



OBSERVER

MARCH 2019

Bringing Stars to the eyes of Tulsa since 1937

Editor – John Land



Photo by Shannon Norwood at our Observatory Sept 1, 2018
Center of Milky Way in Sagittarius / Scorpius region with bright Mars on the left.

Are you tired of dreary days and cloudy nights?

Tour “The World at Night” with “Astronomers without Borders”

To see the stunning Visions of the Night throughout the World

Click the image below to begin your voyage.

International Earth & Sky Photo Contest 2017



[twanight.org/contest](https://www.twanight.org/contest)



<https://vimeo.com/232922147>

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Calendar \$ 5 Each only a few left
 Contact our treasurer John Newton
 at AstroTulsa.tres@gmail.com

Astronomy Club Events
 Details at <http://astrotulsa.com/Events.aspx>

	EVENT DATE	START TIME	LOCATION
MARCH			
PUBLIC NIGHT	SAT, MAR 2	5:45 PM	OBSERVATORY
MEMBERS' NIGHT	FRI, MAR 8	6:30 PM	OBSERVATORY
MESSIER MARATHON	SAT, MAR 9	3:00 PM	TUVA
	^ See Details in President's March Message ^		
DAYLIGHT SAVING TIME BEGINS	SUN, MAR 10		
SIDEWALK ASTRONOMY	SAT, MAR 16	6:30 PM	BASS PRO
ST. PATRICK'S DAY	SUN, MAR 17		
VERNAL EQUINOX	WED, MAR 20	4:59 PM CDT	
GENERAL MEETING	FRI, MAR 29	7:00 PM	JENKS PLANETARIUM
PUBLIC NIGHT	SAT, MAR 30	7:15 PM	OBSERVATORY
MEMBERS' NIGHT			
	FRI, APR 5	8:00 PM	OBSERVATORY
MESSIER MARATHON BACKUP	SAT, APR 6	TBA	TUVA
GENERAL MEETING	FRI, APR 12	7:00 PM	JENKS PLANETARIUM
SIDEWALK ASTRONOMY	SAT, APR 13	7:00 PM	BASS PRO
GOOD FRIDAY	FRI, APR 19		
EASTER	SUN, APR 21		
PUBLIC NIGHT	SAT, APR 27	7:30 PM	OBSERVATORY



ALCon 2019
50th Anniversary of the First Moon Landing
 July 25 - 29, 2019
 Kennedy Space Center and Southern Skies Cruise to the Bahamas

The Astronomical League will celebrate the 50th anniversary of the Apollo Moon landing at its annual ALCon convention July 25 to 29, 2019

Featuring tours of the Kennedy Space Center and a Southern Skies Cruise to the Bahamas
 Weather permitting sections of the deck lights will be turn off to enjoy dark Atlantic skies.
 Special reserved rates for the cruise are going fast **so make your reservations ASAP**

Reservation Details at <https://alcon2019.astroleague.org/>

Note: A valid passport is required for the cruise – ask your local post office for passport requirements and allow plenty of time for processing.



During February Comet C/2018 Y1 Iwamoto made a close approach to the earth as it receded from the Sun. Reaching mag 7 it was visible for a few days in binoculars as it skirted quickly through Leo, Cancer and Gemini. (Unfortunately we only had one clear night week)
 The comet is now receding in the direction of Auriga and can be found in moderated sized telescopes.

See charts at <https://theskylive.com/c2018y1-info>

[Watch Comet Iwamoto passing the Spiral Galaxy NGC 2903](#)

JENKS PLANETARIUM
 205 East B Street, Jenks

TICKETS
 \$5 online or \$7 at the door

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



2019 [Go to Show Schedule](#)

