



Astronomy Club of Tulsa

OBSERVER

April 2007

<http://www.AstroTulsa.com>

ACT, Inc. has been meeting continuously since 1937 and was incorporated in 1986. It is a nonprofit, tax deductible organization dedicated to promoting, to the public, the art of viewing and the scientific aspect of astronomy.



What

The Astronomy Club of Tulsa Meeting

When

20 April 2007—7:00 PM

Where

Room M1 inside Keplinger Hall, the Science & Engineering Building at TU. Enter the parking lot on the East Side of Keplinger Hall from Harvard and 5th Street. This will take you directly toward the staircase to enter the building. Room M1 is the first room on the left.



President's Message

Tamara Green

Hello Everyone. This month's guest speaker is, well, you all! For our April meeting, we will be having a "Show N' Tell" meeting with a Go-To workshop. We were going to try and have this kind of meeting earlier in the year, but the winter weather messed things up and caused us to have to re-schedule two of our guest speakers.

This is an old tradition that we are attempting to revive, and all are invited to bring your favorite telescope or piece of equipment that maybe you got for Christmas or your birthday or anniversary or maybe you have a really cool item you've had for a while that you might want to bring to talk about and show off! Or maybe some of you have some really cool images you've taken that you've been itching to share with everyone!

We will also be having a workshop for Go-To users who want to learn all the in's and out's of Go-To's, so this will be informative as well as fun. The meeting will be at TU's Keplinger Hall, Room M1, on Friday, April 20th at 7:00 PM.

Our March star party was packed, with participants enjoying a beautiful sky, so I'm told. I was unable to attend this one due to cooking food to take to the Messier Marathon.

Our Messier Marathon at TUVa was absolutely glorious! We had over 20 participants, including a family new to Astronomy! The sky was great all night, and the temperatures were wonderful! No strong wind or biting cold this year! We couldn't have asked for better weather in my opinion. Once again, Ron and Maura were wonderful! Thank you Ron and Maura for being such warm and gracious hosts! At the end of the Marathon on that Sunday morning, there were 9 people who had their names and number of objects found on the board. Congratulations to

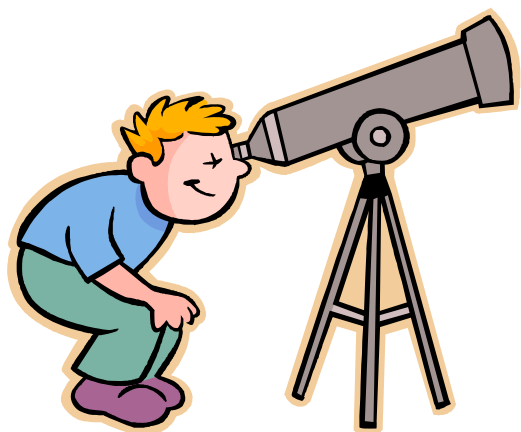
Steve Chapman and Tony White, who tied for First Place with 105 objects each. David Stine took Second with 103, Ann Bruun took Third with 102, Denny Mishler and John Land both took Fourth with 99 each, your humble President Herself came in a respectable Fifth Place with 91, (pretty dang good considering she only found 15 on her very first attempt at a marathon!) Bob Boston did really good, taking Sixth with 32, and Marcia Boston found 4 on her very first attempt! I have not heard what everyone else's count was. Congratulations to all! And thank you John for those really neat pictures, and thanks to David too for leading the caravan to TUVa. That was a Messier Marathon that nobody will forget!

Secretary Teresa Kincannon is trying to get together with the folks at Oxley to try and put together another public event for May. If we can get one put together, this will be another wonderful opportunity to get the public out and pique some people's interest in Astronomy. These are always fun as well, so hopefully we can get one together. And as always, the more volunteers with telescopes we have, the better! Also, we are starting to get some groups scheduled to come out to the observatory for group events, so volunteers will be needed for those too.

Don't forget our Star Party on Friday, April 13 at our observatory. Plan to arrive before dark, and if you do not bring a telescope, or if you are planning on leaving earlier in the night than most, you are more than welcome to park in the parking lot adjacent to the old AT&T building. Be sure to bring your own snacks and drinking water. We will have the coffee brewing.

I look forward to seeing you all there!

