



ASTRONOMY CLUB OF TULSA

OBSERVER

JUNE 2017

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PHOTOS: A stunning view of the Moon, Venus and Jupiter, taken in the early evening and again later that night at the ACT Observatory, June 2015. Both photos by Tamara Green.

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



THE ASTRONOMICAL LEAGUE

JUNE 2017

SUN	MON	TUE	WED	THU	FRI	SAT
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4	5	6	7	8	9 	10
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18	19	20	21	22	23 	24
25	26	27	28	29	30 	

MOON PHASES AND HOLIDAYS:

FIRST QUARTER	THU JUN 1
FULL MOON	FRI JUN 9
LAST QUARTER	SAT JUN 17
FATHERS' DAY	SUN JUN 18
NEW MOON	FRI JUN 23
FIRST QUARTER	FRI JUN 30

UPCOMING EVENTS:

SIDEWALK ASTRONOMY	SAT JUN 3	8:15 PM	BASS PRO
PUBLIC STAR PARTY	SAT JUN 17	8:15 PM	ACT OBSERVATORY
SUMMER SOLSTICE	TUE JUN 20	11:24 PM	
MEMBERS' NIGHT**	FRI JUN 23	8:45 PM	ACT OBSERVATORY
SIDEWALK ASTRONOMY	SAT JUL 1	8:00 PM	BASS PRO
PUBLIC STAR PARTY	SAT JUL 15	8:15 PM	ACT OBSERVATORY
MEMBERS' NIGHT**	FRI JUL 21	8:45 PM	ACT OBSERVATORY
SIDEWALK ASTRONOMY	SAT JUL 29	8:00 PM	BASS PRO

**MEMBERS AND FAMILY ONLY PLEASE.

JULY 2017

SUN	MON	TUE	WED	THU	FRI	SAT
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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:

INDEPENDENCE DAY	TUE JUL 4
FULL MOON	SAT JUL 8
LAST QUARTER	SUN JUL 16
NEW MOON	SUN JUL 23
FIRST QUARTER	SUN JUL 30

ASTRONOMY EQUIPMENT FOR SALE!

CELESTRON 6 SE TELESCOPE

I have a brand-new (still in box) Celestron 6 SE telescope that I would like to sell. I'm in Claremore. Asking \$750.00.

Contact John Knapp at John.Knapp@bakerhughes.com.

KC LOBRECHT'S 12 INCH DOBSONIAN—THIS IS NO JOKE!!



As many of you know this is a wonderful user friendly telescope. Need to be 5'5" not need a step up.

John Hall, (Pegasus Mirrors) reconfigured mirror. Have the light wave curve specs from his work.

Enhanced secondary, capable of 15th magnitude. AstroSystems Teflon, one of the few Dobsonians that pivots beautifully at zenith.

Kenneth Novak hardware. Starlight Instruments, 2" Focuser, #59, with reducer. Had it serviced (rack and pinion) in '09. Flocked it then too. 100+ lbs in three parts, counting mirror. Will fit in a compact car. 2 minute set up.

Acceived many of my Master Observer Certicates with it, except H2, binocular, meteor and solar program.

Asking \$1200. Have \$2k in it.

Contact KC Lobrecht at lobrechtkc@gmail.com.

Happy 80th Anniversary - Astronomy Club of Tulsa
founded the summer of 1937



Poignant moments of the Astronomy Club of Tulsa: By K.C. Lobrecht

I have been an Astronomy club member almost 40 yrs. When I joined, Judy Lieser and I were the only women. Nick Pottorf long time Treasurer was at the desk. As you came into Art Sweeney's studio, (Skelly bypass east of 51st.) Walking in you passed his huge telescope. All the elderly gentlemen at the table was daunting as well.

Nick always had kind words of support to me, and told me to stick with it. He made a frame for my first Certificate, The Messier #1223. He was very proud when I received my Hershel 400 #143 and H2 #10 (first woman). He and Mary were still alive when I earned the Master Observer's #17, ten years later, in '02. I remember Mary hugging me, she was the stern teacher, so her affection was quite wonderful.

(The Hershel certificates are a challenging catalogue of Deep Sky Object by William Herschel)

I became more active in the Spring of '92 when Kevin Manning called to asked if I'd volunteer, to help with the finishing up with the building of the Observatory. I told him I was a painting fool. Think the dome and doors still have my brush strokes. Remember James Liley the task master, told someone **"if K.C. has a job to do, get the h... out of her way!"**.

James did the welding on the dome. I was watching the generator catch the lawn on fire. You never heard so many feet come down those stairs. I had gotten it out by the time they arrived to help.

Blake Champlin the observatory manager, our leader who made jokes of his 40 mistakes, when someone goofed. He was the best, love what you do experience. Later Blake challenged me to do the Hershels by telling of a guy that had done all 800 that was at TSP.

One of our young doctors (name?) designed the spiral staircase in his head. Later on while painting the east wall outside, with my son (Nate was my 7 yr old (now 32),

The doctor slid off the west side roof and landed on his feet. Remember all the excitement and grace of the feat.

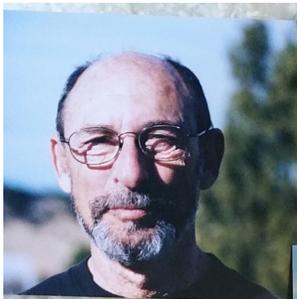
Gerry Andries was the Observatory Manager while I attained all my Observing Certificates.

Gerry ran interference, when we had public groups up. We had a blast.

