SIRIUS ASTRONOMER

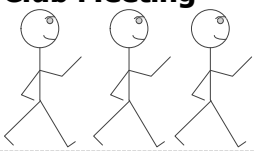
www.ocastronomers.org

The Newsletter of the Orange County Astronomers

February 2025 Free to members, subscriptions $12 for 12 issues **Volume 52, Number 2**

Tom Bash captured the recent occultation of Mars by the moon as shown here. The second image was taken 2 minutes after the first. Lucky imaging technique was used to avoid image degradation from seeing. Equipment was a Vixen 115mm refractor, QHY533M camera.

Upcoming Events - free and open to the public

Beginner's class	Friday, 7 March at 7:30 to 9:30 PM **ONLINE** This is session 1 of the class: Overview of celestial objects, current scientific understanding of the Universe's beginning, present and future. New location: This class is at Orange Coast College, near Building 40, Astronomy House
Club Meeting 	Friday, 14 February at 7:30 to 9:30 PM **IN PERSON** and **ONLINE** "What's Up": Lonny Buinis from UACNJ **ONLINE** Main speaker: Tim Parker from JPL **IN PERSON** whose talk will be "44 Years as a "Career Martian" at JPL"
Open Spiral Bar	Saturday, 15 February at 10:00 to 11:30 PM **ONLINE** Want to socialize? Grab your images, experiences, questions, or none and see your fellow Orange County Astronomers face-to-face.
Star Parties	Saturday, 27 February at the OCA Anza site. ??? Irvine site dates are yet to be determined

The monthly club meeting is viewable in progress on Zoom and our social media platforms. The recording is available on these platforms after the meeting is over.

https://www.facebook.com/OrangeCountyAstronomers
https://www.youtube.com/@ocastronomers

Please consult the calendar on the OCA website to RSVP online meetings (required)

President's Message

By Barbara Toy

Fire Concerns

As I write this, the news is filled with brush fires, particularly the fires that burned through Pacific Palisades and Altadena. I hope that none of you or anyone close to you has had any direct loss from these or any of the other fires that burned out of control in January due to particularly powerful Santa Ana winds. I also hope that the worst is behind us, but Southern California is experiencing an unusually dry "rainy" season this year, and there are more powerful wind events are in the forecast. When we do get some rain, it's not likely we'll get enough this season to pull us out of our current drought condition, and the fire danger will remain high.

As you may recall, we plan to increase the cleared areas around buildings and other sensitive locations at our Anza site to make it more defensible in case of fire and reduce fire risk in general, and we thought we'd have enough rain by now to move forward with that project. With everything so dry, any spark could start a fire, including sparks from chainsaws and other equipment cutting through brush, and we don't want our fire mitigation program to start a fire itself, so we had to postpone it until after we get enough rain to reduce that risk. If any of you do any shrub or brush clearance out at Anza yourselves, please use hand tools as much as possible and otherwise minimize the risk of generating any sparks.

Astronomical Matters

I used to think that droughts would give us a silver lining of more dark, clear nights for viewing. Our last drought showed that skies could still be cloudy far too often, even when there was no rain anywhere in the forecast, so we can't assume an abundance of clear, dark nights even if drought conditions continue. And smoke from drought-enhanced fires, even very distant fires, can be an added challenge when planning viewing or imaging sessions.

You may have noticed that we're already about half-way to the spring equinox, which is on March 20. While we still have some good winter viewing ahead in February, there are some who may be thinking even further ahead to the fun and challenges of the Messier Marathon, which is best tried close to the equinox, when all of the Messier objects can (theoretically) be seen in one night. This year full moon is exactly one week before the equinox, so that week will be pretty bright, but the week after will be 3rd quarter moon to New Moon (on the 29th), which will be darker, so it'll be easier to find dimmer objects, but the nights will be getting shorter, so it'll be harder to get the earliest and latest objects. We'll see how that turns out…

Election

Tim Hogle and John Hoot, who managed our election again this year, confirmed that all candidates listed on the ballot were elected, so we have a 2025 Board. I'm looking forward to working with everyone through the coming year. Remember, though – it's not too early to start thinking about running yourselves for the 2026 Board.