Clear Skies!
Tamara Green



MEETING/STAR PARTY

DATE	WHERE	WHO
Apr 20	Meeting at TU	Open
May11	Meeting at TU	Open
May 18	Star Party - RMCC 8:00PM	Member & Guest
Jun 15	Star Party - RMCC 8:00PM	Member & Guest
Jul 13	Star Party - RMCC 8:00PM	Member & Guest
Aug 10	Star Party - RMCC 8:00PM	Member & Guest
Sep 7	Star Party - RMCC 8:00PM	Member & Guest
Sep 21	Meeting at TU	Open
Oct 12	Star Party - RMCC 7:00PM	Member & Guest
Oct 26	Meeting at TU	Open
Nov 9	Star Party - RMCC 5:30PM	Member & Guest
Nov 16	Dinner Meeting	Open
Dec 7	Star Party - RMCC 5:30PM	Member & Guest
Dec 14	Meeting at TU	Open

Message from the Editor

This will be my last newsletter for the Astronomy Club of Tulsa. I am turning over this duty to the very capable Jerry Mullennix. Jerry will be bring a new and fresh look to the newsletter.

When I first joined the club in about 1962, the club had a newsletter that was done on a mimeograph machine. And sometime in the mid 60's I did a drawing of a proposed planetarium that was in the long-range planning of the city to build in the Arkansas River park area near the 23rd street bridge. This drawing was used for awhile on the masthead of the newsletter.

Server years later, in about 1980 or 1981, the newsletter had faded from existence. The monthly the club meeting was announced via a post card mailed each month. With the introduction of the PC computer and computer bulletin boards, and a vast amount of information that was available via the boards, I saw an opportunity to put together a newsletter each month and I volunteered. I had not learned to be careful of what you volunteer for yet! I took a sabbatical from the duties from August 1989 thru August 1990 when I lived in Wales UK. During that time Joel Fream did the newsletter duties. Once I returned, Joel continued to format the newsletter with information that I collect from the officers and other sources. After Joel's untimely death I started doing the newsletter layout as well.

The layout has gone from an 8.5x11 sheet printed on a dot matrix printer to pamphlet layout using MS Publisher to the layout we have today.

I want to thank Jerry for stepping up and volunteering for this job. (I do not think he has learned about volunteering yet! Don't tell him). So with that I turn this over to you Jerry for the next 25+ years.

Richie Shroff

Chasing the Shadow: The IOTA Occultation Observer's Manual

The International Occultation Timing Association (IOTA) has just released a new book on Occultations: "Chasing the Shadow: The IOTA Occultation Observer's Manual". Its free, online and ready for downloading.

Written by IOTA's most experienced astronomers, this is the only book you'll need for occultation observations by the Moon, by asteroids and other solar system bodies. It includes an extensive set of Appendices, and over 120 color figures and diagrams, 385 pages.

The book is available here: <http://www.poyntsource.com/IOTAManual/Preview.htm>

Richard Nugent
Editor, Author, Chasing the Shadow: The IOTA Occultation Observer's Manual
Executive Secretary
International Occultation Timing Association

Lunar Eclipse

By John Land

Here is a montage of three images I took at the eclipse.

Used a 5 inch Celestron telescope and afocal imaging – (just put the camera up to the eyepiece)
All the images are oriented the way the moon appeared to the eye.



DAVID'S ASTRO CORNER

By David Stine

This years Messier Marathon was one of the best if not the best marathon that we have ever had. There were between 30-40 people show up off and on and more competitors made it through the entire night than ever before. Many of us caravanned it to the site and guess what some fell behind and got lost. I won't say who that was, but they know. We finally got to Tuva and Bob Boston and his wife were already there and set up. The skies were really looking great and the temperature was unseasonably warm. People brought all kinds of food and beverages for the luncheon and we had more than anyone could eat. Everyone got set up and began planning their evening. Before we got into the real reason why we were there, TUVa member Gerald Miller talked about his trip to New Zealand and showed us pictures of the unbelievable southern hemisphere sky. Even Comet McNaught got lost in the blazing southern Milky Way. Gerald said the sky actually looked like the pictures with you're naked eye. You would have had to see the pictures to understand. Just amazing. John Land wanted to get a group picture of everyone and you can see his images at <http://astrotulsa.com> Click on GALLERY then TUVa Messier Marathon 2007. As it started getting darker observers were off to the starting blocks to catch the first Messier object of the night. Usually these two objects are the hardest but for many M77 and M74 turned out to be fairly easy objects. Unfortunately I was busy talking with others and didn't spend enough time to catch these two. The first M objects I found were M31, 32, 110 all around 8:40p.m. Everyone was on a fast past at this time. At 9:28p.m. we all remember about an Iridium Flare that was going to happen so we started spreading the word to take a break and look toward Polaris for this bright flare. At first no one saw anything but a very bright star below Polaris. That's unusual because there is no bright star in that area. We all began realizing that the bright star was the flare. It was the most unusual iridium flare I think I have ever seen. It just remained in the same position getting brighter and brighter. Then after it reached its peak brightness, it faded, never moving from the location. It will be one I will remember for a long time. After that we were back to the marathon logging object after object. We would take breaks and look through Ron's 24 inch Bart telescope at various objects. Bart stands for "Big Astronomical Reflector Telescope". Amazing views we saw through the scope. By 11:30p.m. I had logged 46 objects missing