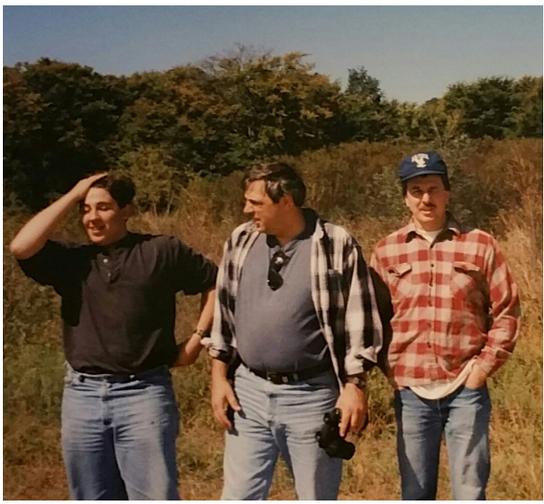
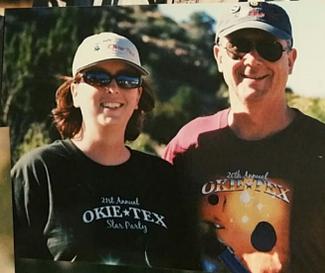
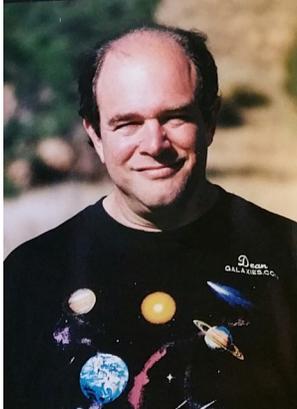
Blake put my name in for Club Secretary/Scheduling Director, that Fall of '92. During this time we ran 6 to 8 groups a month with day trips too for solar observing.

When I was Club President, my first choice for V.P. moved to Texas so I asked Chris Brown, which started the best time of my life. Chris was Physics and Astronomy Professor for TCC. I was his observing assistant for 13 yrs. He said his students Field Log Notes had my name all over them.

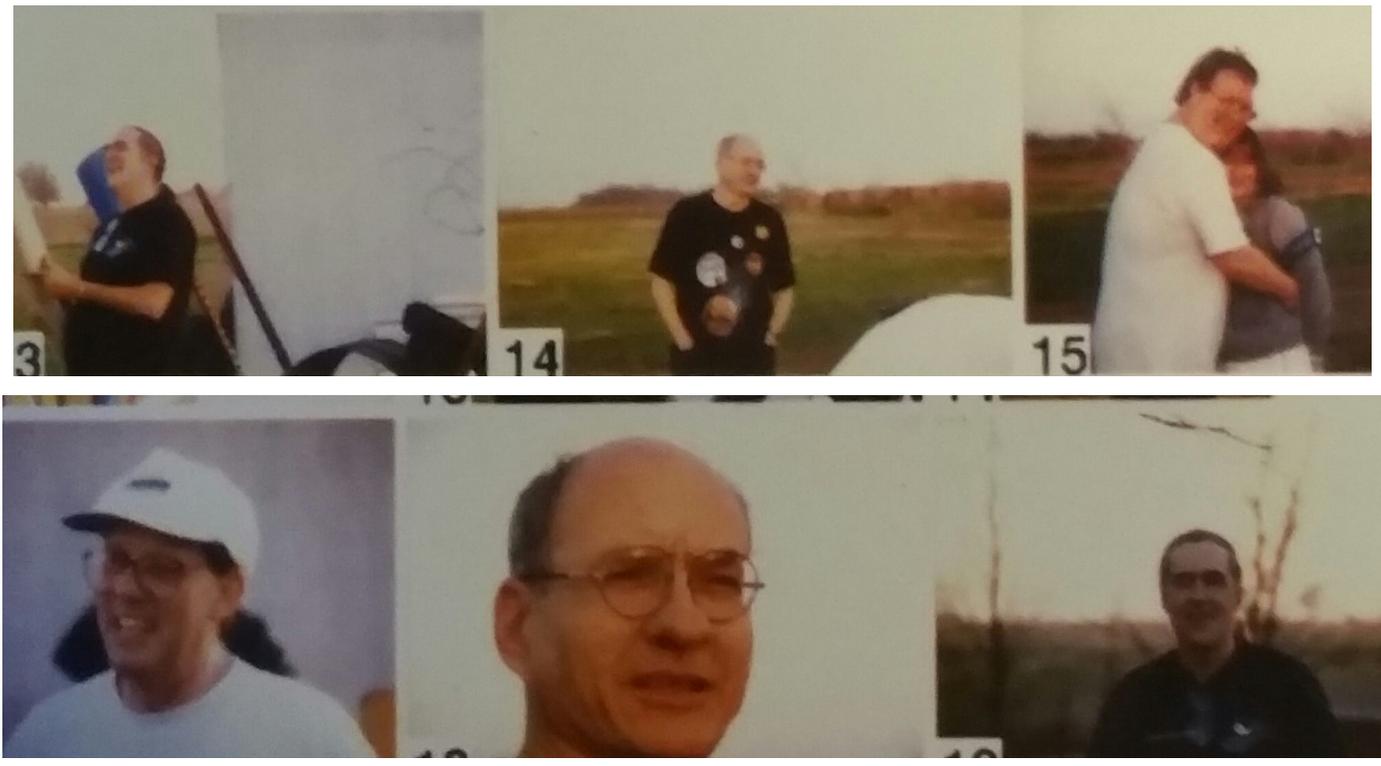
One of the best moments one cold night, with Chris' Field Class, a young boy with a mom in the class, I turned to Saturn, and the boy said "OH WOW!!!". Chris and I beamed, at each other, smiling, across the sidewalk's length, in our Wonder of the Astronomy Club's point.



THROWBACK THURSDAY: Chris Brown, James Liley, Gary Buckmaster and daughter, Dean Saloman, Tony White, Steve Chapman, KC Lobrecht.



Builders of the Observatory.



Above: Tim Hutterner, Ron Woods, Phil and Lynda Jones and David Stine.



Brad Young, Geroge Brenner, Tim Davis, Owen and Tamara Green

Below: Blake Champlin, Nick Pottorf. Photos submitted by KC.