**Click the Date Column
 to sort them by show date**

WINTER/SPRING SHOWS			
TUESDAYS			
Feb 5	Oasis in Space	7pm	Ages 8 & Up
Feb 12	Earth, Moon and Sun	7pm	Ages 4 & Up
Feb 19	Fractal Exploration	7pm	Ages 8 & Up
Feb 26	Apollo 11: Man's First Step Onto The Moon	7pm	Ages 6 & Up
Mar 5	The Sky We Don't See	7pm	Ages 6 & Up
Mar 12	The Sistine Chapel	7pm	Ages 8 & Up
Mar 26	Back to the Moon for Good	7pm	Ages 6 & Up
Apr 2	Solar System Protection Agency	7pm	Ages 4 & Up
Apr 9	The Sistine Chapel	7pm	Ages 8 & Up
Apr 16	My House Has Stars	7pm	Ages 4 & Up
Apr 23	Passport to the Universe	7pm	Ages 6 & Up
Apr 30	Apollo 11: Man's First Step Onto The Moon	7pm	Ages 6 & Up
SATURDAYS			
Feb 9	The Winter Sky	8pm	Ages 6 & Up
Mar 16	How to Use My Telescope	8pm	Ages 6 & Up
Apr 13	The Spring Sky	8pm	Ages 6 & Up
WEEK OF SPRING BREAK 2019			
Mar 18	Spacepark 360	7pm	Ages 4 & Up
Mar 19	Solar System Protection Agency	11am	Ages 4 & Up
Mar 19	The Sistine Chapel	3pm	Ages 8 & Up
Mar 19	Apollo 11: Man's First Step Onto The Moon	7pm	Ages 6 & Up

PRESIDENT'S MESSAGE

BY TAMARA GREEN



Hey Y'all!

We are getting closer and closer to Spring! That means closer and closer to (hopefully) nicer weather and fun events!

The first one coming up is our Messier Marathon. I have sent packets out to all of you. (Please note that the first one I sent was a mistake. That was last year's! I re-emailed all of our members the correct one) If you still need a copy of the charts, send me an email and I will send it to you.

The Marathon will be on **Saturday, March 9. The date in the February newsletter was incorrect. The date is March 9, NOT March 2!** Ron and Maura look forward to hosting us again at TUVA. There will be a potluck dinner and group photo before the marathon begins. If you want to bring something to share, you are more than welcome to, and if not, that's ok too! You can still eat with us!

There will be a caravan going to TUVA. I will be leading it again this year. If you want to join in, we will meet at the Burger King on N. Elm Plc. (161st E. Ave.) in Broken Arrow. The address is 1600 N. Elm Pl. This is south of the BA, on the West side of the street. It is across the street from the big Ferguson Car dealership. The caravan will leave at **3:00 PM SHARP**. This will give us time to get down there, set up, and eat! If you are joining the caravan, please email me at astrotulsa.pres@gmail.com. Send me your NAME, EMAIL Address and a contact PHONE Number. If you wish me to send you a TEXT in return please indicate so. Let me know what the make, model and color of your vehicle is so that I will know which vehicles belong in my caravan and which ones don't. For privacy concerns, I don't give my phone number out in a President's Message in a newsletter will eventually end up openly accessible on our website.

We will, of course, also have our Public Nights and Sidewalk Astronomy events. With the weather becoming warmer, we should have more guests come out to enjoy these events, so, naturally, we will need more volunteers. I have created sign-up sheets for those of you who wish to volunteer. I will be sending those out before each public event we have going forward.

I have been trying for months and months now to get us an event at the Gathering Place. The gentleman who I had initially been in contact with is no longer with the Gathering Place, but gave me the contact information of the folks who schedule events out there. I have reached out to them a couple of times, but have had absolutely no response. I will try one more time within the next week to see if I do get one, and, if not, I will have to consider other options for special public events we might try to have. TASM is really wanting us to do quarterly star parties with them, so that would be a good draw!

I hope that with the warmer weather will come more fun for us. I look forward to an exciting Spring and Summer with y'all.

Clear Skies, Tamara



2019 Messier Marathon 28th Annual Event
Saturday March 9 This is a MEMBERS EVENT
A Caravan will leave at 3:00 PM
From Burger King in Broken Arrow –
Take BA Expressway to Elm Pl exit –
Turn Right (South) about 1 block to first Light
Turn Right into Burger King Lot.