only two objects so far. Most people at this time were taking breaks getting ready for the journey through the galaxies of Virgo. It took me approximately an hour and 42 minutes to get through this mess. But with patience and back and forth looking I finally made it. I took a break after that and watched Tony White and Steve Chapman make their journey through Virgo. I knew that both had seen the first two objects of the evening that I didn't catch so unless they were unable to come up with a few of the objects that I saw, they were going to win the most objects found for the night. Between 2:30-5:45a.m. I wandered through the Summer Objects, which were some of the best objects in the sky. I used binoculars for most of these objects. The Milky Way was a nice sight and many of these summer objects were visible with the naked eye. By 6a.m. it was going to be a race for time as it was dawn was fast approaching. It was amazing how many people were still competing and enjoying their selves. A lot of observers had long packed it in, but still in the race were Bob Boston, Denny Mishler, Tony White, Steve Chapman, Ann Bruun, John Land, Tamara Owens, and myself. I found my last object M2 a globular cluster which brought my nights total to 103. It was just too light to see M72, M73, M30, M55, M75, and I missed the first two. Was it enough to be the champion? That honor went to Tony White and Steve Chapman as they captured 105 objects only missing those last five that I did also. I found out from them and Rod Gallagher, 3 time consecutive champ, who just observed and didn't compete this year that the first two objects of the night were easy. I guess I just wasn't looking in the right place. When said and done 4 people had logged over 100 objects, which was a record for the TUVa Messier Marathon. Three more had 90 or more. In order the winner of the TUVa Messier Marathon David Stine Award was a tie, Tony White and Steve Chapman each found 105, then next was me at 103, third was Ann Bruun with 102, Denny Mishler had 99 and did it with only large binoculars, John Land his first marathon captured 99 also, and our club president Tamara Owens located 91. Bob Boston finished out the group with 32. Thanks to Ron and Maura for being such great host and opening up their excellent site and surrounding facilities. We couldn't have asked for a better night. The biggest obstacle was trying to keep awake and driving off the road on the trip back to Tulsa the next morning. I think next time that will have to be a re-

quirement, a two hour nap before driving home. If you missed it this year, plan on next year and we may even try another fall Messier Marathon in Oct.

Comet 2P Encke will be a binocular object in the evening twilight for a few days between now and the 20th of April. Start looking very low in the western sky as soon as it is dark enough to see some stars. It won't be up long so you will have to start your search early before it sets. You can access a chart for this time at <http://www.skyhound.com/sh/comets/2P.gif>

At the same time that Comet Encke will be too close to the Sun to observe in late April newly discovered Comet C/2007 E2(Lovejoy) will become visible in the early morning before dawn. The comet will be passing the Constellation Aquila between April 20th and April 25th, then pass by Lyra by the end of the month. At this time the comet may be just under naked eye visibility at 7th Mg. A chart for this comet can be found at http://www.skyhound.com/sh/comets/2007_E2.gif This comet has already been reported as having a small dust tail. By April 22 it will rise in Tulsa by 11:30P.M. and be in excellent viewing altitude of 40 degrees by 3a.m. passing by Aquila. Lovejoy is also being reported as very greenish blue in

color. The comet should be around 7.4MG. We have two comets to look forward to in April.

Lunar X came and went in March and Tulsa skies were too cloudy and blocked out our chance to see this amazing moon feature. We will have our next chance on May 24th. 0516UT is the expected time for the "X" to start forming according to Dana Thompson. Dana was lucky enough from his Ohio location to image the March event. See if you can locate the X in the image. Hopefully we will get our chance in May.

