ASTRONOMY CLUB
88 Yrs
OF TULSA

OBSERVER

DECEMBER 2025

Bringing Stars to the eyes of Tulsa

since 1937 *Editor – John Land*

Star forming regions Sharpless 2- 254, 255 & 257 in Orion's club
By Liam Yanulis - 3 hrs. 54 mins stacked

Taken with his taken with an Apertura 6" f/9 Ritchey-Chretien telescope, ASI533MC Pro camera, on a Sky-Watcher HEQ5 mount:

This image shows a complex of H II regions located approximately 8,000 light years away in the Perseus Arm of our galaxy. It is sometimes referred to as the Mushroom Nebula.
The largest at top is Sh2-254, middle is Sh2-257 and bottom is Sh2-255
The smaller region in the center is Sh2-256

Astronomy Club of Tulsa Welcomes its 2026 Officers and Board Members

Officers

President – Jonathan Fussell, Secretary – Skip Whitehurst, Treasurer – Cathy Grounds

Board Members

Don Bradford, Gibson Brasel, Scott Bratt, Jerry Cassity,
Bryan Kyle, John Land, Jack Reeder, James Taggart, Liam Yanulis

Earliest Sunset - Dec. 7th – 5:07 PM Latest Sunrise - Jan 4th 7:33 AM
Winter Solstice – Dec 21st Shortest day Dec 21 - 9 hrs. 42 mins

PUBLIC TELESCOPE VIEWING EVENTS

Volunteers needed to share your love of the stars

Hunter Park Saturday Nov. 29th
5:00 PM to until park closing time – Approx 9:30
5804 E 91st St, Tulsa between Yale & Sheridan

See event details and directions at https://www.astrotulsa.com/events

Stargazing Nights and Observatory Nights

Our GUESTS & Members nights are open to anyone. We do ask guests to try to RSVP.
Large groups need to make separate arrangements.

Members Only Nights are Open to members and their family
Details, Times and Direction Maps are posted on our Website
https://www.astrotulsa.com/events

Guest and member Observatory nights

Come enjoy an evening of star gazing at our observatory located in darker rural skies.

See details and directions on our Website Events Page

Guests are requested to RSVP

Saturday Dec 13 - 4:30 PM Guest & Members Observatory Night
Saturday Jan 10 - 4:45 PM Guest & Members Observatory Night
Saturday Feb 7 - 5:15 PM Guest & Members Observatory Night

Astronomy Club Members Nights

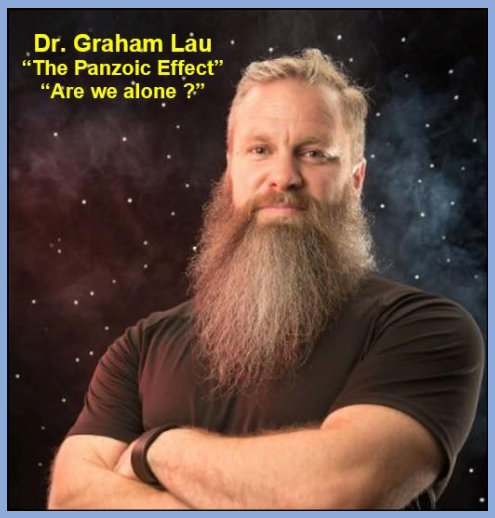
Our members are invited to come work on their observing goals, do some Astro imaging and share ideas.

Saturday Nov 22 - 4:30 PM Members Observatory Night
Saturday Dec 20 - 4:30 PM Members Observatory Night
Friday Jan 16 - 4:45 PM Members Observatory Night

If a Friday event must be cancelled due to weather, we will try on Saturday at the same time
- Always check the website for event updates

See full Event details and directions at https://www.astrotulsa.com/events

CHANGE NOTICE: Due to a scheduling conflict, we have changed our December club meeting DATE and Location



Join us on Saturday, December 6th at 2:00 PM at the Zarrow Regional Library 2224 W 51st St. in Tulsa
If parking is full there is extra space across the street at Carbondale Assembly of God church

Dr. Graham Lau presents "The Panzoic Effect," an exploration of Earth's deep history, the evolution of life, and what it all means for our search for life beyond our planet.

Dr. Graham Lau is a renowned astrobiologist, geomicro-biologist, and gifted science communicator dedicated to sharing the wonders of space and life's origins with audiences around the world. Many may recognize him as the host of "Ask an Astrobiologist," the NASA-sponsored talk show that connects the public with scientists exploring one of humanity's biggest questions

— are we alone in the universe?

Beyond the screen, Dr. Lau has worked tirelessly to make science engaging and accessible through public lectures, museum exhibits, blogs, and educational outreach. His enthusiasm for sharing knowledge has inspired countless people of all ages to explore the frontiers of space and the natural sciences."

Required Library Disclaimer

This event is not affiliated in any way with the Tulsa City-County Library.
The Library neither sponsors nor endorses this event, the speaker(s) or the organization.

Salutations, and Happy Holidays to all!