Details for reserving your space in the caravan are in this month's President's Report

Each year near the Spring Equinox, Club members get together for an all night Messier Marathon at TUVA (the home of our wonderful hosts Ron and Maura, located south of Muskogee, OK

TUVA is also Home of the 24" Bart Custom built telescope.

There will be a caravan led by Tamara Green to the TUVA observing site. Be sure to bring something for the **Pot-luck dinner and snacks and drinks to keep you going through the night.**

There are 110 objects in Messier's famous catalog. The object of the game is to see how many of them you can find in one night. In the late 1700's French astronomer Charles Messier made a catalog of 110 deep sky objects that are visible in amateur telescopes. They include star clusters, galaxies and nebula.

Near the Spring Equinox it is possible to view all 110 of them in a single night starting in the west just as the sun sets and extending to dawn as the sun rises in the east.

Our website has log sheets with the objects arranged in the optimum order for observing them during the night. You'll want to **Print off the Log sheets** to record each object as you locate it. A couple of EverSharp Mechanical pencils work best for keeping your records.

You may also print the **set of observing charts** with each object marked with a Sequence number. You can **print these off these charts** or use your on star charts.

<http://okmcd.com/pub/MessierMarathonCharts.pdf> **Log Sheets & Observing Charts**

The maps make a great finder chart during the year also.

Prepare yourself well for a full nights observing. Red lights are a must to maintain you dark adaptation.

Temperatures can drop sharply throughout the night. Dress in layers and supply yourself with warm gloves, hat and insulated shoes or double socks. You'll need to bring some sort of clip board or tray to keep your log papers organized. Also bring your own lawn chair and maybe a blanket to catch a power nap along the way. Some people bring a small tent or blankets. The main building is heated and has a small restroom. Outdoor electricity is limited so bring your own power supplies if you have them.

Guide to Messier Marathon Observing

<http://www.richardbell.net/marathon.html>

Great Single page search list

http://www.richardbell.net/Files/messier_list.pdf

Star Hopping Guide to the Marathon

<http://www.robhawley.net/mm/>

Enjoy a Live Video Marathon Mar 28

<http://www.mvastro.org/starparty/messier.php>

Composite Image of all 110 M objects

<http://apod.nasa.gov/apod/ap000311.html>

Messier Marathon **App** Store on iTunes –

<https://itunes.apple.com/ca/app/messier-marathon/id594617818?mt=8>

Composite Image of all 110 M objects

<http://apod.nasa.gov/apod/ap000311.html>

Awesome APOD Image of a Messier Night

<http://apod.nasa.gov/apod/ap110527.html>

AVOID FRUSTRATION

M 40 is only a Double Star

<http://astrotulsa.com/Observe/m40.htm>

Observing Artificial Satellites – the ISON List

Brad Young

Observing artificial satellites has been a big part of my astronomy for 16 years. Once the bane of astrophotographers, there are now lots of folks out there interested in seeing them. Groups such as seesat-l, satelliteobserving.net, and most astronomical societies around the world have ongoing efforts to promote satellite tracking.

Most satellites, their rockets, and any debris associated with launches are cataloged by the U.S. Space Surveillance Network (SSN), and orbital elements are published by USSTRATCOM (US Strategic Command) at space-track.org. This information, in turn, is used by other outlets to provide predictions for satellite watchers (e.g. International Space Station [ISS] passes). There are also many well-known orbiting objects that do not appear on those lists. Hobbyists refer to them as classified objects, and those that are published as unclassified. The space-track.org information does include most of the classified objects in its general database, but the orbital elements are not published.



“Anonymous” ISON satellite as imaged remotely over New Mexico by author (60 second exposure).