If you are planning your vacation and looking for ideas, how about the dark skies of New Mexico. One of our new club members, Mac Patton and his family spent a few nights at a place called Star Hill Inn recently and came away very impressed. The Patton family was recently at the Messier Marathon in TUVVA and told me about Star Hill. Here is Macs review of STAR HILL INN.

Star Hill Inn is located in Sapello, New Mexico about 10 or 12 miles away from Las Vegas(New Mexico not Nevada of course). It costs about \$200 a night, two night minimum.



LUNAR X Image taken March 26th, 2007 by Dana Thompson

As we arrived off of a little dirt road and continuously passing the place by about 3 times we came to a sign that said Star Hill private. We saw a gate that was open and pulled in only to be greeted by a library and an observatory dome. Right next to the library there is a deck with somewhat portable buildings. As we continued on the dirt road that lead through the middle of the place we saw many wild animals the most common being turkeys. When we looked to the left and to the right we saw cabins with name such as Cygnus. When we reached the end of the road we saw a nice two story house with a sign in the window that said office. So I got out of the truck and went up to the front porch and there was a dry erase board that said "Welcome Pattens" with the keys taped next to our name. It said cosmos was our cabin so we grabbed the keys and headed where we thought the cabin was. As it turned out some of the cabins are kind of like condos split in half. We entered our cabin after finally finding it. I was pleasantly surprised by how nicely it was furnished the only problem was which I didn't mind but my mom did is that there was no air conditioning. Also there wasn't any food in the fridge. Of course that's why Vegas was so close.

The first night it rained. The owner of the place, Phil Mahon, Said if it cleared up any time soon he would be more than happy to star our star tour. But of course it rained all night long.

The next day I went down to his library. What a place it had every sky and telescope from about '79 to the present and many years of astronomy mag. He also had many books many of which I had read and since then I have now purchased. He also had many movies and documentaries. That night it was gorgeous you couldn't have asked for better weather. For the star tour he used a 12 inch Meade LX 200. Their was another couple there they had rented an 18 inch star splitter dob from Phil. I guarantee you will probably need the star tour being that the sky is so dark. Phil was nice enough to let me use his scope after the star tour. I used long after everyone left.

My impression of the place was incredibly dark skies, a very knowledgeable staff, great scopes to rent if you didn't bring one, great library, pricey but worth every penny. If you want dark skies this is the place to go. Phil, the owner is a very nice trusting person. For More information go to www.starhillinn.com

Mac Patten

1. Lyrids - Our Spring Shower...

The Lyrids (LYR) are the meteor highlight for the month of April, and herald our spring season.

The Lyrid shower is the oldest meteor shower for which observations have been found. It was seen in ancient China over 2,000 years ago. According to the IMO Handbook, of the International Meteor Organization, the Lyrid meteoroid stream - the actual debris shed by its parent comet - is highly inclined in its orbit. This means that its path doesn't come near our solar system's planets, and hence is not disrupted by those planets' gravity. Because of this, although the stream is very old, it acts younger than its age. It has a short period of maximum activity, usually only hours long, and has higher density concentrations of material - clumps of debris - which can cause interesting outbursts of activity.

Do all meteor showers have comets as parents? No, but the Lyrids do. They are debris from Comet Thatcher, C/1861 G1. This comet was discovered by A.E. Thatcher of New York on April 5th, 1861, and independently by Baeker of Nauhen, Germany, with the unaided eye. It brightened to about magnitude 2.5 with a tail of about 1 degree in length. That means it was slightly fainter than the stars in the Big Dipper with a tail about 1/5 the distance between the pointer stars of the Dipper. It was determined that the orbit of the comet was elliptical, and that the comet returns to our area of the solar system about every 415 years.