November was a lively month for our club, beginning with our annual Club Banquet—what a night! Thank you to everyone who helped plan, prepare, and make the evening so memorable. We enjoyed an inspiring talk from Mr. Eugene Harris about his work with Solid Foundation Preparatory Academy, and we had a wonderful time with games that brought plenty of laughs. With special honors given to two outstanding individuals this year: Mr. John Land, who was awarded a Lifetime Membership for his decades of dedication and service to the club, and Mr. Dan Zielinski, whose time, talent, and partnership with the Jenks Planetarium continue to make our monthly meetings a truly immersive experience for all who attend.

The biggest surprise of the night came from Mr. Connor Mathis, who presented the club with a generous $1,000 donation through the Caitlyn's Way Foundation. I want to extend my sincere thanks once again for this contribution. These funds will directly support the club's mission of education and outreach.

In the spirit of transparency, I'd also like to keep our membership informed as upgrades to the observatory dome begin to take shape. While we are still in the early stages, the first piece of hardware has officially been ordered, and testing will begin soon. This new addition—a ZWO ASI294MC color camera—will allow visitors to enjoy stunning live views of nebulae, galaxies, and popular Messier objects during guest nights.

Speaking of outreach, this month's Guest Night was a tremendous success! Several large families joined us, and the excitement was high—no doubt influenced by the incredible aurora activity we experienced earlier in the month. On the evening of November 11th, I received texts, emails, and calls from across Oklahoma, Arkansas, and Kansas as a Kp index of 9 lit up much of the Midwest. It was a rare and unforgettable night for skywatchers everywhere.

Lastly, I'd like to extend a warm welcome to our newest members who joined in November: Summer Lamborn and Walter Parish. We're thrilled to have you both with us as we head into 2026.

I truly believe that 2026 will be a hallmark year for our club as we approach our 90th anniversary in 2027. With dome upgrades underway, new outreach opportunities on the horizon, and a soon-to-be formalized social media presence, I'm confident we will continue to live out our motto and "bring the stars to the eyes of Tulsa."

Clear skies and Happy Holidays,
Jonathan Fussell - President

Astronomy Club of Tulsa

"Bringing Stars to the Eyes of Tulsa since 1937"

Download your own copy of picture > [2025 Astronomy Club Photo]

Our November 1st club dinner was a great time of fellowship with our members and their family. We'd like to extend a big "Thank You" to Cathy Grounds for arranging the catering from Oklahoma Joes and all the table setting up. Cathy would like to extend a "*Thank you to everyone who helped with our annual dinner on Nov. 1st , especially Tamara Green and Marilyn Leamon who headed up the front table. Thank you to all the board members who showed up early to set up and everyone who helped serve. The dinner was a great success, and we had a record number of people attending. Nothing beats good food and great company!*"

Jonathan extended a Thank You to Dan Zielinski for all his generous support for our club. The board extended a Lifetime membership to John Land for his years of dedication to the club. Member Aliosha Hand presented the club with a framed newsletter front page of the Apollo 13 moon landing. Mr. Connor Mathis, who presented the club with a generous $1,000 donation through the Caitlyn's Way Foundation.


THE CINCINNATI ENQUIRER

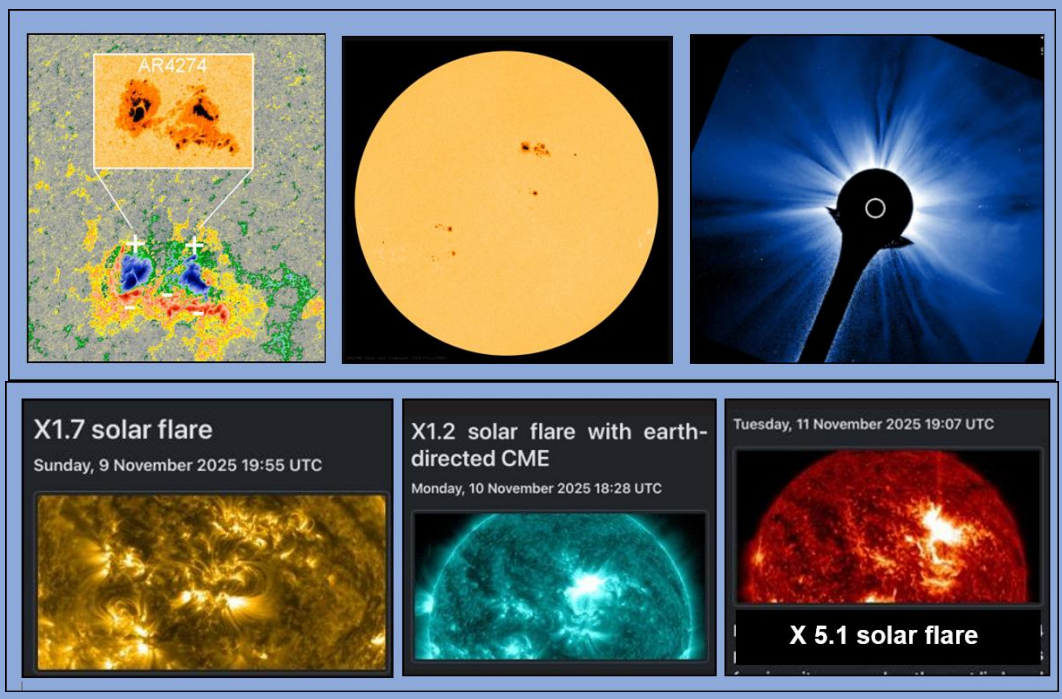
FOOTSTEPS ON MOON!