Over the past few months, I have been attempting to track several orbiting objects that are listed in the “[ISON catalog](#).” These are objects that are not currently matched with items in the “classified” hobbyist tracking list published by Mike McCants, and that have not yet been identified as matching unclassified objects. I wrote a white paper that discusses my findings and presents options for future effort, including a list of objects that would be practical to independently track. A few other satellite observers have also tracked these objects, using visual, imaging, and even radio techniques. Of course, there’s always room for more!

If you are interested in a deep dive into this fascinating subject, the paper is posted at:

http://satobs.org/seesat_ref/misc/ison_study.pdf

For more info on observing satellites (in general):

<https://www.mnassa.org.za/html/Oct2007/2007MNASSA..66..Oct..205.pdf>

<https://www.skyandtelescope.com/observing/satellites/>

A few groups involved with satellite observing, with reporting and prediction communities:

<https://satelliteobservation.net/>

<http://www.satobs.org/>

<http://www.satflare.com/>

<https://www.calsky.com/>

Thanks to:

Mike McCants

Ted Molczan

Perth Observatory



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!

Springtime Planet Party

David Prosper

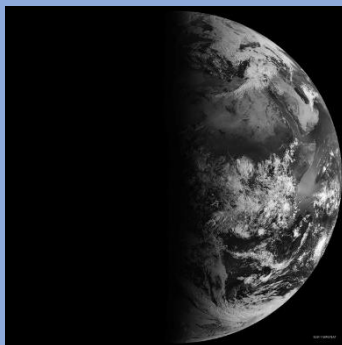
March brings longer days for Northern Hemisphere observers, especially by the time of the equinox. Early risers are treated to the majority of the bright planets dancing in the morning skies, with the Moon passing between them at the beginning and end of the month.

The **vernal equinox** occurs on **March 20**, marking the official beginning of spring for the Northern Hemisphere. Our Sun shines equally on the Northern and Southern Hemispheres during the moment of equinox, which is why the March and September equinoxes are the only times of the year when the Earth's north and south poles are simultaneously lit by sunlight. Exacting astronomers will note that the length of day and night on the equinox are not *precisely* equal; the date when they are closest to equal depends on your latitude, and may occur a few days earlier or later than the equinox itself. One complicating factor is that the Sun isn't a point light source, but a disc. Its edge is refracted by our atmosphere as it rises and sets, which adds several minutes of light to every day. The Sun doesn't neatly wink on and off at sunrise and sunset like a light bulb, and so there isn't a perfect split of day and night on the equinox - but it's very close!

Ruddy **Mars** still shines in the west after sunset. Mars scoots across the early evening skies from Aries towards Taurus and meets the sparkling Pleiades star cluster by month's end.

March opens with the morning planets of **Jupiter**, **Saturn**, and **Venus** spread out over the southeastern horizon before sunrise. A crescent **Moon** comes very close to Saturn on the 1st and occults the ringed planet during the daytime. Lucky observers may be able to spot **Mercury** by the end of the month. March 31 opens with a beautiful set of planets and a crescent Moon strung diagonally across the early morning sky. Start with bright Jupiter, almost due south shortly before dawn. Then slide down and east towards Saturn, prominent but not nearly as bright as Jupiter. Continue east to the Moon, and then towards the beacon that is Venus, its gleam piercing through the early morning light. End with a challenge: can you find elusive Mercury above the eastern horizon? Binoculars may be needed to spot the closest planet to the Sun as it will be low and obscured by dawn's encroaching glow. What a way to close out March!

Discover all of NASA's current and future missions at nasa.gov



Caption: Earth from orbit on the March equinox, as viewed by EUMETSAT. Notice how the terminator – the line between day and night - touches both the north and south poles. Additional information can be found at <http://bit.ly/earthequinox> Image credit: NASA/Robert Simmon

Caption: The morning planets on March 31. Image created with assistance from Stellarium.

SECRETARY'S MESSAGE

BY JESS CAGNOLLATI



Happy March Everyone!!

Here is a summary of the ACT Board meeting on Feb. 2nd (***Complete Minutes are at end of Newsletter***) Discussion on being respectful and open minded to others in the club was the first topic. Please remember to be kind to those around you to make it an enjoyable environment for everyone.