HISTORICAL NEWSPAPER CLIPPINGS

Submitted by Jack Wells

A collection of newspaper clippings about the Club from those bygone days!

Aug 23
1957

"Here and There" with Wally

TULSA DOWNTOWNER
Published Every Friday by

WALTER C. COX
P. O. BOX 1897
Phone TE 5-7444

We ran onto two new dishes out at Alfred's this past week end. Pan this-ka-bob and Kafka. We suggest you try either one, or both of these unusual meat dishes—they're tops!

Did you get a good look at MRKOS comet last week? We did, and reason was that Astronomy



Club of Tulsa's past president Jack Wells of Public Service Co. lives just across the street from us. Several nights last week Jack and a couple of other Astronomy Clubbers held "look-see" sessions in the Wells' back yard with many a neighbor gettin' their first real look at the skies through the big scopes. This pix shows Jack gettin' the comet centered on one of the 6' reflecting scopes.

Searching for more data on the



Mrkos Comet through one of the other huge scopes is Public Service

Co's Gene Gallaher who figured the "tail" was somewhere near a million miles long. Still lookin' and more figurin', and Modern Bindery's Henry Montreich came up with the fact that



the length of the tail would be about 40 trips around the earth at the equator. Wells later told us the comet was close to 50 million miles from the earth and got the name "MRKOS" from the man who first saw it—in Czechoslovakia, Aug. 2nd this year.

Stargazers Await Mars' 'Close' Trip Toward Earth

By JACK FENCER
Stargazers will be out in force around Tulsa the next 2 weeks as the red planet Mars pips Earth a neighborhood visit that may answer a lot of questions.

Is there life on Mars? If so, is it highly developed organization or a simple vegetation? What about the suspected polar bonzas, oxalis, red deserts and expanses of green that suggest a living atmosphere?

Astronomers throughout the world have been straddled to insure an unobscured, unobstructed view of the red planet as it sweeps its way within 28,000,000 miles of the earth. It will be the closest since 1888 and it won't be that close again until 1971.

In Tulsa, amateur astronomers are quick to point out that the relative nearness of Mars won't necessarily alter the view on their comparatively small telescopes. They will have the stargazing experience, if not the discovery, to Palomar and other giant observatories.

But local stargazers aren't mindless. A hot, early, when it comes to seeing the rare opportunity to get a better picture of Earth's neighbor in the sun's inner orbit. And they have come to Tulsa and that day, too. Jack C. Wells, president of the Tulsa Astronomy Club, said a public viewing will be held Sept. 15 at the residence of George H. Rose, 605 S. Westhollow. It should be the best view of the red planet since Mars started at 1958.

"We invite Tulsa to come take a look," Wells said. "Members will be on hand to explain the telescope's workings and answer any questions about astronomy."

However, Wells warned against expecting too much in the way of a picture.

Don't Have Gear
"We simply don't have the equipment to get a large picture," he said. "The amount of information that people often come expecting to bring the size of a baseball, like scientists always see in science fiction stories."

"We can't offer that. But we can offer the best view in the city," Montreich, as one observer succinctly put it, "Mars will be the most photographed heavenly body since Mars's discovery."

The International Mars committee set up in 1955 has arranged for 77 observations in 11 nations across the globe in 1958. The committee is the red planet's biggest fan in the evening sky.

All equipment will be loaned and used and all will be straddled to insure uniformity, except the pictures from every angle.

FRIDAY, MAY 4, 1956

Interest in Astronomy Grows

Fan Club for Real Stars

By GEORGE KANE
Are there any star-gazers present? If so, you'll be interested in the rapidly-growing hobby of astronomy in Tulsa.

Jack C. Wells, an electrical engineer at Public Service Co. and president of the Tulsa Astronomy Club which dates back to the early 1930's, said there are now 50 active members in the club.

In 1957, the members plan to observe the first flight of a space satellite around the earth with telescopes they have constructed.

"The satellite will travel on a course within 150 miles of Tulsa," Wells said, "and it will give us a good chance to follow it in its flight."

"In 1949, we acquired a 12½-inch telescope," George H. Rose, a past president of the club, said, "and with different size eyepieces, we have been able to obtain up to 400 times magnification of heavenly bodies."

Arthur Sweeney Jr., another club member, is working on a project to construct a radio-telescope, which will not only be used to observe a planet or other body in its orbit, but will be able to pick up sound waves which the planet or comet emits.

The Tulsa club is affiliated with the National Astronomical League. "The club was not active during World War II," Wells said, "but began again in 1948 with more members and much more interest."

Dr. Leon Stuart, a club member and Tulsa physician, uses his hobby of photography in connection with the club.

"I had the pleasure of taking a 'first' picture in the field of astronomy some time ago," Dr. Stuart said.

"Through luck, mostly, I got a picture of a meteor striking the surface of the moon."

Dr. Stuart said that to his knowledge there has never been another such picture taken in the 20 or more years he has been studying astronomy and photography.

Wells announced that there would be a public demonstration, a "star party," at the University of Tulsa's Student Union building at 7:30 p.m. Saturday.

"We will have a display of astronomical equipment," he said. "We'll also show how mirrors for telescopes are ground, how telescopes can be made by the astronomy fan, and photographs of the sky and moon."



STAR GAZING—Jack C. Wells, president of the Astronomy Club of Tulsa, observes through a 12½-inch telescope at the home of George H. Rose, a club member. Left, H. A. Montfeith, club secretary, and Dr. Leon Stuart, a member, watch as Wells sights an object in the sky.

Wells said if the weather permits, there will be a telescope available for viewing at the home of H. A. Montfeith, secretary of the club.

"The purpose of the show is to acquaint the public with the club and invite new members," Wells said.

Officers of the club include Wells, Montfeith, and John A. Stewart, observing chairman.

Stars and others just the naked eye.