Amazing Aurora Display of November 11-12, 2025

On the evening of Veterans Day Nov. 11, the first of three strong solar storms hammered the Earth. Two Coronal Mass Ejections arrived closely together and streamed down into the upper atmosphere following the line of the Earth's magnetic field. Aurora displays lite up the sky as far south as Florida and beyond. The northern sky glowed with red and pink colors visible even through thin clouds here in Tulsa. Some of our members even saw them from central Tulsa and my friend saw them from his yard in Plano, TX.

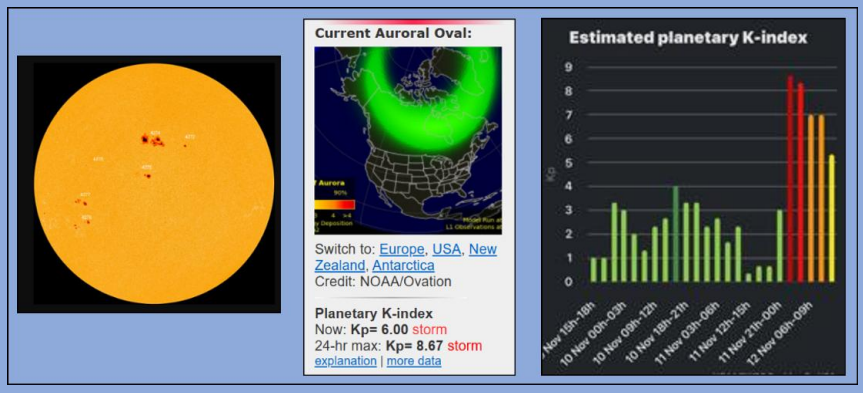
Scott Bratt sends these images taken near Prue N of Keystone Lake
Scott also has made a YouTube Aurora video of more images

A very active sunspot region AR 4274 had a complex twisted magnetic field that had be crackling with solar flares for many days. As it rotated near the center of the sun any CMEs would be Earth directed. You can explore the history of all this activity but exploring the pages of https://spaceweather.com/ There were almost daily updates of images and data analysis from Nov. 5th all the way to Nov. 19th It will be back on the front side of the Sun around Dec 1st If it is still active things might get interesting



Typically, it takes 24 to 36 hours for the blast from a CME to reach Earth. Fast moving ones may arrive within 18 hrs. The aurora displays of Nov. 11-12 resulted when the CMEs from the X1.7 and X1.2 arrived almost together keeping the sky active for hours.

https://spaceweather.com/ is a good website to check daily to see what the Sun is doing. It has a labeled image of the sunspot activity and a column showing the aurora regions and other solar data. It also features updates on current comets and interesting atmospheric phenomena. People from all over world contribute images to their photo gallery. Note: the times below are UT which is 6 hrs. ahead of Tulsa time.



Look for data in current aurora section. If a storm is indicated click on the *"More Data"* link to bring up a graph of the Kp Index. For aurora to be possible in Oklahoma the activity needs to be in upper RED ZONES. Kp Index only shows a 3-hour average and tops out at 9. A few months ago, I discovered https://www.spaceweatherlive.com/

Which has much more timely and extensive data on solar activity. They also have SpaceWeatherLive app which I can set to give me notifications of strong X-class solar flares. While exploring my app I discovered a much more timely presentation of aurora activity called the Solar Hp 30 Index (Do a search for that) and click on the one that says GFZ or just go to https://kp.gfz.de/en/hp30-hp60 It's the German site for Helmholtz Center for Geosciences. The Solar Hp 30 Index displays readings every 30 minutes and does not max out at 9. As you can see from comparing the Kp Index and the Hp 30 index graphs above the Hp 30 shows a much better representation of how the activity ebbed and flowed. It also shows that it peaked above 9. You can also explore activity for earlier dates. Just for curiosity I pulled up the grand aurora of May 10, 2024 that was visible deep into tropical latitudes. That one reached Hp 30 levels as high as 11 !

The X 5.1 solar flare of Nov. 11 hurled a fusillade of energetic protons toward Earth. Some of the particles were so powerful, they penetrated the atmosphere all the way to the ground. "Neutron monitors around the world are detecting it." Professor Clive Dyer of the Surrey Space Centre says this is called a Ground Level Event (GLE). GLEs of this magnitude are rare; they happen only once or twice every solar cycle. The WWV shortwave atomic time signals were disrupted. One person reported his robotic GPS mower went berserk and chewed up some of his flowers. And my antenna TV wouldn't pick up signals for a few hours.