Help Wanted

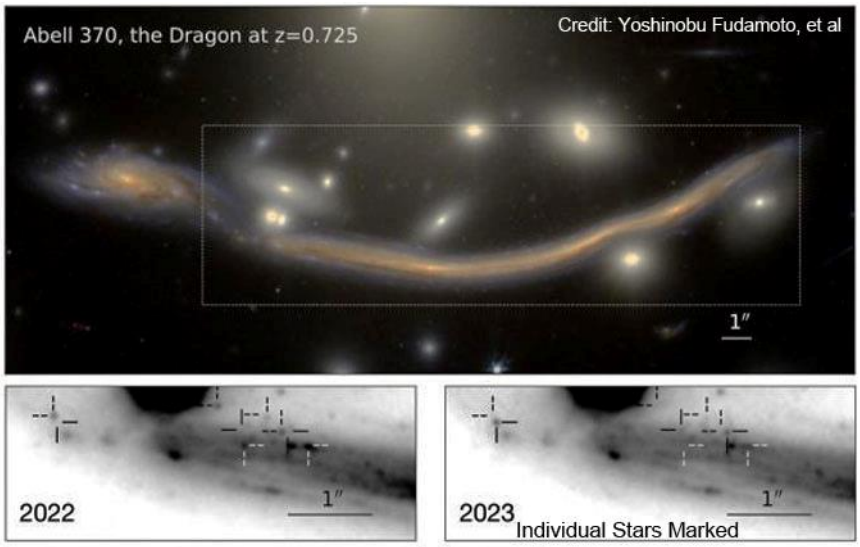
- Coordinator to organize star parties in Orange County

AstroSpace Update

February 2025
Astronomy and space news summarized by Don Lynn from NASA and other sources

Pre-Supernova Surges – It has been predicted that extremely massive stars should undergo brightness surges shortly before they explode as supernovas at the end of their lives. But this had never been observed until now, likely because extremely massive stars are so rare and the surges should occur for such a short period in the life of such a star. The surges are caused by shells of ejected material colliding with each other. Instability within the star, designated Pulsational Pair Instability, which occurs only shortly before going supernova causes those successive shells of material to be ejected. In 2020 and 2021 a star in galaxy NGC 2981 was observed to brighten dramatically twice, and further study showed the first brightening was the predicted brightness surge from shell collision and the second was the supernova explosion.

Very Distant Stars – Individual stars farther than those in relatively nearby galaxies are beyond being imaged by even the most powerful telescopes, except in the case of a gravitational lens magnifying and brightening distant stars. Such a condition exists where the gravity of the Abell 370 cluster of galaxies forms a gravitational lens and magnifies more distant galaxies at 5 to 7 billion light-years distance. Further, recent observations show that stars within those distant galaxies sometimes pass in front of one another forming a gravitational lens within a lens. New results from the James Webb Space Telescope (JWST) obtained spectra of more than 40 individual stars at these huge distances. The spectra show these stars are red supergiants similar to Betelgeuse.



Distant Spectroscopy – Using the ALMA radiotelescope array in Chile and JWST, a team of astronomers detected several elements spectroscopically, including hydrogen and oxygen, in an extremely distant galaxy known as GLASS-z12. These are the most distant of such detections. The light left this object only 400 million years after the Big Bang. The galaxy has a mass of a few hundred million times the Sun's mass (small for a galaxy) crowded into a small region, giving it a similar stellar density as that now found in globular clusters. It is undergoing a high rate of star formation.

Sideways Black Hole – New image analysis techniques that bring out faint objects were applied to old X-ray images of the galaxy NGC 5084 and they found 4 plumes of hot plasma (electrically charged gas) emanating from the galaxy. Observations with other telescopes then found evidence for a supermassive black hole with a disk of material about it, at the center of the galaxy. But the disk and black hole are rotating at right angles to the rotation of the galaxy. Disks and massive black holes are normally found to rotate with the same orientation as their galaxies. Black holes that do have plumes normally have 2 of them, not 4. So astronomers have a lot of explaining to do as to how NGC 5084 formed its black hole and plumes. One theory is that some sort of collision can explain all this.