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George Rose (left), president of the Tulsa Astronomical society, and Jim Westphal, put together Rose's homemade scope. Prism and eye piece are from war surplus tank periscope. Barrel of scope was made from masonite heated and bent around sewer pipe.

A cloudy night session for the Tulsa astronomer. Members Edwin Nobles, Ben Reames, Roy O'Mara and Glen Davis pore over books containing astronomical data. Men are not the only ones interested in the hobby. Thirty per cent of wives participate in star observation with husbands.

APRIL 12, 1953

HISTORICAL NEWSPAPER CLIPPINGS

Submitted by Jack Wells

A collection of newspaper clippings about the Club from those bygone days!



April 1

Astronomy is a fascinating hobby for men and women of all ages in the month of April. The Tulsa Astronomical Society, which meets for the club's 12th anniversary for a special view of the moon.



April 15, 1953

BY DAL YERK
Of The World Staff

The night was bright with millions of stars, the moon alive with a glaring light. Only the wind-whipped dust partially obscured the heavens.

In the backyard at 4855 S. Birmingham ave., 18 persons, members of the Tulsa Astronomical society, gathered about a bulky black tube and crudely fashioned stand. The mirror scope was pointed at the moon.

Standing on a six-foot high platform, Hank Monteith peered into a small eye-piece, salvaged from a war surplus tank periscope.

"You're right on the button moon," he told Jim Westphal, who was squatted on the ground looking through a sight not unlike that of a rifle. Westphal stood up, then walked over to an electronic device at the base of the scope. He shoved a plug into an electrical outlet and turned on a dial.

"How's it going?" he asked Monteith.

"It's tracking just right," he answered.

The gadget, designed by Westphal, through elaborate timing and gearing, keeps the large delicately balanced scope "locked" on the moon as it swings in its orbit about the earth.

"Let him have a look," said George Rose, the club's president. He was referring to Hank.

We climbed up on the platform, closed one eye and peered into the eye-piece. The moon's craters and ridges looked close enough to touch.

Rose located an unusual moon tunnel for us. He said it was about four to five miles long. The entrance and exit holes looked like pin points in the scope.

"The theory," Rose said, "is that the tunnel was caused by a meteor which struck a moon ridge at a low angle, tunneled through and made its exit showing the surrounding area with a spray made up of meteor and moon particles."

We were then shown Saturn, with its rings, and Venus in its "half-phase." We also looked at the Great Nebula in Orion which resembles a cloud or wisp of smoke. Millions of stars make up the nebula.

The scope, with its 15-power mirror, is the pride of the Tulsa astronomy group. Like the majority of other scopes used by club members in their monthly Saturday meeting, it is homemade. In the making for several years, it was put into use 18 months ago.

"Surprisingly, you don't have to have a scope to participate in our group," Rose said. "Several of the members use binoculars and others just the naked eye."



Lauren Kilmer (right), owner of the Tulsa Astronomical society's only refractor scope, explains the mechanism to Ben Reames (standing) and Dale Vanderford.

April 12, 1953



Using a focussalt, George Rose and Ben Reames make a knife edge test for checking curve on mirror. Though homemade like the majority of the club's equipment, this machine can measure to a tolerance of one one-millionth of an inch.

A simple grinding machine, designed and built by Arthur C. Sweeney, Jr. (right) saves countless hours of labor in grinding mirrors. Steps are (1) rough grinding; (2) fine grinding; (3) polishing and (4) figuring.

Electronic device, designed and built by Jim Westphal (above), keeps the large 12-inch scope tracking the moon and stars and planets as the earth rotates, eliminating manual operation of balanced scope.

TULSA SUNDAY WORLD MAGAZINE

April 12, 1953

John Henry Drops Hammer, Sits in Club Car

By Brad Young

My last article for our newsletter described my dissatisfaction with the dying of amateur visual astronomy and its replacement by imaging. I compared the “struggle” of die-hard visual amateurs to that of the famous hero of a fable. Since then, I had the hammer snatched out of my hand, and was thrown on the train. Certain Astronomical League (AL) programs such as Target NEOs, and the upcoming 2017 Total Solar Eclipse certificates require imaging. I ranted and raved to the observing director (those of you who know me are unsurprised by this), but to no avail. I even suggested substitute visual programs for the asteroid search, and it sure seems like looking at the solar eclipse (safely of course) is the only thing that makes sense. I, for one, am not going to be trying to image the solar eclipse – I’m going to be standing there in awe of it, having never seen a total solar eclipse in my life.

Be that as it may, I finally realized I was going to have to do some imaging. So I studied some of my observing buddies who own their equipment. I noticed that they had scars where a kidney used to be, were living out of their RV, and were often seen looking in the dumpsters for aluminum cans to recycle for food money. Granted, they did go to bed promptly at sunset, but they had a hollow, sallow look that indicated too much time indoors, processing images on the computer.

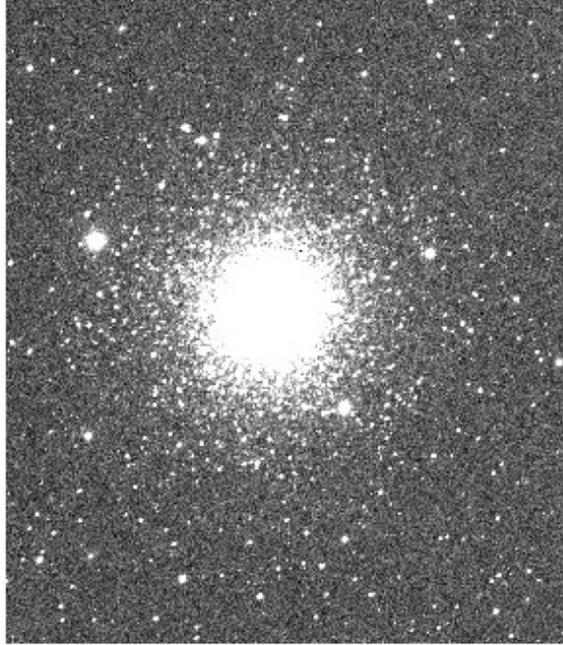
So I chose instead to use remote rental scopes. I had sort of dipped my toe in on this while working on the AL Radio Observing Program, remotely observing with the Greenbank 20 meter radio telescope in West Virginia. After all, no matter how dark adapted I get, I’m never going to be able to see radio waves. Then for pursuit of the certificates, I turned to itelescopes.net. This worked out very well; the management and staff was quite helpful and the service provides scopes in Australia, Spain, New Mexico and California, so there’s (almost) always clear sky somewhere.