Watch Aurora Display from ISS Space Station

We have had several successful outreach events this fall. Scott and Kit Bratt did an interview on Ch 2 news about the Comet 3i ATLAS and Kit added an invitation for people to visit the observatory. We had a good turn out of guests for our Nov 15 Guest Observatory Night.

Cathy Grounds brought her antique 4-inch f/15 refractor telescope with its unique brass eyepieces to our October Case Community Center Night

Thirty odd years ago I received this antique telescope as a final gift from my father, who received it from his grandfather. The brass tag reads "Dollond London", Dolland was a prominent telescope maker in England during the 1800's. As the original John Dollond died in 1771, the scope was likely made by the next gen Dollond Company sometime around 1850. The objective lense is a ground glass achromatic lense (which corrected color and spherical aberration), a major advancement for its time. Growing up I remember being thrilled to see Jupiter and Saturn through this scope and had fun setting it up in the backyard on summer nights. These days, I have fun bringing it to the club's public events for new generations to enjoy.

Click on these images to links on the Internet

ASTRONOMY TOOLS

Tulsa National Weather Service

GOT A NEW TELESCOPE? **Here are some sites to help you get started with you telescope.**

Getting Started with Your New Telescope
https://skyandtelescope.org/astronomy-news/getting-started-with-your-new-telescope-2/

Astronomy for Beginners | Night Sky Facts, FAQs & Resources
https://skyandtelescope.org/astronomy-information/

What to Know Before Buying a Telescope
https://skyandtelescope.org/astronomy-news/what-to-know-before-buying-a-telescope/

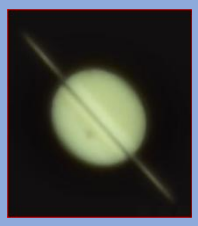
See Website Observation Station for a collection of Interactive Sky Watching Tools
Moon phases - Sun rise & Set - Make your own custom interactive sky chart and more
Great website for printable Finder Charts of Solar System objects https://in-the-sky.org/

Moon Phases - Full Thurs Dec 4 - 3rd Q Thurs Dec 11 - New Fri Dec 19 - 1st Q Sat Dec 27

Lunar conjunctions – Saturn & Neptune - Sat Nov 29 - Jupiter - Dec 6 & 7

Another Full "Super Moon" Weds Thurs Dec 6

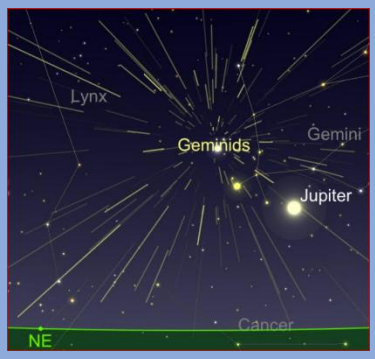
The popular term Super Moon is applied hen the full moon occurs within a day or so of the Moon's Perigee (Closest to Earth) Thus the moon will appear slightly larger and brighter. These images show the difference in the moon's apparent size at perigee and apogee. Since the Full Moon rises at sunset its proximity to the horizon makes it appear especially large. Moon's distance on Dec 04 is 221,965 miles



Planets - Saturn and Neptune are still close together in western Pisces and visible until about midnight. We are once again viewing Saturn's rings edge on. Scott Bratt shares his image of Saturn with its moon Enceladus transiting in front. Noted planetary imager Christopher Go took an astounding image on November 20, 2025 Uranus was at opposition on Nov 21 lying between Pleiades and Hyades clusters in Taurus. It is a fairly easy target in binoculars or small telescopes. Its disc shape and greenish hue can be seen at about 100X.

Jupiter returns to evening sky rising about 7:30 PM. It will reach opposition Jan 10th Observe it on several nights and sketch the arrangement of it four brightest moons as they dance around the planet. To challenge yourself try to catch the shadow of a moon transiting its surface. Another interesting challenge is to time the eclipses of its moons as they pass into or out of its shadow. As the Voyager spacecraft were flying out toward Jupiter, myself and many other amateur astronomers, carefully timed these events using the WWV shortwave time signals. Sky & Telescope compiled these timings which NASA used to refine the moon's orbits in preparation for the spacecraft arrival. Try this interactive Jupiter Moon Calculator or handy JupiterMoons App

Before there were accurate clocks, published tables of Jupiter moon eclipses were used to more accurately establish time. Knowing the accurate time was essential to measuring the longitude of a location. While carefully observing the times of Jupiter moon eclipses, Danish astronomer Ole Romer noted that they arrived a bit earlier than predictions when Earth was Jupiter and later as it receded. He noted that the accumulated time difference was about 16 minutes. From that he correctly deduced that Light had a Finite Speed reasoning that it took the 16 minutes for light to cross from one side of Earth's orbit to the other.



The Geminid Meteor Shower peaks on the night Sat Dec 13-14
Which is also our Members and Guest Observatory Night ! !