The club is exploring ways to manage group and public requests, as well as ways to bolster donations to the club. Volunteering for events is vital for the club's success in outreach to the community. If you are available to volunteer for upcoming events, please reach out to Tamara or any board member. Plans are underway to provide sign in sheets as well as information on different volunteer opportunities for events. Be on the lookout for these!

James is working on replacing the motors and tires on the dome for better usability. James anticipates on having this project done by late May- early June.

Tamara is working on securing an event with The Gathering Place in the future. The summer reading program this year is space related, with Tulsa area libraries contacting the club to hold events. Jerry is reaching out to these libraries to see what their expectations are and what dates they are looking for. Planning will continue when information is provided by the libraries.

Michael Blaylock has graciously offered some of his images to be used for either bumper stickers or car magnets for the club to sell. Skip is contacting companies to get details on costs and configuration of the design.

Inventory of the equipment at the observatory is well underway with the majority of the items being accounted for. James and Skip are working on cataloging them to provide for a system for items to be loaned out. The 14" RCX at the observatory is working with no major issues noted by board members. Plans to return heater wire around corrector plate were discussed.

There will be an all-day goal planning meeting on March 2nd beginning at 10 AM. This meeting is to discuss the future goals and vision of the club, including structural updates, providing more educational outreach at public events and ways to get more donations to the club.

On Friday February 15th, there was a general meeting at the Jenks Planetarium. Upcoming events include: Member's Night on Friday march 8th, Messier Marathon on Saturday march 9th, Sidewalk Astronomy at Bass Pro on Saturday march 16th and Public Night on Saturday March 30th. Please see the website or the Facebook page for any changes. There was information sent out by Tamara about the Messier Marathon including a caravan down to the event. Tamara provided a great presentation on the Messier Marathon, including its history and tips and tricks to have a great time! Dan presented the final draft of the planetarium show,

The Mid-States astronomical convention is to be held June 14th -16th at Rockhurst University in Kansas City. More information will be provided when available. *Apollo 11 – Man's First Step Onto The Moon*. The Jenks students did a fantastic job with this program and a big thank you for the members of this club that provided feedback and information to make the show a success! Here's to more "lambs" than "lions" in March!

Jess Cagnolatti

See complete Meeting Minutes at end of newsletter.

TREASURER'S and MEMBERSHIP Report

BY JOHN NEWTON



As of February 16th, the Astronomy Club of Tulsa has **170 members**, including one new member who has joined us this month. I want to welcome our newest members to ACT this February, **James Urbon**. Welcome James, looking forward in seeing you at our meetings!

Accounts as of February 22, 2019 - **See Detailed Treasurer Report for 2017 - 2018 at the end of this newsletter**
Checking: \$ 5,965.72
Savings: \$ 5,780.44
Investments: \$ 23,468.11 (Value 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. Details - Contact their websites

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

Dates and Times for Events are found at www.AstroTulsa.com under EVENTS tab
Be sure to check the Website for Weather Cancellations before coming.

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

MEMBER ARTICLES WANTED

Have YOU HAD A FUN ASTRONOMICAL ADVENTURE?

Got a new piece of equipment your dying to brag about?

Been on a vacation to an astronomical destination or done stargazing along the way.

Want to share your latest astrophotography success

Contact our Newsletter Editor about details at
Tulsaastrobiz@gmail.com

Submissions should be in MS Word and submitted by the 20th of each month.