Authors note: I don’t presume to recommend any particular remote imaging service. The ones mentioned in this article are simply the only ones that I have used, and both have been very satisfactory.

Using this service, I was able to complete the AL Target NEOs program and have also been using it for tracking satellites I would never see without travel. Additionally, I have been imaging deep sky objects that are out of our reach in the southern sky. I have been fortunate enough to travel to Australia four times, but of course I haven’t seen everything, and as I get older it becomes more difficult to make the long trip.



Itelescopes.net facilities



M3 by author, using itelescope.net (while tracking satellites!)

Using a rental imaging service like [itelescopes.net](https://www.itelescopes.net) is not prohibitively expensive, but you really can't do much for less than \$40 a month. They are, however, very generous with refunds, coupons, discounts, and most importantly, help. I haven't tried to do any sophisticated deep sky imaging but I have been taking clear filter shots of many deep sky objects. I have even tried just a little bit of narrow band imaging. Often you can set up the run and then just go to bed and see what happened the next day. So, you can act just like our imaging friends do at star parties, when they aren't telling you the sky looks "weak". For NEOs, satellite tracking, and other time dependent observations, this isn't always true, due to uncertainties in orbits and the fact you can't "hold" a scope to expose only at a certain time.

I also inquired with the Perth observatory in Western Australia about using their telescopes for imaging because they are on the same Skynet system as the Greenbank radio telescope. They responded quite quickly and were able to set me up with an account to do citizen science using their telescope and imaging equipment. Of course, since this program does not charge for the use of their equipment, there are stipulations about what I can do. Taking 203 hour long images of M42 is certainly not acceptable, but there is a short list of things that you can do using their telescopes that I have found to be quite useful. For instance, during a recent near Earth asteroid passage, the [itelescopes.net](https://www.itelescopes.net) reservations were all taken up, but I was able to get good images on the Perth scope where there was a window of free time and it was nearly as visible as from the [itelescopes.net](https://www.itelescopes.net) location in Coonabarabran in eastern Australia.



Image used by permission of Perth Observatory <https://www.perthobservatory.com.au/>



M83 by author, using Perth scope

In summary, I have been dragged kicking and screaming into the 21st-century again. I still prefer standing at the top of a teetering ladder looking through an eyepiece on a very dark clear night, but there are some occasions, some objects, and geographical and physical limitations that have led me to start using images. I must admit that I have crossed at least a little bit over on to the Darkside, and it's not that bad.

Find an Observing Program for You with the Astronomical League!

This article courtesy of the Night Sky Network. See full article at:
https://nightsky.jpl.nasa.gov/news-display.cfm?News_ID=746



Pins and logos from the Astronomical League's many excellent observing programs- there are even more than seen here! *Image Credit: The Astronomical League*

Looking for something to jump-start your stargazing? Maybe need a bit of direction? Or possibly you are tired of looking at the same set of objects every time you observe? If so you should definitely check out one of the [Astronomical League's observing programs!](#)

There are programs for all levels from novice beginners to challenges for advanced observers.

Ready to “Slip the Surly Bounds of Earth” and explore the treasures of the night!

Explore the possibilities tonight!

Alphabetical listing <https://www.astroleague.org/al/obsclubs/AlphabeticObservingClubs.html>

Listing by Skill Level <https://www.astroleague.org/al/obsclubs/LevelObservingClubs.html>

The League has run their excellent observing programs for [the past 50 years](#). Since 1967, the Astronomical League's observing programs have awarded over 10,000 observing certificates to skilled amateurs in recognition of their stargazing achievements - along with some great pins, too! These programs have helped amateur astronomers shore up their observing legs as well. Many folks might eventually observe all of the Messier objects, for example; but the League's requirements for their Messier program will make that observer carefully take into consideration the factors around their observation, such as the time and observing conditions present that night, as part of their needed documentation. Some harder to spot objects may even go unnoticed but for the need to complete the observing list - helping to sharpen those eyes and starhopping skills, with a cool pin and certificate as a reward - although the true reward is the boost in confidence and knowledge gleaned from working towards these observations for the participating observers.



Great American Solar Eclipse Updates

Monday Aug 21, 2017 is the date of the long awaited the Great American Solar Eclipse. Everyone continental United States will be able to see at least a partial solar eclipse. Tulsa will experience an 88.6 % partial eclipse.

For State by State details of viewing locations and planned events go to

http://www.eclipse2017.org/2017/path_through_the_US.htm

Also has many helps and suggestions for preparing and viewing the eclipse.

For a Google style map to zoom into any specific location go to

http://xjubier.free.fr/en/site_pages/solar_eclipses/TSE_2017_GoogleMapFull.html

Note: You'll have to read the map instructions details and click agreed button to see the map.

Link to a photography blog regarding the Eclipse: [CLICK LINK HERE](#)

Featured Resource: [2017 Solar Eclipse Resource List](#)

Are you ready for the August 21, 2017 total solar eclipse? Is your community ready? Check out this collection of resources to prepare the 99% of the country who will see a partial eclipse.

Find the list at: https://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=588



BUILD A SAFE SOLAR FILTER for your telescope, binoculars or camera. You can make your own Safe Solar Filter using a sheet of Mylar Baader coated material from AstroPhysics. This specially designed material gives safe images with excellent resolution. The Astronomy Club of Tulsa has ordered some of the material in bulk.

