



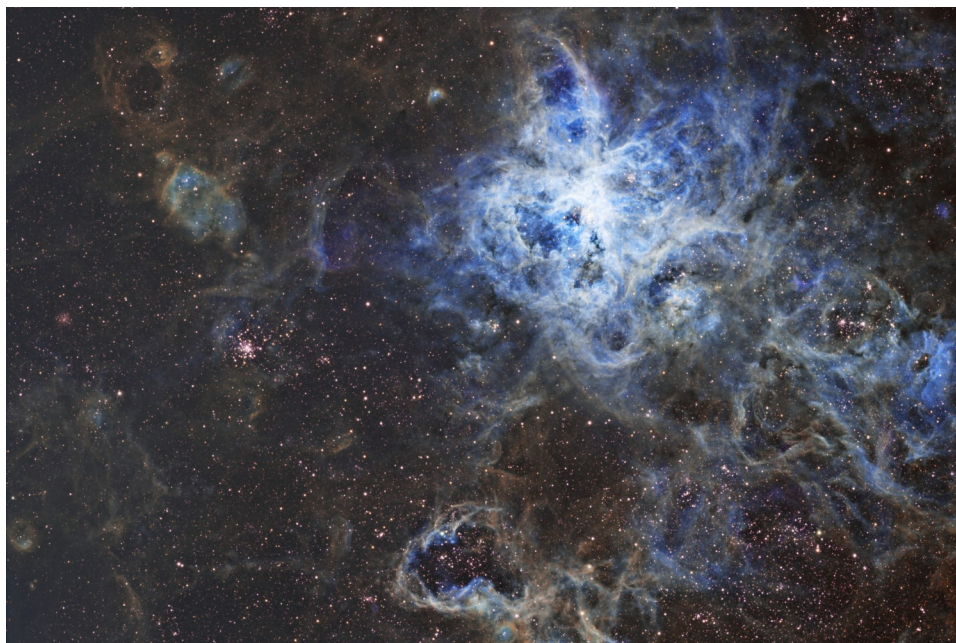
Fall/Winter, 2023

Holiday Party this December!

We've had a busy year in 2023, and it's time to celebrate the accomplishments, volunteers and new members we've gained this year!

The party starts at 4pm in the Quonset Meeting Hall on Saturday, December 2.

We'll have Olive Garden food and drinks available but please bring some holiday cookies or dishes to pass, and have a great time with us! It's a great chance to meet some of the members and get to know everyone. If you've been curious on how to get involved with the club, this is a great opportunity to meet any of the volunteers here, the Board of Directors, and just chat about astronomy, learn about areas we're in need of volunteers for, or talk about some of the new equipment we've got at the observatory. We're thankful for all of our members, so let's celebrate heading into 92 years as an astronomical society!



Tarantula Nebula imaged by William Gottemoller and Dhruva Kalyani. See Award Winners for more information.

Inside this issue:

[At-a-Glance News](#)

[Retracing Steps](#)

[Award Winners](#)

[At-a-Glance](#)

[Star Analysis](#)

[Yerkes Holidays](#)

[MAS Imagers](#)

[eVscope Fun!](#)

[Volunteer Openings](#)

Renewal Time!

MAS Membership
Renewal is Due
December 31st.

[RENEW NOW >](#)

Upcoming Meetings

There is no board meeting or membership meeting in December.

The **First Wednesday** meetings continue to be held in person at the Observatory grounds at **7:00 PM**. New members are especially encouraged to attend these meetings. It is a chance to gain hands-on experience, receive tips on how to get started and/or get more involved in the Club's activities.

The **Imagers Interest Group** continues in an all virtual format, on the **second Wednesday monthly at 7pm**. Please [join via this virtual link](#). These meetings will now combine membership with the Madison Astronomical Society!

Treasurer's Report

\$5,264.76	Starting Balance as of 10/24/23
	Expenditures
\$69.5	PayPal / Stripe fees
\$169.98	Annual Expenses
\$59.39	WE Energies
\$446.82	Periodic Expenses
\$803.97	TOTAL Expenditures
	Revenue
\$2,449.00	Membership dues
\$360.22	Private Donations
\$463.00	Public Donations
\$3,273.00	TOTAL Revenue
\$7,733.79	Ending Balance as of 11/18/23

	Revenue	Expenditures	Net
September	\$1,648.65	\$2,403.60	-\$754.95
October	\$3,196.00	\$1,482.35	\$1,713.65
November	\$3,273.00	\$803.97	\$2,469.03

Membership Report

Total Active Memberships: **343**

Membership to Renew in 2023: **154** (44.90%)

Membership Renewed thru 2024: **179** (52.19%)

Honorary/Founder: **10** (2.92%)

Please Remember to Renew your Membership by December 31:
www.milwaukeeastro.org/renew

Observatory Notes At-a-Glance

Abridged summary of general observatory updates:

Mach 1 mount working with F-scope after Mike Bauer worked out the communications problems between the Control Room & F scope. Control of F-scope is available via remote Wi-Fi connection via virtual desktop. Instructions are available online for trained members.