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Astronomy Club of Tulsa		Treasurer - John Newton Oct 2018 to present Tim Davis 2013 to Oct 2107		
Banking Summary - 2017 vs. 2018				
Category	Y'2017	Y'2018	Delta (Y'18-Y'17)	Notes/Comments:
INCOME REPORT				
Calendar Sales- 2017	100.00	0.00	-100.00	
Calendar Sales- 2018	-63.52	36.00	99.52	
Calendar Sales- 2019	0.00	-73.01	-73.01	
Calendar Sales	36.48	-37.01	-73.49	Calendar sales off from 2017
Donation- General	557.36	646.79	89.43	
Donation- Group Event	493.00	146.00	-347.00	Group event donations down
Donation- Raffle Tickets	0.00	487.00	487.00	Raffle ticket donations were a positive boost
Donation- Star Party	564.81	613.83	49.02	
Donations	1,615.17	1,893.62	278.45	Cash donations slightly better than 2017
Interest	1.61	1.70	0.09	
Bank Interest	1.61	1.70	0.09	
Magazine- Member payment- Astro	656.03	494.03	-162.00	
Magazine- Member payment- Sky &	528.01	362.33	-165.68	
Magazine Subscriptions (Income)	1,184.04	856.36	-327.68	Member payments for mag subscription at club discount rates
Membership- New	2,296.34	2,223.37	-72.97	
Membership- Renewal	3,374.24	3,613.49	239.25	Member renewals were stronger in 2018
Memberships	5,670.58	5,836.86	166.28	
Solar Film Sales	96.00	0.00	-96.00	
Solar Glasses Sales	120.00	0.00	-120.00	
Other	216.00	0.00	-216.00	
TOTAL INCOME	8,722.27	8,549.83	-172.44	
EXPENSES REPORT				
Annual Dinner - Food Caterer	785.19	554.75	-230.44	
Annual Dinner - Room Reservation	300.00	300.00	0.00	
Annual Dinner - Silent Auction	-61.00	0.00	61.00	
Annual Dinner - Reimburse Expense	96.03	0.00	-96.03	
Annual Dinner - Guest	-560.00	-634.00	-74.00	
Dinner Expense	560.22	220.75	-339.47	Individual donations in 2018 helped to offset cost of dinner expenses
Bank Fee	0.00	26.00	26.00	
Bank Fee	0.00	26.00	26.00	New checks printed for (new) treasurer
Magazine- Club Payment to Astrono	722.95	629.99	-92.96	
Magazine- Club Payment to Sky & Te	494.25	461.20	-33.05	
Magazine Subscriptions (Expense)	1,217.20	1,091.19	-126.01	Checks sent for new or renew mag subscriptions
Operating Expense- Astro League du	750.00	835.00	85.00	Cost matches increased memberships
Operating Expense- Events	88.00	243.61	155.61	
Operating Expense- Insurance	1,841.00	2,038.00	197.00	Cost of insurance is creeping up y/y 11 % inc
Operating Expense- Misc Expense	234.52	106.38	-128.14	
Operating Expense- Newsletter Prin	19.95	0.00	-19.95	
Operating Expense- Observatory	1,190.12	5,015.69	3,825.57	Water line leak detection, tool rentals, plumbers work, AC Unit replacement & sales tax, shelving project, and finder scope (see expense detail below)
Operating Expense- Post Office Box	132.00	140.00	8.00	
Operating Expense- Postage	36.22	28.79	-7.43	
Operating Expense- Speaker Fee	0.00	200.00	200.00	
Operating Expenses	4,291.81	8,607.47	4,315.66	