25 cm Sqaure (~ 9 in) for \$ 12 available at our club meeting or contact our treasurer Tim Davis. Complete details in our March newsletter

http://astrotulsa.com/CMS_Files/201703.pdf



The Tulsa Astronomy club has individual solar glasses that you can purchase at meeting or events for \$ 2 each <https://www.rainbowsymphony.com/> has a good prices on Eclipse glasses and viewing cards. You can purchase bulk orders in lots of 25 or more for about \$ 1.00 each. For the younger kids Eclipse Cards are recommend. Mount them taped securely on a larger sheet of stiff cardboard with a cutout section for the viewing area. This allows their face to be covered from the sun when observing. I bought sets of glasses and cards for friends and each of my grandkids' school classes.

ASTRONOMY CONVENTIONS FOR 2017

Looking for an opportunity to meet other astronomy enthusiasts and learn what area clubs are doing. Consider attending an astronomy convention. You'll meet interesting people, hear some great presentations and guest speakers and even browse the products of invited vendors.

Mid States Region
of
The Astronomical League



The Mid-States Region of the Astronomical League (MSRAL) convention will be held at Missouri State University in Springfield, MO.

Friday June 9 through Sunday June 11.

This event will be cohosted by the Springfield Astronomical Society and the Ozarks Amateur Astronomers Club.. Attractions will include a tour of the University's Baker Observatory near Marshfield, Missouri (birthplace of Edwin Hubble) (<https://physics.missouristate.edu/BakerObservatory.htm>)

Friday evening features a "Star-B-Q" Saturday will have a variety of guest speakers.

Sat Night has a banquet and the keynote speaker will be Dr. Peter Plavchan, Assistant Professor in the Department of Physics, Astronomy, and Material Science at Missouri State University.

Details and registration available at

<https://missouristate.collegiatelink.net/organization/ozarks-amateur-astronomers-club/calendar/details/1277692>

Accommodations available on campus and also in area hotels.

Located just a 3 hour drive from Tulsa, Springfield, Mo. also has many tourist attractions.

The birthplace of President Harry Truman, the city has several historical sites including a National Park at the Wilson's Creek Civil War battlefield which features restored buildings and guided tours of the extensive area. The Fantastic Cavern Cave tours are always a favorite as you can ride through this an ancient limestone cave. Home of the original Bass Pro shop you can tour the adjoining "Wonders of Wildlife" National museum and aquarium.

Other area attractions at <https://www.springfieldmo.org/museums-and-historical-attractions>

PRESIDENT'S MESSAGE

BY RICHARD BRADY



I have been the president of ACT for three years now. The year before that, I was vice-president. I have decided not to run for president again. I will probably run for a board position. Elections are scheduled for the October General Meeting.

In the sky this month, Jupiter still takes center stage, Saturn is coming up around sundown, and Venus is the bright morning star. Mars and Mercury are too close to the sun and basically unobservable this month.

Jupiter is still well placed for viewing in the evening. It is in Virgo all month, about a fist width (11°) west of the star. It is dimming slightly, but still the brightest object in the evening sky. It is down to around magnitude -2.0 with an apparent diameter of $37''$. It remains up until around 3 AM at the start of the month but sets around 1 AM by the end.

Saturn is at opposition (i.e., directly south at local midnight, which because of our location and daylight saving time is actually around 1:30 AM CDT) on June 14, so it is basically up all night all month, and it stays around magnitude $+0.0$ all month too.

Venus reaches its greatest elongation 36° west of the sun on June 3rd. It is still the bright morning star around magnitude -4.5 dimming slightly to -4.2 and shrinks from about $24''$ to $18''$. It comes up about $1\frac{3}{4}$ hours before sunrise at the beginning of the month and just over 2 hours by the end.

Mars sinks into the evening twilight and so is basically can't be seen all month.

Mercury is still lost in the solar glare again this month.

Summer begins officially at 11:24 PM on June 20th.

John Land sent out an email about comet Johnson C/2015 V2. It is a fairly bright comet, just below naked eye visibility at magnitude 6.8, so it should be visible with binoculars or a small telescope. It is high in the sky near Arcturus in Bootes. Finder maps can be found at <http://www.skyandtelescope.com/observing/comet-johnson-makes-a-splendid-sprint-through-bootes/>. Thanks John.

Clear skies!
Richard Brady

TREASURER'S AND MEMBERSHIP REPORT

BY TIM DAVIS



Astronomy Club of Tulsa: 163 members, including 22 new members in 2017.

Welcome to our new members this month: Dianne Palazzolo-Mann, Chad Canady, Jerry Farmer, Joy Pannell, Paul Cleary and Jeremy Benefield.

Club Accounts as of May 31, 2017:

Checking: 7,572.83; Savings: \$6,776.75; Investment accounts: \$21,528.16 (*Value Fluctuates with Market*)

The club now has PayPal available for you to start or renew memberships and subscriptions using your credit or debit cards. Fill out the registration form at <http://astrotulsa.com/page.aspx?pageid=16> Click **Submit** and you will be given the choice of either **mailing in your dues** with a check or using **PayPal** which accepts most major credit cards. A modest processing fee is added to PayPal transactions.

You may also renew your membership or join at one of our club events using your credit card by seeing one of our officers. We can take payments with the Square card reader. A small fee is also added on to these transactions.

ALSO NOTE: For our current members who are renewing their memberships, you can now go to a new link on the website to start your renewal process. On the home page, hover over the "Member" tab on the ribbon menu near the top of the page. Then select the "Membership Renewal" link and this will take to a page to fill out your information. Fill this out, submit it, then pay your dues by whatever method you choose.