Gamma-Ray Flare – The Event Horizon Telescope, a collaboration of scientists and radiotelescopes that in 2019 released the first close up image of a supermassive black hole (the one in galaxy M87), has now announced that they have observed a high-energy gamma-ray flare from the M87 black hole. It occurred while astronomers were in a campaign to observe the M87 black hole with telescopes for multiple wavelengths of light, from radio to gamma rays. The flare lasted about 3 days, suggesting that the region of emission is smaller than 3 light-days in size. The bright spot on the ring about the black hole was found to have shifted in position since the 2019 image. Astronomers are looking at how the bright spot and the flare and the black hole's jets relate.

Star Consumed – Seven years ago astronomers witnessed a galaxy known as 1ES 1927+654 become 100 times as bright in visible light. The observations did not fit a supernova, but did fit a supermassive black hole consuming a star. The galaxy is about 270 million light-years away in Draco. Then months later the X-rays generated by this dropped for months and slowly climbed back. An 18 minute period in the X-rays was then detected, and the period shrank over time. This would indicate some part of the star survived the initial consuming and was circling the black hole in a deteriorating orbit. For the star to have partially survived the initial encounter, it would have to be a compact object with high surface gravity, likely a white dwarf star. Later radio emission began. This has been attributed to the black hole casting out material in jets, which would generate radio emission. This appears to be the first-ever time astronomers were watching while a black hole formed jets. Many had thought the process would take thousands of years or more. Something is creating oscillations in the radio emission. Observations will continue to explain the oscillation and to watch for any further surprises.

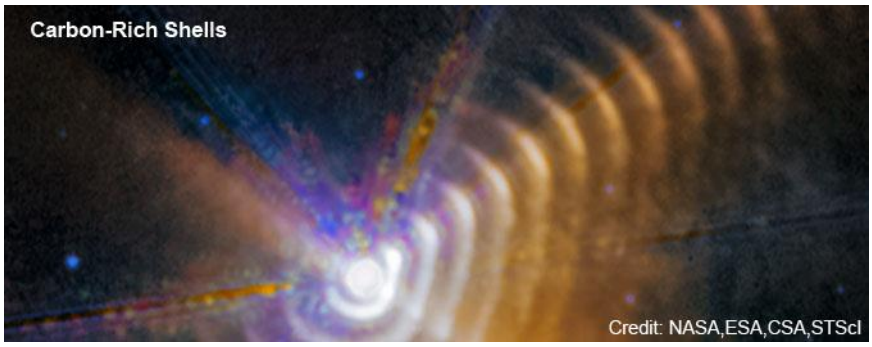
Quasar Jets – Quasars are supermassive black holes at the centers of galaxies that are currently seen feeding, which lights them up brightly. Some quasars have jets. The leading theory is that galaxy mergers cause those jets. However, the Hubble Space Telescope has discovered a quasar, known as J0742+2704, that has jets and is in a galaxy with spiral shape and little or no evidence of a merger disturbing that shape. It is believed that the jets are new because observations 20 years ago did not see the jets. Further observations with different types of light are planned to try to explain what is going on.

Little Red Dots – JWST images of the very distant Universe often show what astronomers have come to call little red dots (LRDs). They are red in the false color used to represent certain wavelengths of infrared light that JWST sees. They were determined to be galaxies so distant that the light we are seeing left there only 600 million to 1.5 billion years after the Big Bang. This presented problems: There were too many of them and they were too bright to have formed so soon according to galaxy formation theory. And there was no explanation why they disappeared at 1.5 billion years after the Big Bang. Newer studies of LRDs have now shed light on those problems. At least 70% of the 341 LRDs in a recent study showed rapidly orbiting gas, evidence that supermassive black holes were accreting material. This black hole activity boosts the brightness from what galaxy formation theory expected to what is actually observed. The fact that they are brighter than expected means more of them exceed the limits of how dim JWST can see, accounting for the unexpected numbers of LRDs. The disappearance of LRDs after 1.5 billion years after the Big Bang is not completely understood, but it may be due to differences in black hole accretion that change the wavelength of light emitted. So LRDs need more study to settle the cause of their disappearance. Work is also needed in X-ray wavelengths where LRD accretion seen in infrared is not showing up as expected.