The Geminid shower is the strongest shower of winter producing up to 120 meteors per hour in dark skies. Even in moderately dark suburban sky one will likely see a few dozen. The radiant will be easy to find this year as the bright planet Jupiter is also in Gemini which rises in the NE about 7:30 PM. Unlike most other meteor showers, the Geminids are not associated with a comet but with the asteroid 3200 Phaethon. The asteroid takes about 1.4 years to orbit the Sun.

Patience is the key to observing meteors (aka "shooting stars") Find a nice lawn chair and wrap up well for the cold. Face toward the NE or East and look overhead. If you are with friends, choose different sections of the sky to observe. Use ONLY your eyes to scan the sky. Take a tablet and PENCIL (pens work poorly in the cold) and a dim red light. Write down the time you start and divide your tablet into 10-minute intervals. Make a tally mark each time you see a meteor. Plan to observe a minimum of 30 mins - an hour or more - is better. Take a break when you need to but avoid bright lights. You may wait several minutes without a sighting, or you may see 2 or 3 closely together. Make notes of particularly bright ones especially if they leave a persistent smoke trail. If you want to try photographing them. Place a firmly mounted camera on a tripod and take a series of 1-minute photos with a wide-angle lens.

You might want to explore earning the Meteor Observers Certificate from the Astronomical League Learn more at https://www.timeanddate.com/astronomy/meteor-shower/geminids.html

December COMETS

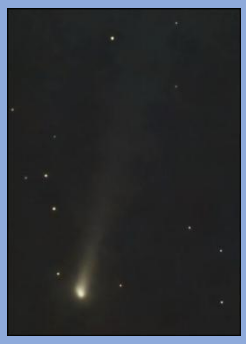
Website of latest comet data - https://astro.vanbuitenen.nl/comets

There are several comets withing range of medium sized telescopes and a few more accessible with these new Smart imaging telescopes.

The interstellar Comet 3i ATLAS has been at the top of SPACE NEWS coverage. Our own Scott Bratt got this image on Nov 10 with his SeeStar S50 smart imaging telescope.

It was at perihelion on Oct 29 but unfortunately on the opposite side the Sun. However, several Solar spacecraft that observe the sun's corona did manage to extract images of its location. The CCOR-1 coronagraph onboard NOAA's GOES-19 satellite was tracking the comet and monitoring its brightness near perihelion. It is now in the predawn sky and many amateur astronomers are contributing images.

A great image from Nov 20 clearly shows it comet tail and also explains its sunward pointing jet. It passed closest to MARS on Oct 2 and several Mars orbiting satellites got images of it. Due to the gov't shutdown these were not released until Nov. 19th . NASA had a LIVE announcement of the images on Nov 19. It was rather disappointing. They did a lot of talking but only released two images we hadn't already seen. Supposedly better images will be posted once they are fully processed and analyzed.



Comet C/2025 K1 has been another interesting morning comet. It's nicknamed the "Golden Comet" because of its coma appears brownish colored. It appears to have much lower levels of diatomic carbon (C2), and carbon monoxide (CO+) which give most comets a greenish hue. Recent images show that it is breaking up following its Oct 8 perihelion passage. Scott Bratt took this SeeStar S50 image on Nov. 5th which illustrates its brownish hue

Comet C/2025 A6 (Lemmon) and C/2025 R2 (SWAN) are still visible in the evening sky as they recede back into deep space.

Observing Chairman Brad Young

Beware of Space Lasers

"You know, I have one simple request, and that is to have sharks with frickin' laser beams attached to their heads". *Dr. Evil, Austin Powers: International Man of Mystery*

I don't like to be an alarmist, but we have a situation like something I thought was like a crazy conspiracy theory postulated by a lady Representative from Georgia with a fondness for shooting things. If you are lucky enough not to know what I'm talking about:

"In 2018 a prominent Georgia Congresswoman took to social media to share her suspicions that the California wildfires were started by 'space solar generators' which were funded by powerful, mysterious backers. Instantly, thousands of people rallied around her, blaming the fires on 'Jewish space lasers' and, ultimately, the Rothschild family." *Jewish space lasers: the Rothschilds and 200 years of conspiracy theories, Mike Rothschild (2023)*

Who could have thought that would ever come to fruition. We are all aware of the Starlinks and other mega constellation satellites that have been and are continuing to be launched. If you've been outside at night or taken an image, you've almost certainly seen them or had trails across your image from them. The unfortunate news of course is that they are continuing to add not only to the Starlink fleet, but several other fleets from both private companies and governments like China. This, to me, was bad enough and came up at least for me as a surprise when it began. I had no idea that many satellites had been licensed to fly or that other entities would join the fray. All of that will seem like a lone cloud in the sky if either of two other ideas, now being commercially developed, are able to achieve their goals.

One is the use of space to bring solar power to Earth by reflecting the sun's rays down to receiving stations, therefore concentrating the power derived from the system. Briefly, this sort of technology would use the same type of system that unfurled the heat shield on the James Webb Space Telescope. However, the solar reflectors would be much larger and would present a very bright object indeed in the sky.

