at least 30 mins outside observing overhead. Keep a notebook to tally your sighting counts. J. Land*
For More Details about Meteors or earning an Observing Certificate see our **Dec 2017 Newsletter**

You can also look for **comet 46P/Wirtanen** while you're out meteor watching. Its closest approach to Earth brings it within 7.1 million miles of us on December 16. That's 30 times the average Earth-Moon distance! While passing near enough to rank as the 10th closest cometary approach in modern times, there is no danger of this object striking our planet. Cometary brightness is hard to predict, and while there is a chance comet 46P/Wirtanen may flare up to naked eye visibility, it will likely remain visible only via binoculars or telescopes. You'll be able to see for yourself how much 46P/Wirtanen actually brightens. Some of the best nights to hunt for it will be December 15 and 16 as it passes between two prominent star clusters in Taurus: the Pleiades and the V-shaped Hyades. Happy hunting!
Customizable Finder Charts from in-the-sky.org

Catch up on all of NASA's past, current, and future missions at **nasa.gov**
or https://science.nasa.gov/

Caption: Earthrise, 1968. Note the phase of Earth as seen from the Moon. Nearside lunar observers see Earth go through a complete set of phases. However, only orbiting astronauts witness Earthrises; for stationary lunar observers, Earth barely moves at all. Why is that?

You are invited to come join us to learn more about
Astronomy and view the wonderful sights in the night sky.
Check our Events Page of Dates **Link to Events Page**

During the school year our club holds a
Monthly General Club meetings at
Jenks Public Schools Planetarium
205 East B St, Jenks, OK
Located North of the intersection of
1st and B St

Meetings begin at 7:00 PM

When you enter the building lobby,
take the elevator to the 3rd floor.
Click for Google Map Link

Sidewalk Astronomy Night

East side of Bass Pro in Broken Arrow near the lake.
101 Bass Pro Drive, Broken Arrow, OK
Click Map Link here

On a Saturday evening near the 1st Quarter moon Astronomy Club volunteers set up telescopes to share views of the moon, planets and other bright objects. It's a come and go event where shoppers and restaurant goers get a chance to experience glimpses of the universe with their own eyes.

ASTRONOMY CLUB OBSERVATORY
Located on a hilltop about 25 miles SW of Tulsa
Features: classroom, restroom, dome with 14 inch telescope and an acre to set up your telescopes.

Weather permitting, we host two types of observing nights.

PUBLIC OBSERVING NIGHT on a Saturday
This event is open to individuals and families.
Club members set up telescope for public viewing.
***** Groups need to make separate arrangements.

MEMBERS OBSERVING NIGHT usually on a Friday near new moon
Reserved for club members and their families to allow them to pursue observing projects.

The Observatory is ONLY OPEN for SCHEDULED EVENTS. **Link to Events Page**
Click for Observatory Map
CAUTION: **DO NOT use GPS** it will likely send you on some nearly impassible back roads.

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NIGHT SKY NETWORK –
Open Position

WEBMASTER JENNIFER JONES

JENKS PLANETARIUM

Jenks High School Campus
205 East B Street, Jenks

TICKETS
$5 online or $7 at the door

Purchase online at
jenkscommunityed.com
or call 918-298-0340

2018 Go to Show Schedule
Click the Date Column to sort them by show date

Shows take place on
Tuesday evenings from 7:00 PM to 8:00 PM