Astronomy Club of Tulsa		Treasurer - John Newton Oct 2018 to present Tim Davis 2013 to Oct 2107		
Banking Summary - 2017 vs. 2018				
Category	Y'2017	Y'2018	Delta (Y'18-Y'17)	Notes/Comments:
Utilities- Electric Co.	524.03	536.50	12.47	
Utilities- Water Co.	509.57	278.55	-231.02	High cost in 2017 due to water leak
Utility Bills	1,033.60	815.05	-218.55	
TOTAL EXPENSES	7,102.83	10,760.46	3,657.63	
OVERALL TOTAL	1,619.44	-2,210.63	-3,830.07	2018 Net loss of nearly \$4k from 2017
Need to improve income revenue while reducing expenses.				
Operating Expense 2018- Observatory (Detail)				
1/10/2018		Ck 5011- Reimburse for tool rental- water line repair		(242.99)
1/11/2018		Ck #5008- Leak detection- water line repair		(295.00)
2/5/2018	Amazon	Eyepiece for dome scope		(219.19)
2/13/2018	Carner Plumbing	Leak repair- Ck #5014		(1,046.23)
2/20/2018	Carner Plumbing	Leak repair- Ck #5015		(910.57)
3/12/2018	POS Purchase 03/1	Paper towels, air freshener		(12.87)
5/8/2018	Astron Astronomic	Finder scope for dome RCX scope		(162.70)
5/8/2018		Ck #5024- Shelving project		(499.61)
7/11/2018	Associated Parts	AC unit		(500.00)
7/12/2018	Associated Parts	AC unit- Ck #5035		(436.09)
8/28/2018		Ck 5038- Reimburse for tri-fold brochure printing		(234.41)
9/18/2018		Ck #5041- Sales tax for A/C unit, misc scope parts		(145.43)
9/28/2018		Ck #5040- A/C duct supplies		(147.78)
12/8/2018		Check # 6001- Observatory Locks		(162.82)
		Plumbing costs nearly \$2,500		Total Expensed
		AC Unit costs nearly \$1,100		-5015.69

Two Large Observatory Expenses occurred in 2018

In late December 2017 a water line to restroom developed a leak below the slab that required major effort to remove a section of the floor. Then installed a new line made of the modern PEX Plastic that can withstand corrosion and resists freezing ruptures.

Much of the labor of removing & replacing the floor was done by member volunteers. The actual plumbing was done professionally. A more modern pedestal sink basin was donated and installed also.

In the spring AC / Heater unit for the classroom failed and was replaced with a new more efficient unit.

The combined repair and replacements costs amounted to about \$ 3,600

Also shelving and other improvements were added to the classroom space as well as purchase of new eyepieces and finder for the telescopes.

Board Meeting – Saturday, February 2nd Location/time: Brookside Public Library, 12:00- 3:00 PM

Club board members attendees:

Tamara Green (President), Jerry Cassity (Vice President), John Newton (Treasurer), John Land (Club Editor), Sheldon Padawer (Board), Skip Whitehurst (Board), James Taggart (Board), Richard Brady (Board), Jacob Shepherd (Board), Tony Cagnolatti (Board)

1. Bullying/Abusive Behavior.

Tamara addressed the need for respect, courtesy and open communication throughout the club and in emails. Discussion took place to minimizing disrespectful actions/behaviors in the club, including using club bylaws to address these issues appropriately.

2. A new way to manage groups/public requests.

Jerry is interim group director in Owen's absence. Discussion took place about combining groups and asking for donations. For school groups, suggesting students/parents and sponsors provide donations to bring for the club. Maybe provide information that club uses donations for upkeep.

Discussion took place in to recruit volunteers during weekdays as well as volunteerism as a whole. Sheldon recommended calling membes to get them engaged as well having a phone list including numbers of officers and board members. James suggested utilizing a private Facebook page and possible discussion forum to reach out to members. It was decided to have a private Facebook group for members. Sheldon suggested a running record of who participated in volunteering at events, as well as a sign up sheet for events. Tony suggested a condition that being a key holder of the observatory requires participation at events to keep key. Discussion took place as to how many events will be required, including public nights/sidewalk or other events. Per club, it was agreed to require members to participate in 2 events a year or at the discretion of the club president, as some members do not participate in events but are at the observatory during the week and can keep an eye on the observatory when others are not there.

John Land suggested an outreach certificate at annual dinner, apply for outreach pin through the Astronomical League.

3. Ways to make the dome easier to operate.

James would like dome operation completed by May 31st. Replace the single motor with three motors. James is suggesting changing tires to ones that are not air filled. The motors would replace the need for as many tires on the dome — James requesting \$900 for initial construction. Sheldon made a motion to approve \$999 for dome reconstruction; Jerry seconded the motion. The vote was unanimous. Motion carried.