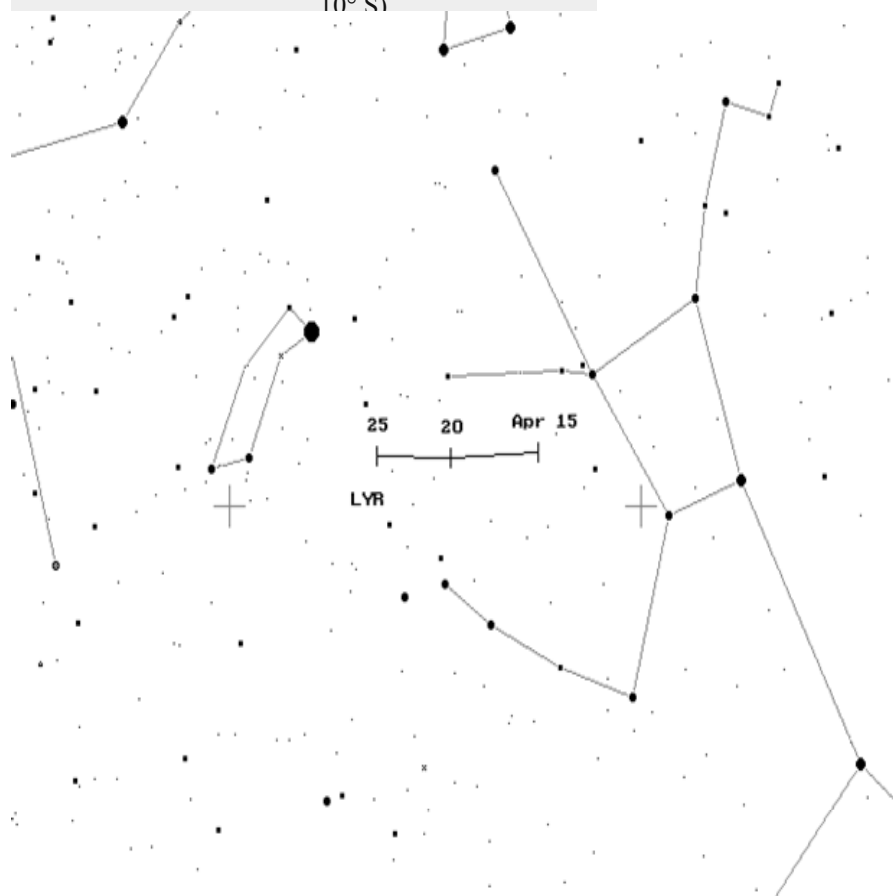
This year, the Lyrid meteors are predicted to reach their highest rates on April 22nd at about 22h30m UT, Universal Time in Greenwich, England. For east coast North American observers, this means about 6.30 pm EDT. However - the peak time can vary, and could occur anytime between 14h45m UT on the 22nd and 1h45m UT on the 23rd. For EDT, subtract 4 hours. Lyrids can be seen from about April 16th to the 25th.

They are average velocity meteors at about 49 km per second. ZHR rates on the 22nd are predicted to peak at about 18 meteors per hour. What is ZHR? ZHR refers to Zenithal Hourly Rate, and is the number of meteors that an observer would expect to see in an hour, if they are out under a dark country sky, and if the radiant, the area in the sky where the meteors seem to come from, is directly overhead. Occasional outbursts of activity have occurred in the past - up to 90 meteors per hour. Enhanced rates around the peak

time, where rates are at least half the peak rates, can last from about 15 hours (as in 1993) to 62 hours (as in 2000).

Where is the radiant for the Lyrids? It's in the constellation of Lyra the Lyre. In ancient mythology, the lyre was the musical instrument of Orpheus.

Active:	April 16 —25
Maximum:	April 22; 22h30m UT ($\lambda = 32^{\circ}32'$; but may vary — see text)
ZHR =	18 (can be variable - up to 90)
Radiant:	$\alpha = 271^{\circ}$; $\delta = +34^{\circ}$
Radiant drift:	see Table 6
$v_{\infty} =$	49 km/s
$r =$	2.1
TFC:	$\alpha = 262^{\circ}$; $\delta = +16^{\circ}$ and $\alpha = 282^{\circ}$; $\delta = +19^{\circ}$ ($\beta > 10^{\circ}$ S)



1st INTERNATIONAL SIDEWALK ASTRONOMY NIGHT MAY 19, 2007 We'd like to invite all amateur astronomers to take their telescopes out to the sidewalk on the evening of May 19th. We know that many amateurs have commitments with local observatories, planetariums, libraries, etc on the Saturday evening near first quarter Moon, but if you can spare some of your members, it would be great if they could find places where people AREN'T expecting to look through a scope. Most outreach is focused around people who already know they want to see the night sky. That's why they are at an observatory or planetarium. We need to give people who may not even know they are interested in astronomy exposure to the night sky. It is so important that "amateurs take telescopes to the people" (John Dobson). The truth is most people aren't at the observatory; most people are out having dinner, going to the movies, and shopping. Sidewalk Astronomy does not have to be a large, highly coordinated event. It's very simple - grab a scope and go stand on the corner, in front of the movie theater, next to a convenience store, near a subway or busy bus stop, by a book store - anywhere there are large numbers of people walking by. One or two scopes at