Light Echo – Cassiopeia A is a supernova remnant whose explosion would have been seen about 350 years ago, but there is no record of it. Either it was obscured by something or no astronomers happened to look. However, astronomers are still seeing consequences of the explosion in the form of the flash of the explosion echoing off dust and gas that happen to be in the vicinity. Recent JWST images show an amazing level of detail in that material, including knots, sheets and clouds. Analysis showed that the material in the images was not material blown off from the star that exploded. Astronomers plan to continue taking JWST images of Cassiopeia A to see how the light echoes evolve, eventually being able to make a 3D map of the gas and dust. To be precise, the light is being absorbed by the gas and dust and re-emitted as infrared in wavelengths that JWST can see, rather than just bouncing off the material like a true echo does.

Fast Radio Burst Source – It is notoriously difficult to determine the source of Fast Radio Bursts (FRBs). Some of them never repeat, most last a tiny fraction of a second, and they happen at random places in the sky and random times. Magnetars, extremely magnetic neutron stars, are suspected to be a source of FRBs. Study of a repeating FRB known as 20221022A showed that scintillations were imposed on the FRB by its passage through the interstellar medium on its way us and that the FRB originated near an extremely strong magnetic field. This is strong evidence that magnetars are the source or a source of FRBs. The source in these observations is in a galaxy about 200 million light-years away.

Unusual FRB – The Canadian CHIME radiotelescope discovered a repeating FRB early last year and astronomers were able to observe it with two radiotelescopes simultaneously, allowing its precise position to be determined. The FRB came from the outer edge of an old galaxy about 2 billion light-years away. This is unusual because FRBs are thought to be more common in the denser centers of younger star-forming galaxies. That's where magnetars are usually found, and magnetars are thought to produce FRBs. One possible explanation is that the FRB source was a young magnetar formed by collision of old neutron stars, possibly in a globular cluster where collisions are more frequent. Observations will continue to try to explain the oddities of this FRB.



Carbon Source – Wolf-Rayet 140 consists of a pair of aging massive stars orbiting each other every 8 years, located about 5000 light-years away. Every time the stars come close to each other in their orbit, their stellar winds collide and create an expanding shell of carbon-rich dust. JWST observed the pair and imaged 17 shells of this dust. The shells expand at nearly 1% the speed of light. It is thought this will continue for thousands of shells, with each shell slowly dissipating. Astronomers will continue to observe this pair of stars to see how their dust will contribute to the formation of future stars and planets.

Puffy White Dwarfs – Theorists have long claimed that hotter white dwarf stars should puff up larger in diameter than cooler ones of equivalent mass. A new study of 26,000 white dwarfs has finally conclusively proved this. White dwarfs are the burned-out cores of stars after they have run out of hydrogen to use as nuclear fuel. They are extremely small (as stars go) and extremely dense, resulting in extreme surface gravity. The new study measured how much, according to Relativity, the surface gravity of white dwarfs was red shifting their light. The temperature of a star is determined from its spectrum.

Windy Exoplanet – An exoplanet known as WASP-127b was found to have the fastest winds ever measured, at about 20,000 mph. The wind speed was found from the red shift and blue shift of the spectrum of the atmosphere on opposite sides of the planet. It orbits its star quite closely (so close that it takes only about 4 hours per orbit) and tidal forces have apparently locked it so one side is always day and the other night. This heats the day side far hotter than the night side, which generates the winds. The planet is one fifth the mass of Jupiter, but 1.3 times the diameter. The size is caused by its star's heat puffing up the atmosphere.