These satellites would have to orbit in sun synchronous orbit, so that they would only be affecting the night sky on certain passes near the sunset or sunrise line to reflect the sunlight when it is available. However, especially in summer at mid-latitudes, they would be able to reflect sunlight deep into the night and early in the morning and would appear for several hours at every interval of the constellation, crossing the sky as a bright object possibly rivaling the Moon. There are two companies currently commercially developing this technology and both are at the point where there is a real possibility of launch.

Even more chilling [pun intended] is the idea of injecting aerosols into the upper atmosphere to mitigate carbon dioxide and possibly refreeze the polar ice caps. This too is being seriously developed, led by the Applied Physics Department at Harvard, and would have a devastating effect on ground astronomy across the world. All nighttime skies would be always hindered, and the daytime sky would forever appear as the milky white that we have our most humid days in the summer with terrible transparency rivaling some of our most polluted cities.

https://www.popularmechanics.com/science/environment/a41281408/stratospheric-aerosol-injections-refreeze-polar-ice/

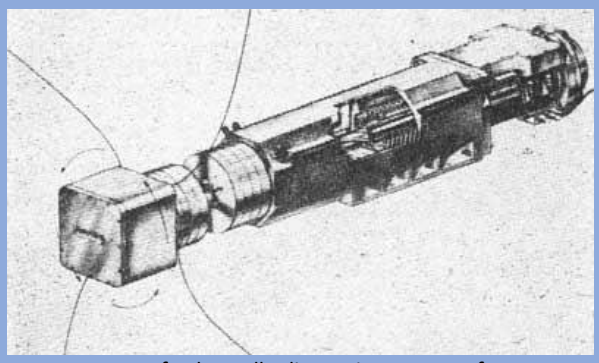
I can't understand how either one of these ideas is being allowed. But they had been previously predicted in several books including “The Next 100 Years: A Forecast for the Future” by George Friedman. Friedman wrote in 2009 that by 2080 solar power from space would be a major source of energy. He quotes a 2007 Defense Department study that makes the case that the technology exists, has been fundamentally available for decades, and will be necessary soon. Worst of all, that study prefers geosynchronous orbits for the solar collectors, so that they can continuously beam energy down day and night. Obviously, having highly reflective solar collectors like these, constantly sunlit throughout the night, would be a devastating blow to ground based astronomy. If there is any good news in the current plans, it is that the collectors would be low earth orbit and not interfere all night every night.

“No, I expect you to die, Mr. Bond” – *Auric Goldfinger, “Goldfinger”*

Even as far back as in 1941, science fiction writer (one of my favorites) Isaac Asimov published the science fiction short story "Reason", in which a space station transmits energy collected from the Sun to various planets using microwave beams. The SBSP concept, originally known as satellite solar-power system (SSPS), was first described in November 1968 by Peter Glaser in *"Power from the Sun: Its Future", in the journal Science. Although the source of transmitted power was patented to be microwaves, the collectors will still certainly reflect huge amounts of visible light. When you have a sixty-year-old movie that describes some of the world-shattering problems that can occur when you beam power down from space (see above), it might be time to scrap the idea.*

In the 2022 book “Under a White Sky” by Elizabeth Kolbert, she describes the ongoing research in the aerosol debacle. The aerosols are designed to remove CO_2 from the atmosphere and are dispersed by large aircraft flying at 60,000 feet called SAIL (Stratospheric Atmospheric Injection Lofter) and $2.5 billion is being invested in

developing the system and aircraft. There are real companies, backed by investors and government grants, developing these ludicrously dangerous systems that will certainly irrevocably change our sky, our air, and damage the environment in ways perhaps much worse than climate change.