any given location is more than enough. You all know that you don't need a huge scope to look at the Moon, so take your smaller scopes out. Many times, individuals and clubs contact us asking about how to do sidewalk astronomy. They usually are trying to get several members out at the same location, they want to promote it with local media, they worry about permits, they want to know what information they should give people - all kinds of questions. It doesn't have to be that difficult. Find somewhere near where you live, grab a scope and go. We will post on our website who is going out on the night of May 19th. We don't need to have an exact location yet, but you do need to send contact information that you don't mind being posted on the internet. Later, when you have exact locations, we will post them, along with minimum times you expect to be out. If

you have the exact location already, that is fine to. On the evening of May 19th, we encourage you to take a few photos when it doesn't disrupt observing and to try to keep some kind of count of the number of people that look through your scopes. If you have more than one scope at a location, please only count the people once. We'd like to get an idea of how many people we reach. Afterwards, for those who send us photos and/or summaries of their activity that night, we will be sending them a founders button of some kind (I could use someone to design that..) and we will possibly be putting together a commemorative booklet of the event for John. In a couple of weeks, I will have some flyers on our website (www.sidewalkastronomers.us) that can be copied and handed out or you can use your own information, just please put our website on anything you give out that night. Thank you, Katy Haugland Vice President Sidewalk Astronomers.

That's it from my corner in April, keep your eyes skyward and I will see you next month.

David Stine
Comet - 1



Summer Star Parties And Vacation Events

There are many opportunities this summer to observe and share experiences with other amateur astronomers around the country. Since many of you have to plan early for vacation time, here are a few to consider. REMEMBER THERE ARE USUALLY DISCOUNTS TO REGISTER EARLY.

Midstate's Regional Astronomy Convention -- June 8 & 9, 2007 Hosted by the Omaha, Nebraska club this event draws veteran and novice astronomers from all over the central region of the country. <http://www.omahaastro.com/MSRAL2007.html>

Heart of America Star Party - June 12 to 17 Held in a private astronomy preserve in west central Missouri. This event is sponsored by the Kansas City club. <http://www.omahaastro.com/MSRAL2007.html>

Green Bank Star Quest - July 4 to 7 Held on the grounds of Green Bank Radio observatory in West Virginia. This is billed as the largest optical and radio astronomy star party in the nation. Details at www.greenbankstarquest.org Note: this event is 3 days after full moon to 3rd quarter.

Nebraska Star Party July 15 to 20 This star party has events for the whole family. Held at a state park with fishing boating and star gazing. There are special classes and events for beginner and novice stargazers as well as plenty of dark skies for veteran observers. www.nebraskastarparty.org

OkieTex Star party - Oct 6 to Oct 14 This event is held in the tip of the Oklahoma Panhandle under some of the darkest skies in America. Many of our Tulsa area members attend this event. www.okie-tex.com

Tulsa area events: Our Tulsa club will also be having monthly star parties at the observatory during the summer. Plus many members get together at other times to do some serious observing. Club Star Parties are scheduled May 18, June 15, July 13 and Aug 10 Other events may be announced as they develop.

PDF 2006 Club Finance Report
goes here

Lands Tidbits

by John Land

Welcome Recent New Members: Jelena Susic, Connie Swan, Daniel Yaws, Linda Loffer, Fred Morgan, Julie Moeller

DON'T LET YOUR MEMBERSHIP or Subscriptions LAPSE!! Check your MAILING LABEL for membership expiration date. Those receiving Email should get a reminder when your membership is up for renewal or you may contact John Land. You may also renew magazine subscriptions through the club for substantial discounts.

Magazine subscriptions Renewals: Several of you may be receiving renewal notices for you Astronomy or Sky & Telescope. If you renew through the club you get a substantial discount. Go to the website and fill out the renewal form then print it off and mail it in with your notice and envelope from the magazine. Or you may fill out and mail in the form below.

GUEST SIGN IN SECTION on the Website is already bringing the club new contacts for potential new members.

Changing EMAIL - When you change your email or mailing address be sure to send me the new information so I can update the club records. You can use the Join feature on the club web page to make changes.