NEWS NOTE: Both Sky & Telescope and Astronomy have free Digital subscriptions available with print subscriptions, or Digital subscriptions may be purchased separately. Contact their websites for details.

Membership rates for 2017 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.



National Aeronautics and
Space Administration



NASA Space Place

Educator Newsletter

May-June 2017 / Vol. 10, Issue 3

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!

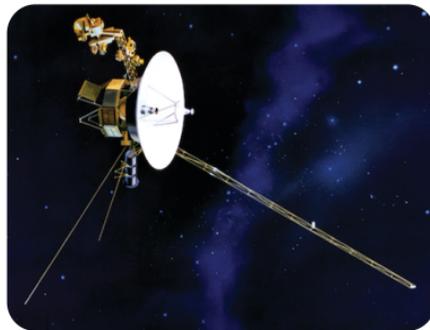
<http://spaceplace.nasa.gov/subscribe>

New!

Voyager 1 and 2: The Interstellar Mission

The Voyager 1 and 2 spacecraft launched from Earth in 1977. Their mission was to explore Jupiter and Saturn—and beyond to the outer planets of our solar system. Learn more:

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



New!

What is gravity?

Gravity is the force by which a planet or other body draws objects toward its center. The force of gravity keeps all of the planets in orbit around the sun. What else does gravity do? Go here to find out!

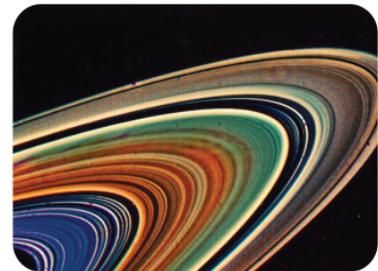
<https://spaceplace.nasa.gov/what-is-gravity>

Saturn's Rings

Saturn's rings are about 400,000 kilometers (240,000 miles) wide.

That's the distance from the Earth to the moon! They range from particles too tiny to see to "particles" the size of a bus. Scientists think they are icy snowballs or ice covered rocks. Learn more:

<https://spaceplace.nasa.gov/saturn-rings>



JunoQuest

Jupiter is the largest planet in our solar system. But, there is still a lot about this gas giant that we don't know. NASA's Juno spacecraft is currently helping scientists learn more. Play JunoQuest and help Juno take us a giant step forward in our understanding of how giant planets form and what part they play in putting together the rest of the solar system:

<https://spaceplace.nasa.gov/junoquest>

Explore Earth and space at spaceplace.nasa.gov

Summer Activities

Looking for fun, educational activities for the summer? Check out these links below:

Make Sun Paper:

Our sun is a burning ball of superheated gas. Even though it's 93 million miles (149.6 million kilometers) away, we can feel its heat and light on Earth. Make this marbled paper that looks just like our sun!

<https://spaceplace.nasa.gov/sun-paper>

Bake Sunspot Cookies:

Even when the sun appears to be shining as brightly as ever to us, it sometimes has some dark spots called sunspots. Learn more with this simple and delicious activity:

<https://spaceplace.nasa.gov/sunspot-cookies>



Make Ultraviolet Handprint Art:

In this activity, see how sunscreen can be used to block the sun's ultraviolet light rays.

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

Make a Pinwheel Galaxy:

The Pinwheel Galaxy is a spiral-shaped galaxy about 21 million light years away from Earth. Scientists call this swirling galaxy M101. Make a Pinwheel Galaxy pinwheel!

<https://spaceplace.nasa.gov/pinwheel-galaxy>

Special Days

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

May 5 — Alan Shepard became the first American in space on this day in 1961.

See more astronauts in action in our gallery:
<https://spaceplace.nasa.gov/gallery-technology>

May 6 — Today is peak viewing time for the Eta Aquarids meteor shower.

What's the difference between an asteroid and meteor?

<https://spaceplace.nasa.gov/asteroid-or-meteor>

May 26 — Astronaut Sally Ride was born on this day in 1951.

She was the first American woman to fly in space! Learn more:

<https://go.nasa.gov/2jtoYHo>

June 8 — Happy World Oceans Day!

Did you know that water covers 71% of Earth's surface, and 96.5% of it is salt water?

<https://spaceplace.nasa.gov/ocean-currents>

June 20 — Today is the first day of summer.

Why does Earth have seasons?

<https://spaceplace.nasa.gov/seasons>

June 22 — Pluto's moon Charon was discovered on this day in 1978.

Learn more about Pluto and its moons.

<https://spaceplace.nasa.gov/ice-dwarf>



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!



The Fizzy Seas of Titan

By Marcus Woo

With clouds, rain, seas, lakes and a nitrogen-filled atmosphere, Saturn's moon Titan appears to be one of the worlds most similar to Earth in the solar system. But it's still alien; its seas and lakes are full not of water but liquid methane and ethane.

At the temperatures and pressures found on Titan's surface, methane can evaporate and fall back down as rain, just like water on Earth. The methane rain flows into rivers and channels, filling lakes and seas.

Nitrogen makes up a larger portion of the atmosphere on Titan than on Earth. The gas also dissolves in methane, just like carbon dioxide in soda. And similar to when you shake an open soda bottle, disturbing a Titan lake can make the nitrogen bubble out.

But now it turns out the seas and lakes might be fizzier than previously thought. Researchers at NASA's Jet Propulsion Laboratory recently experimented with dissolved nitrogen in mixtures of liquid methane and ethane under a variety of temperatures and pressures that would exist on Titan. They measured how different conditions would trigger nitrogen bubbles. A fizzy lake, they found, would be a common sight.

On Titan, the liquid methane always contains dissolved nitrogen. So when it rains, a methane-nitrogen solution pours into the seas and lakes, either directly from rain or via stream runoff. But if the lake also contains some ethane—which doesn't dissolve nitrogen as well as methane does—mixing the liquids will force some of the nitrogen out of solution, and the lake will effervesce.

"It will be a big frothy mess," says Michael Malaska of JPL. "It's neat because it makes Earth look really boring by comparison."