Trans-Neptunian Objects – JWST was used to observe 54 Trans-Neptunian Objects (bodies orbiting beyond Neptune) to determine their surface composition from their spectra. They fell into 3 categories: 1) rich in carbon dioxide ice, 2) reddish colored and rich in nitrogen and organic molecules, 3) dark and dusty and rich in water ice. The study scientists believe these reflect that they formed at 3 different distances from the Sun, resulting in temperature and therefore composition differences. The compositional differences correlated with different types of orbits, which also supports that these types formed in different regions. Some but not all Centaurs, bodies that orbit between Jupiter and Neptune, also fit into the newly defined categories, implying that they formed beyond Neptune, but moved in closer to the Sun later.

Jupiter's Clouds – A study of Jupiter that began with an 11-inch telescope equipped with methane and ammonia filters found that the long-held belief that the giant planet's clouds are ammonia ice is incorrect. Those clouds were found to be made of smog-like hydrocarbons and ammonium hydrosulfide. The results were confirmed with the 8-meter Very Large Telescope in Chile. The clouds were found to be in a layer too low and warm to allow ammonia ice to form.

Lunar Magnetic Field – The Moon is believed to have formed with a global magnetic field generated by motions of a molten core. It is known to have now only tiny local remnants of magnetism. Most estimates of when the Moon lost the global magnetic field are early in its history. New results from the Chinese Chang'e 5 mission indicate the Moon had a global magnetic field only 2 billion years ago, later than generally believed.

Solar Flare Warning – Scientists have long been looking for some sign that warns that our Sun is about to cast off huge amounts of charged particles that have the possibility of disrupting communications and damaging spacecraft. Observations from the Solar Dynamics Observatory have apparently found that warning sign. When a loop of material near the Sun's surface flickers in ultraviolet light, that loop usually gives off a flare within 2 to 6 hours. The strength of the flare might be correlated with the speed the flickering peaks, so further study will be done to see if the warning can include how strong the flare will be.

Lunar Landers – The Blue Ghost Mission One, built by Firefly Aerospace, launched toward the Moon in mid-January on a SpaceX rocket. It carries 10 NASA science and technology instruments that are designed to prepare for human lunar landings. Among other accomplishments, it will test drilling and sampling methods, radiation tolerant computing, and dust mitigation. It is scheduled to land in Mare Crisium on March 2. Also riding the same rocket launch was a Japanese lunar lander/rover mission known as HAKUTO-R M2 Resilience (lander) and Tenacious (rover). It is scheduled to land in April within Mare Frigoris.

Mercury Mission – BepiColombo, the joint European-Japanese planet Mercury dual orbiter, made its 6th and final flyby of the planet before it begins orbiting there in late 2026 for its primary mission. This was the closest flyby, at just 183 miles above the surface. Great images of the planet were returned from the flyby. The spacecraft is named after the Italian scientist who proposed gravity assist flybys for planetary missions. Mariner 10 and Messenger are the only previous spacecraft to visit Mercury.

New Glenn Launch – The New Glenn rocket, built by the Blue Origin company, made its first flight to Earth orbit. A version of New Glenn is one of two rockets selected to ferry astronauts from lunar orbit to the Moon's surface and back as part of the Artemis missions. The first stage of New Glenn is designed to land for reuse, but it failed to land on this first launch. The rocket is named after astronaut John Glenn.

Starship Launch – The other rocket selected to ferry astronauts from lunar orbit to the Moon's surface and back as part of the Artemis missions is SpaceX's Starship. It made its 7th test flight in January, but the second stage exploded and rained debris over the Caribbean about 8 minutes after launch from southern Texas. Preliminary cause is that a leak developed in the second stage fuel tank, though investigation of the mishap continues. The first stage landed successfully for reuse back at its launch site and was captured by mechanical arms designed for that purpose.

Meteorite Recorded – Last July a couple living on Prince Edward Island, Canada, returned home from walking their dog and found a dusty splat on their paved walkway. Checking their doorbell camera, they saw a rock fall from the sky minutes before. They contacted a meteorite expert who analyzed samples of the splat and declared it was a stony chondrite meteorite. This is believed to be the only time a video with sound has ever recorded a meteorite hitting the ground. It sounded something like glass breaking.