Westford Needle dispensing spacecraft

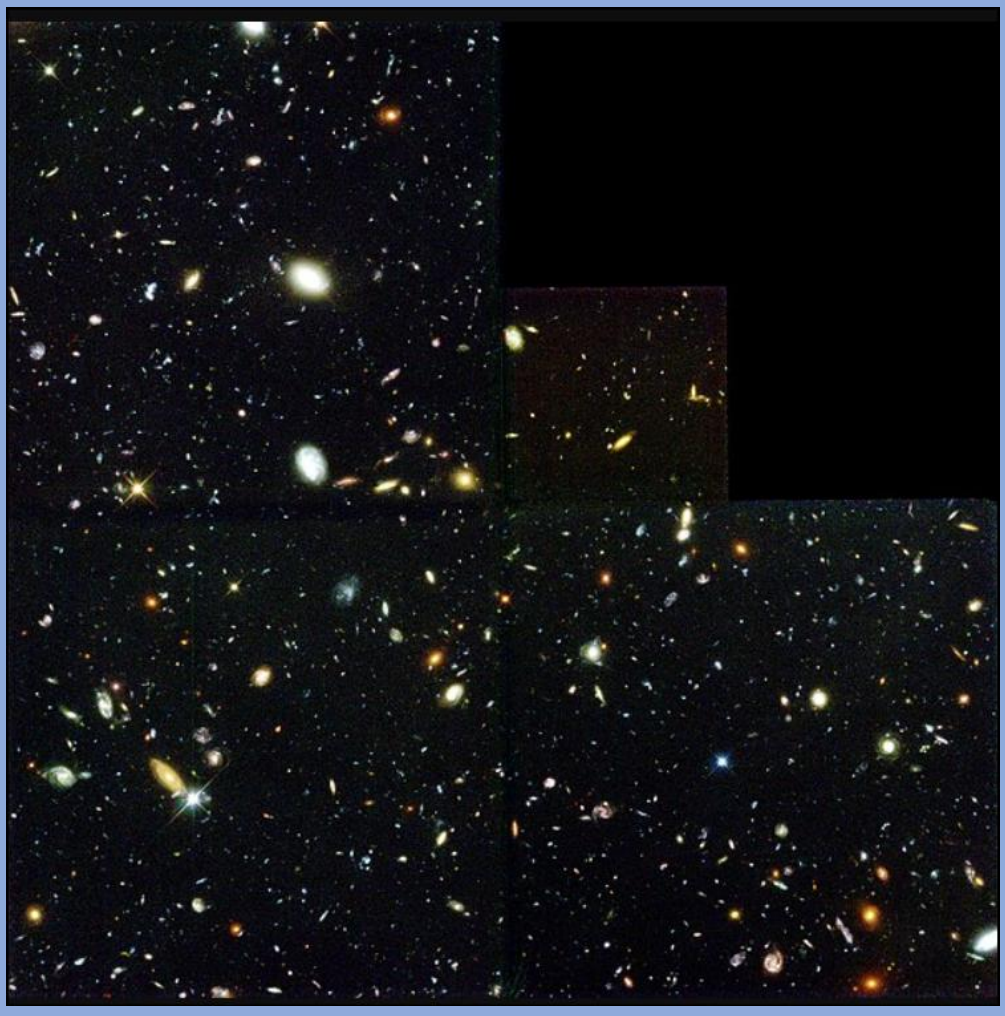
In the sixties, the U.S. injected 480 million of tiny needles in low earth orbit in a ring around the Earth to, supposedly, improve long distance radio transmissions and facilitate weapons tracking. These Westford Needles did not accomplish the goal, and ultimately most of them reentered the atmosphere and burned up. However, there are still unknown numbers of them up there. We already have a bad situation with low earth orbit filling with satellites that may ultimately collide and start the Kessler Effect, where debris begets debris until the whole orbital area becomes unusable. Let's not increase our odds of disaster by injecting aerosols, beaming sunlight, or continuing to launch uncontrolled numbers of satellites.

There is no way to predict what the effect of either of these weird ideas might be on astronomy, other than they will be bad. Not only visual light, but perhaps radio and infrared ground-based astronomy would be severely curtailed. And the ecological effects are mind boggling. Areas where the beams from space are shone would be dangerous to man and beast, and with the prospect of building *thousands* of receiving stations, the effect on migration patterns and other wildlife needs would be threatened, perhaps damaged beyond repair.

The aerosol idea is so much worse. It is thought humans, and many other species, nearly went extinct or did with the Toba super volcano eruption 74,000 years ago. For comparison, Vesuvius dropped 3 square kilometers of ash, Mt. St. Helens, 1. Toba dropped 2800, and the gas emissions were almost certainly commensurate. During these events, the air is filled with poisonous vent gas and later aerosol effluvia that dim the sun, withering crops and killing off animals who starve. Sound familiar? We have risk of such volcanic eruptions now, that we cannot control. Why introduce another, similar situation to increase our odds of devastation?

We have issues with climate change and the need for clean renewable power, and we do need solutions as time is not our friend. But these are not solutions we can tolerate, either as amateur astronomers or humans. Now is the time to make sure we take action to prevent either one of these horrible ideas from being licensed or commissioned. I will work with the IAU committee I'm on (Center for the Protection of the Dark and Quiet Sky) to figure out how to put the kibosh on the solar power satellites if possible. The aerosol idea, though less likely soon as it's not as far along, should be addressed immediately with our legislators to make sure nothing like this ever occurs in Earth's atmosphere otherwise we can say goodbye to ground-based astronomy, both professional and amateur. Starlinks snuck up on astronomy – don't let solar collector and white skies do the same.

Hubble Deep Field Image Celebrates 30th Anniversary



During December of 1995, Robert Williams, the director of the Space Telescope Science Institute, made the courageous decision to point the Hubble Space Telescope at a seemly empty region of Ursa Major. The area was chosen because of its high declination away from the rich star fields and dusty regions along the galactic plane. They used the Wide Field and Planetary Camera 2 to image the same area over ten consecutive days between December 18 and 28, 1995 Using the different filters of HST they acquired 342 images of a tiny field just 2.6 arcminutes on a side. That's about the same apparent size of a tennis ball 100 meters away.