Bubbles could also arise from a lake that contains more ethane than methane. The two will normally mix, but a less-dense layer of methane with dissolved nitrogen—from a gentle rain, for example—could settle on top of an ethane layer.

In this case, any disturbance—even a breeze—could mix the methane with dissolved nitrogen and the ethane below. The nitrogen would become less soluble and bubbles of gas would fizz out.

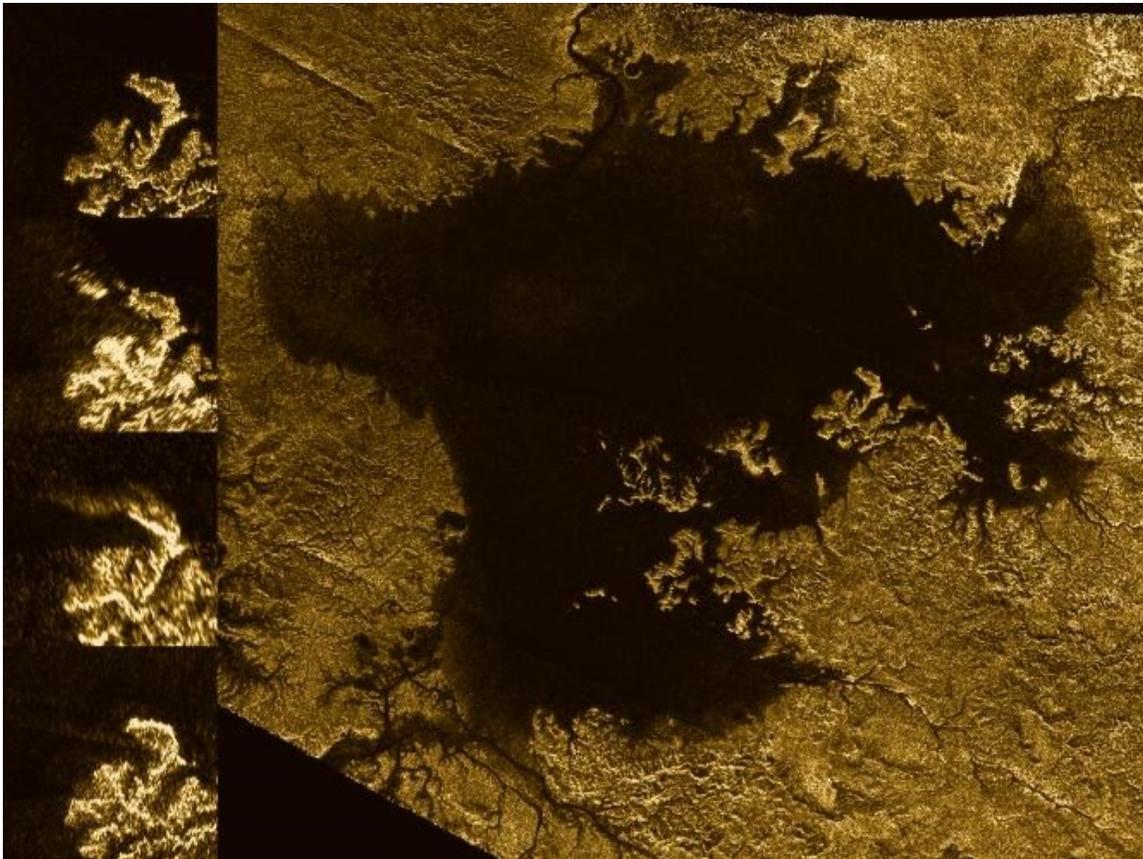
Heat, the researchers found, can also cause nitrogen to bubble out of solution while cold will coax more nitrogen to dissolve. As the seasons and climate change on Titan, the seas and lakes will inhale and exhale nitrogen.

But such warmth-induced bubbles could pose a challenge for future sea-faring spacecraft, which will have an energy source, and thus heat. "You may have this spacecraft sitting there, and it's just going to be fizzing the whole time," Malaska says. "That may actually be a problem for stability control or sampling."

Bubbles might also explain the so-called magic islands discovered by NASA's Cassini spacecraft in the last few years. Radar images revealed island-like features that appear and disappear over time. Scientists still aren't sure what the islands are, but nitrogen bubbles seem increasingly likely.

To know for sure, though, there will have to be a new mission. Cassini is entering its final phase, having finished its last flyby of Titan on April 21. Scientists are already sketching out potential spacecraft—maybe a buoy or even a submarine—to explore Titan's seas, bubbles and all.

To teach kids about the extreme conditions on Titan and other planets and moons, visit the NASA Space Place: <https://spaceplace.nasa.gov/planet-weather/>



Caption: Radar images from Cassini showed a strange island-like feature in one of Titan's hydrocarbon seas that appeared to change over time. One possible explanation for this 'magic island' is bubbles. Image credits: NASA/JPL-Caltech/ASI/Cornell

WHERE WE MEET

JENKS HS PLANETARIUM



**Our Club General meetings are held at the
Jenks Public Schools Planetarium
105 East B St, Jenks, OK**

When you enter the building lobby, take the elevator to the 3rd floor.

Meetings begin at 7:00 PM

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

We hope to see you there!

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MEMBERSHIP RATES FOR 2017 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 SUMMER TO JOIN
US AT A STAR PARTY!

OPEN TO THE PUBLIC

FOR MORE INFORMATION
PLEASE VISIT
WWW.ASTROTULSA.COM.

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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:

MARCUS WOO

NIGHT SKY NETWORK

JOHN LAND

KC LOBRECHT

JACK WELLS

BRAD YOUNG

RICHARD BRADY

TIM DAVIS

TAMARA GREEN



PHOTOS: Above, Evening stars over the observatory; Below: More Summer evening stars, both photos taken during the Summer of 2016 by Tamara Green.