Parker Sets Records – Since its launch more than 6 years ago, the Parker Solar Probe has been making flybys of Venus to bend its orbit ever closer to the Sun. It has now reached its target orbit where the close point (perihelion) of each orbit is only 3.8 million miles from the Sun, more than 24 times closer than the Earth is to the Sun. It has a sun shield designed to protect it from the intense Sun's heat, expected to reach 1800°F. In late December, Parker survived its first close pass. It set records for the closest any spacecraft has been to the Sun and for the fastest any spacecraft has traveled (430,000 mph). Parker data has already revolutionized how solar astronomers understand the Sun.

Mars Sample Return Mission – Because the mission to retrieve samples of Mars collected by the Perseverance rover is far behind schedule and over budget, NASA asked the space community for suggestions to modify the mission to save time and money. The result of analyzing these suggestions was released, and two possible pathways forward are going to be further designed, with a choice between them expected in latter 2026. Both plans will use a smaller Mars Ascent Vehicle (the rocket that will lift the samples to Mars orbit). Both will use a nuclear-powered device to load the samples, rather than solar powered. The plans differ on how the Mars Ascent Vehicle and sample loader will land on Mars (sky crane or retro rocket).

From the Editor

The newsletter is once again looking for front cover picture contributions.
Due dates for submission of articles, pictures and advertisements

Issue	**Due date**	
March 2025	22 February	
April 2025	10 April	Changed
May 2025	5 May	Changed

Change is coming ! We will be transitioning the Sirius Astronomer to an electronic only distribution. This means that the March 2025 issue will be the last one to be available on paper.

There are rising costs for all aspects of the club, including maintenance, insurance, utilities as well as increased printing and postage. The club needs to meet these with our available funds. We also want to be kinder to the environment and eliminating the printed newsletter will help us achieve both goals. The newsletter will be available to download and you can print if so desired.

February's Night Sky Notes: How Can You Help Curb Light Pollution?

By Dave Prosper
Updated by Kat Troche

Before and after pictures of replacement lighting at the 6th Street Bridge over the Los Angeles River. The second picture shows improvements in some aspects of light pollution, as light is not directed to the sides and upwards from the upgraded fixtures, reducing skyglow. However, it also shows the use of brighter, whiter LEDs, which is not generally ideal, along with increased light bounce back from the road. Image Credit: The City of Los Angeles

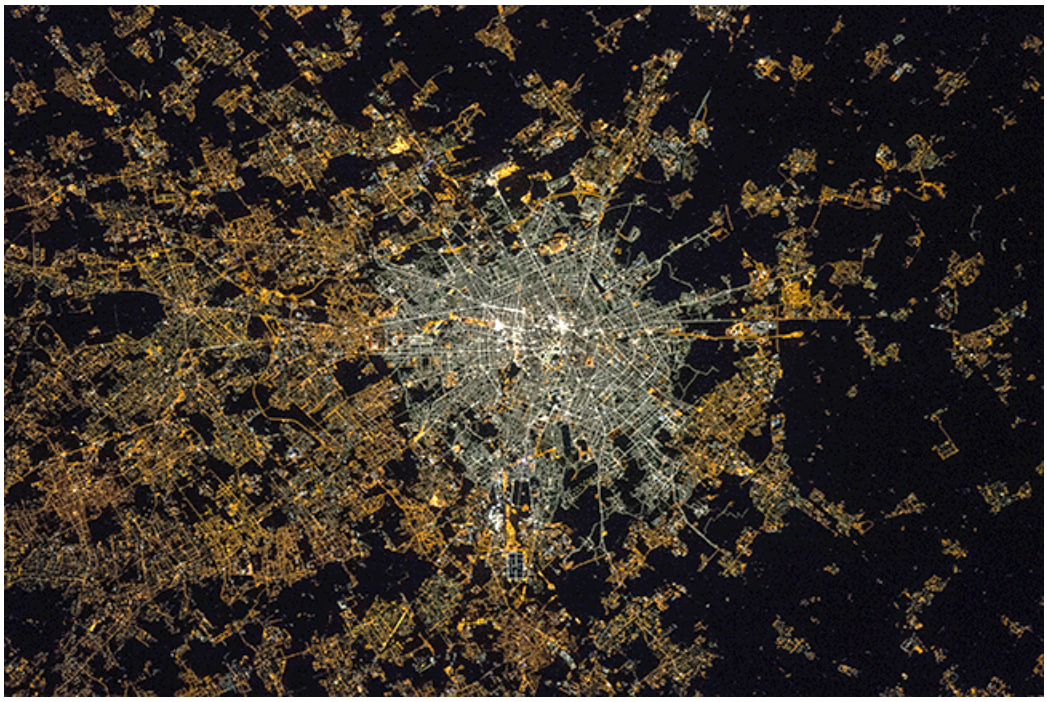
Light pollution has long troubled astronomers, who generally shy away from deep sky observing under full Moon skies. The natural light from a bright Moon floods the sky and hides views of the Milky Way, dim galaxies and nebula, and shooting stars. In recent years, human-made light pollution has dramatically surpassed the interference of even a bright full Moon, and its effects are now noticeable to a great many people outside of the astronomical community. Harsh, bright white LED streetlights, while often more efficient and long-lasting, often create unexpected problems for communities replacing their older streetlamps. Some notable concerns are increased glare and light trespass, less restful sleep, and disturbed nocturnal wildlife patterns. There is increasing awareness of just how much light is too much light at night. You don't need to give in to despair over encroaching light pollution; you can join efforts to measure it, educate others, and even help stop or reduce the effects of light pollution in your community.