Once the images were processed, they revealed that this tiny "empty" spot in the sky contained 3,000 galaxies, some of which are among the youngest and most distant known. By revealing such large numbers of very young galaxies, the HDF has become the landmark image in the study of the early universe. This bold decision torn back the curtains to reveal that our universe contains billions of galaxies. Since that historic image another HDF image was made in the southern sky, then an Ultra Deep Field image and an Extreme Deep Field image. Now the James Webb telescope is confounding our models of the universe by revealing fully formed galaxies pushing cosmic time to the beginnings of the universe.

The December 2025 Issue of Sky and Telescope magazine has a wonderfully detailed article on the 30th anniversary of the Hubble Deep Field image.

The majority of this information came from https://en.wikipedia.org/wiki/Hubble_Deep_Field

Treasurer Report
Cathy Grounds

Thank you to everyone who helped with our annual dinner on Nov. 1st , especially Tamara Green and Marilyn Leamon who headed up the front table. Thank you to all the board members who showed up early to set up and everyone who helped serve. The dinner was a great success, and we had a record number of people attending. Nothing beats good food and great company!

As of November 2025, we have 163 members, with 44 new members this year. Please welcome our newest members Tom Fitch and Walter Parrish!

Don't forget these easy methods to join or renew your membership:
https://www.astrotulsa.com/join – see the "join" tab at the upper right

FAQ: How do I know when to pay my dues? You will receive a notice by email that it is time to renew your membership. Look for it on or around the 1st of the month in which your membership expires. If you are not sure you are always welcome to check with the treasurer.

1. **PayPal (click "join/renew" on the website) and follow the prompts, there is small fee.**
   (You can use any major credit card - you don't need a PayPal account)
2. **Mail in a check or money order to Astronomy Club of Tulsa,**
   PO Box 470611, Tulsa, OK 74147.
3. **Direct your bank's bill pay service to send payment to our PO Box address above.**
4. **Pay cash at any club event or swipe a credit card (there is roughly a 3% service charge).**

As always if you have any questions or concerns or if your email, phone, or postal address has changed please email me at: AstroTulsa.Tres@gmail.com

Membership rates for 2024 - 2025 are as follows:
All include an Astronomical League Membership, and you will receive their magazine *The Reflector* each quarter.

Adults: $ 50 per year
Sr Adult: $ 40 per year **(65 or older)**
Students: $ 40 per year
Additional Family membership: $ 30 **includes voting rights**

The regular membership allows all members in the family to participate in club events but only ONE Voting Membership and one Astronomical League membership.

Magazine Subscriptions- You can see subscription info on the "Join" tab at www.astrotulsa.com.
You can get a discount rate as an Astronomy Club member. You will need to do so directly using their web links below to make your subscription

To learn about Sky and Telescope magazine see their home page
Digital $ 37.05 Print & Digital $ 45.75 includes a $ 10 club discount
Use this **Sky & Telescope Subscription Link**

To learn about Astronomy magazine see their home page
Use this **Astronomy Subscription Link** **Digital $ 39.95 Print & Digital $ 49.95** no club discount

You are invited to come join us to learn more about
Astronomy and view the wonderful sights in the night sky.
Check the EVENTS section at https://www.astrotulsa.com/

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

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.

GUEST OBSERVING NIGHT – RSVP requested
This event is open to our Guests – both individuals and families as well as our regular members. Several of our club members set up telescopes 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.

Check the EVENTS section at https://www.astrotulsa.com/
Follow our map directions DO NOT USE GPS

Two Options for travel to the observatory

MOSTLY PAVED ROADS – Hwy 75 to 201st St S – through Mounds OK

Most DIRECT ROUTE – Hwy 75 to 241st St S – some coarse gravel & dirt roads

ASTRONOMY CLUB OFFICERS:

PRESIDENT – JONATHAN FUSSELL
astrotulsa.pres@gmail.com

SECRETARY – SKIP WHITEHURST
astrotulsa.secy@gmail.com

TREASURER – CATHY GROUNDS
astrotulsa.tres@gmail.com

You may also contact club officers or board members using the CONTACT tab on our website

BOARD MEMBERS-AT-LARGE:

DON BRADFORD
GIBSON BRASEL
SCOTT BRATT
JERRY CASSITY
BRYAN KYLE
JOHN LAND
JACK REEDER
JAMES TAGGART
LIAN YANULIS

STAFF:

FACILITIES MANAGER – JAMES TAGGART
astrotulsa.obs@gmail.com

NEWSLETTER EDITOR - JOHN LAND
tulsaastrobiz@gmail.com

Public Facebook Page Coordinator – Cathy Grounds

OBSERVING CHAIR - BRAD YOUNG
hafsnt1@gmail.com

SIDEWALK ASTRONOMY – TIM GILLILAND

PR AND OUTREACH – Open Position
GROUP DIRECTOR – Open Position

NIGHT SKY NETWORK – Jonathan Fussell

Enjoy at Planetarium Show at Jenks High School

JENKS PLANETARIUM

Jenks High School Campus
205 East B Street, Jenks

TICKETS are $7

See our Current Shows Schedule and ticket purchase links at
Shows and Ticket Link

Shows take place on Tuesday evenings or Saturday mornings
Must purchase tickets online in advance
Shows and Ticket Link