4. Suggestion from Jerry: Purchase of speaker and mike for public night.

Suggestion for a microphone to make announcements at public nights/ events and for use during shows/presentations. Jerry suggested a system that is semi portable that comes with a corded microphone that is approximately \$230. It requires set up to use. Tony suggested a portable microphone system that can be carried on your shoulder and costs approximately \$165.00. This can be used as an initial system to gauge what will be needed to be heard clearly during events. This microphone system can also be used at events offsite as well. James to make the motion to allow Tony and Jerry to decide what system to use for up to \$300. Sheldon seconded the motion. Vote unanimous. Motion carried.

5. Gathering place Discussion

Tamara received a message from one person at the Gathering Place. Viewing will be limited to moon and planets. Skip suggested seeing if lights there can be selectively turned off to allow for optimal viewing. Tamara will be head of committee for this and will continue to reach out to gathering place to see if event can be scheduled.

6. Summer astronomy event with the libraries

Tulsa area libraries have reached out to our club about the Space Themed summer reading program. Moon and planetary viewing expected at locations. Discussion took place to determine if one event can be held for all the libraries, what the event would look like, limiting events to Friday/Saturday nights and including activities for kids. Jerry will reach out to libraries to determine expectations and will revisit planning for events.

7. Budget report

Investment funds- no changes have been made and there was marked dip at end of year, off by 5%. There are 20 calendars left for sale, if 7 more are sold at half the price, the club would break even. Donations have improved in 2018 but still down from 2017. Setting a donation amount for groups will help improve this number. John suggested setting up a CD to get a little more interest (1.5%) and he has discussed this with bank. Discussion to be held at goal planning meeting. John noted that insurance premiums have increased- If anyone knows any insurance brokers that might be able to provide a better deal, let him know. James noted that the nest is installed at observatory and alarm company and to discuss procedures about setting thermostats at the observatory and movement so it will be turned down automatically after 2 hours of no movement. Discussion in moving PO BOX to an independent post office agent- PO boxes are half the cost of what is being paid now. If PO BOX is changed, it will change the address of the club and amendment will need to be made to bylaws as well as contacting appropriate entities of changes- will be up for discussion at goal planning meeting.

8. Michael Blaylock - design for bumper stickers from his images

Plan would be to sell for a small profit. Skip noted that bumper stickers at 2" x 6" size start at \$94 for 100. Magnetic stickers from same company, for the same size are \$123 for 100. Only place online for quote on magnets, representative stated they would last 2-3 years before they fade. Skip will do more research on companies that could provide them, as well as cost of doing both magnets and bumper stickers.

9. Status report on equipment inventory.

Total of 58 items in classroom, excluding shelves and cabinet have been inventoried. James has started adding items to Google drive, so in future can be adjusted when items are loaned out. James to bring label maker to create equipment tags. Skip determining what gear belongs to club and what gear belongs to members. James will determine what toolbox will be needed once inventory is complete.

10. Status report on 14" RCX.

Quick collimation by Skip and James with no major issues noted with viewing, GPS turned off by hand control. Going forward we will need to put time in by hand to align telescope, but waiting for GPS will take too much time for public events. Skip and James to work on document for operating scope, including turning it on and off. Plan to laminate it and keep near scope. Meade returned message to Skip and they do not make replacement parts for scope. Need dew heater wire around corrector plate which requires manipulation of glass, as there is no slack – Skip recommended suction holder for glass.

John Land mentioned issues with lady bugs getting into telescope when the dome is open, suggested foam to cover openings on scope.

11. Planning meeting at James' house 10 AM on March 2. What is expected of us.

All day meeting – please be respectful to each other and our hosts. Ultimate plan of action is to set goals for the future of the club. This is a brainstorming session and we should acknowledge the ideas presented without immediate critique.

Projector will be available as well as whiteboard. Bring your laptops as well! There will be availability for printing. Lunch to be catered- Please email if you plan on attending.

Tony suggested that if observing is cancelled, planning work/fun nights at the observatory.

Possible discussion at goal planning meeting?