Amateur astronomers and potential citizen scientists around the globe are invited to participate in the Globe at Night (GaN) program to measure light pollution. Measurements are taken by volunteers on a few scheduled days every month and submitted to their database to help create a comprehensive map of light pollution and its change over time. GaN volunteers can take and submit measurements using multiple methods ranging from low-tech naked-eye observations to high-tech sensors and smartphone apps.

Globe at Night citizen-scientists can use the following methods to measure light pollution and submit their results:

- Their own smartphone camera and dedicated app
- Manually measure light pollution using their own eyes and detailed charts of the constellations
- A dedicated light pollution measurement device called a Sky Quality Meter (SQM).
- The free GaN web app from any internet-connected device (which can also be used to submit their measurements from an SQM or printed-out star charts)

Night Sky Network members joined a telecon with Connie Walker of Globe at Night in 2014 and had a lively discussion about the program's history and how they can participate. The audio of the telecon, transcript, and links to additional resources can be found on their dedicated resource page.



Light pollution has been visible from space for a long time, but new LED lights are bright enough that they stand out from older streetlights, even from orbit. Astronaut Samantha Cristoforetti took the above photo from the ISS cupola in 2015. The newly installed white LED lights in the center of the city of Milan are noticeably brighter than the lights in the surrounding neighborhoods.
Image Credit: NASA/ESA

The International Dark-Sky Association (IDA) has long been a champion in the fight against light pollution and a proponent of smart lighting design and policy. Their website provides many resources for amateur astronomers and other like-minded people to help communities understand the negative impacts of light pollution and how smart lighting policies can not only help bring the stars back to their night skies but also make their streets safer by using smarter lighting with less glare. Communities and individuals find that their nighttime lighting choices can help save considerable sums of money when they decide to light their streets and homes "smarter, not brighter" with shielded, directional lighting, motion detectors, timers, and even choosing the proper "temperature" of new LED light replacements to avoid the harsh "pure white" glare that many new streetlamps possess. Their pages on community advocacy and on how to choose dark-sky-friendly lighting are extremely helpful and full of great information. There are even local chapters of the IDA in many communities made up of passionate advocates of dark skies.

The IDA has notably helped usher in "Dark Sky Places", areas around the world that are protected from light pollution. "Dark Sky Parks", in particular, provide visitors with incredible views of the Milky Way and are perfect places to spot the wonders of a meteor shower. These parks also perform a very important function, showing the public the wonders of a truly dark sky to many people who may have never before even seen a handful of stars in the sky, let alone the full glorious spread of the Milky Way.