ON LINE Club Memberships and Renewals:

Adults - \$ 35 per year includes Astronomical League Membership
 Sr. Adult discount \$25 per year for those over 65 includes Astronomical League Membership
 Students \$ 15 without League membership.
 Students \$ 20 with League membership.

We now have an automated on line registration form on the website for new AND renewal memberships plus magazine subscriptions. You simply type in your information and hit send to submit the information. <http://www.astrotulsa.com/Club/join.asp> You can then print a copy of the form and mail in your check.

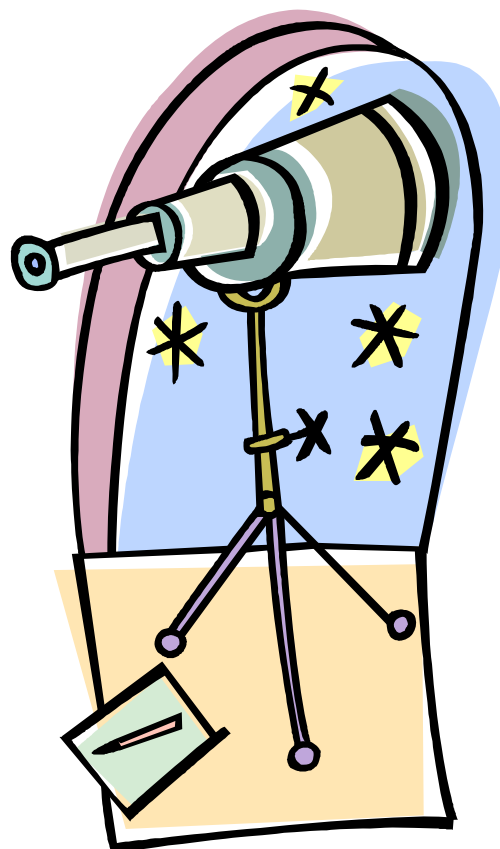
Astronomy Club of Tulsa
25209 E 62nd St
Broken Arrow, OK 74014

Magazine Subscriptions: If your magazines are coming up for renewal, try to save the mailing label or renewal form you get in the mail. Do NOT mail renewals back to the magazine! To get the club discount you must go through the club group rate.

Astronomy is \$ 34 for 1 year or \$ 60 for 2 years. www.astronomy.com

Sky & Telescope is \$33 / yr www.skyandtelescope.com Sky and Telescope also offers a 10% discount on their products.

Address Corrections- Email changes - Questions: You may forward questions to the club call our message line at 918-688-MARS (6277) Or go to the club website and Fill out an online form or just click on John Land and send an email. Please leave a clear subject line and message with your name, phone number, your question - along with address or email





<http://AstroTulsa.com>

Club Logo Merchandise



Items bearing the club logo can now be purchased at our online store:

<http://www.cafepress.com/astrotulsa>

A portion of each sale goes to the club's general fund. It's a great way to promote and support ACT!

Astronomy Club of Tulsa membership (\$35/year) includes membership in the Astronomical League and subscription to ACT's "Observer" and AL's "Reflector". "Astronomy" (\$34/year) and "Sky and Telescope" (\$33/year) are also available through the club. For more information contact John Land at 918.357.1759. Permission is hereby granted to reprint from this publication provided credit is given to the original author and the Astronomy Club of Tulsa Observer is identified as the source.

OFFICERS

President:

Tamara Green
918.851.1213

Vice-President:

Tom McDonough
918.665.1853

Treasure:

John Land
918.357.1759

Secretary:

Teresa Kincannon
918.637.1477

BOARD MEMBERS AT LARGE

Steve Chapman
Craig Davis
Rod Gallagher
Richard Alford
Owen Green
Jim Miller
Denny Mishler
Tony White
Jerry Mullennix

APPOINTED STAFF

RMCC Observatory Director:

Teresa Kincannon—918.637.1477

RMCC Facility Manager:

Craig Davis—918.252.1781

Membership Chairman:

John Land—918.357.1759

Observing Chairman:

David Stine—918.834.1310

New Members:

Denny Mishler—918.274.4772

Newsletter Editor:

Richie Shroff—918.835.3565

Webmaster:

Tom McDonough—918.665.1853

Astronomy Club of Tulsa

918.688.MARS (6277)

<http://www.AstroTulsa.com>

ASTRONOMY CLUB OF TULSA
P.O. BOX 470611
TULSA OK 74147-0611