More research into the negative effects of light pollution on the health of humans and the environment is being conducted than ever before. Watching the nighttime light slowly increase in your neighborhood, combined with reading so much bad news, can indeed be disheartening! However, as awareness of light pollution and its negative effects increases, more people are becoming aware of the problem and want to be part of the solution. There is even an episode of PBS Kid's SciGirls where the main characters help mitigate light pollution in their neighborhood!

Astronomy clubs are uniquely situated to help spread awareness of good lighting practices in their local communities to help mitigate light pollution. Take inspiration from Tucson, Arizona, and other dark sky-friendly communities that have adopted good lighting practices. Tucson even reduced its skyglow by 7% (as of 2018) after its own citywide lighting conversion, proof that communities can bring the stars back with smart lighting choices.

Originally posted by Dave Prosper: November 2018 Last Updated by Kat Troche: January 2025

Outreach Activities

Upcoming Outreach Events

Event Date	Type	Site Name	Address
18 February	Outreach	Ball Junior High	Ball Road in Anaheim
20 February	Outreach	Cadence Park Elementary	Benchmark in Irvine
27 February	Outreach	Cerro Villa Middle School	Serrano Avenue in Villa Park
5 March	Outreach	Cerritos Library	Bloomfield Avenue in Cerritos
7 March	Outreach	Robinson Ranch School	Lindsey Drive in Trabuco Canyon

Please also check OCA website for start times and with Martin Christensen for updates to this list.

Advertisements

Buy, Sell or Trade some of your gear? This is where club members can place advertisements. Please contact the editor at newsletter@ocastronomers.org to place an advertisement or to learn more about placing one. There is no cost to club members for non-commercial advertisements in the newsletter.

Each advertisement may be run for 3 consecutive issues, after which it will be removed. The advertiser may resubmit it for inclusion after a one-month hiatus.

For Sale	contact	Gene Kent	714-604-8396	Kenthouse@Cox.net

Telescopes & Optics

8 inch Cassegrain (Orion)	$ 400
8 inch Cassegrain (Celestron)	$ 350
4 inch refractor (Orion)	$ 60
4 inch refractor (Orion)	$ 60
5 inch refractor (Stellavue)	$1,000
2 inch tracking (Stellarvue	$ 50
Loadstar tracking scope	$ 50
Lenses	$ 200
3 Telrads	$ 90
Eye piece lenses	$ 100
Elbows 3	$ 50

Cameras

Orion I-cap5	$ 200
Atik Horizon	$ 800
Atik 420	$ 600
QHY 8L-C	$ 700
Loadstar (guide scope)	$ 225

Mount

Orion Atlas Pro	$1,000
Control paddle	$ 50
Atlas Pro tripod	$ 400
2 x 25lb weights	$ 60
Three Wheeled platform	$ 75

Connectors, hardware

Threaded extenders ~15	$ 100
Threaded tubing	$ 30
Elbow size adapter	$ 100

Electric Items

Power adapters –A/C to D/C	$ 10
Electric cables	$ 10
Control Pad	$ 50
12 volt D/C boat battery	$ 30
electric focuser	$ 50
Cable union box	$ 150
Astronomer's chair	$ 50
Wet/dry telescope cover	$ 30

Raffle at the OCA Club Meeting in February 2025

Prize: Celestron CPC 800 (8" SCT) telescope,
Dual Fork Mount on 2-axis motorized base,
ALT/AZ configuration, GoTo Nexstar hand controller,
GPS time and location, 12vDC power supply,
Heavy Duty Tubular Steel Tripod, Eyepieces

When: February 14, 2025, 7:30 pm.
Where: OCA General Meeting at Chapman University.

Participation is OPEN to OCA club members and non-members. Interested parties must be present IN PERSON at the meeting. Tickets for the RAFFLE are FREE to those in attendance.

Here we have our Adopt-a-Scope coordinator Jake Brown with OCA member Janeane Dominey and the Meade eyepiece that she won in the raffle at the January General Meeting at Chapman University. Jake selected the eyepiece from the program's inventory.

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