Matthew Ryno has licensed the MAS a permanent lifetime license of the Slooh Remote Telescope Service as a Slooh Ambassador. John Koors and Mike Bauer have adapted a computer from the control room to act as an always-available, easy to log in interface for Slooh, which can be projected easily and used by any members in the control room.

B-dome door is repaired. We have a new focuser and motor for A scope.

C9.25 has a new white light solar filter. In same box as H-alpha.

Loaner telescope program re-established. Beginner scope & binocs on tripod, intermediate & advanced scopes. 1-2 week loan. Laminated signs installed under stairs in A dome and to left of entrance to Control Room in Z dome. Scopes can be checked out & returned on Member's Nights or 1st Wed. Check out sheets under sign in book in A dome. The Board approved a purchase of no more than \$200, toward the purchase of a Bresser 102s Comet Edition Telescope.

John Koors is working on a project to print and display astrophotography done by MAS members.

Unistellar eVscope Purchase, eV1: Matthew Ryno proposed a sale of his original Unistellar eVscope ev1 telescope to the MAS. A donation was proposed, and the board agreed to purchase the telescope for a remaining cost of \$700. A tablet was also added to the smart scope charging station, along with a copy of rSpec and a Star Analyser for spectroscopy. A smart telescope station is now available to use by all members on members nights with the eV1 for science missions.

Sale of Cub Cadet Tractor: The MAS is seeking buyers to sell the MAS's Cub Cadet tractor for the best offer.

Observatory Notes At-a-Glance (Cont.)

Matthew Ryno proposed a targeted Facebook advertising campaign pilot, to increase impressions via a targeted demographic, with a limit on spending of \$300, to allow enough data on targeting results to collect. He reports results were successful, with impressions far exceeding goals. Various members have joined, citing Facebook as an awareness driver and followers have climbed. He will seek a budget for next year.

We are looking for help in the roles of Program Planning, arranging regular speakers to engage MAS audiences. Please reach out to Jill Roberts to join this committee or plan.

A March meeting at the Horwitz-DeRemer planetarium has been proposed. Members are encouraged to attend a planetarium show afterward.

Stellarvue 5" Imaging Telescope: Paul Borchardt proposed the MAS purchase his own Stellarvue 5" APO triplet telescope, which he had up for sale for \$2,000 and lowered the price to \$1,800. Per Borchardt, "I have a proposal to upgrade the F Scope into a two OTA system. Along with the current 4" F5.8 Stellarvue scope I would like to add a second scope. The second scope would be a 5" F7 Stellarvue with a field flattener that keeps the scope at F7. The focal lengths of the two scopes would be 580mm and 910mm giving the user the opportunity to go for smaller objects than the 4" scope usually images. A user could choose which scope he wants to use, or two users could run at the same time shooting the same object." He noted, "I would like to have the club buy the scope now but wait until next year to get the camera and filters for it since this part of the set is far more costly than the scope. The scope would be mounted on the Mach 1. I feel this mount can easily handle both scopes. In discussion to follow, John Koors noted, "as more people start to get into imaging and realize what's here, anything we can do to accommodate it is great." Board members asked if the scope could be used immediately, and Borchardt offered to bring his own headless setup outside for usage in summer and training. Board members asked that training opportunities be included as part of this setup and installation. A motion was approved, to utilize \$1,800 from the MAS Endowment fund to purchase this telescope from Paul, along with additional training and setup / shadowing opportunities.

John Koors, Lee Keith and Russ Blankenburg will call an observatory committee together to investigate mounting with a Mach 1 mount, and our existing Meade telescope.

Lee Keith announced a Portaball 12.5" telescope may soon be added to our loan telescope program, more details to come.

Insurance Policy Updates: The board voted to approve \$450 a year toward enhanced policies.

Adopt-a-Telescope: Russ Blankenburg asked if the initiative should continue, as the idea was a member could clean up and take care of an assigned scope. After a discussion, the Board of Directors decided this program could be retired, due to wavering participation or uncertainty around duties. A spring cleaning event was proposed as a fair substitute.

The Board will set aside \$500 from the budget toward snowplowing services.

The Board voted to set aside funding for a Holiday Party, sternos, aluminum pans need to be provided. Members should bring a dish to pass. Decorating is taking place this week, Lee Keith will pick up the order.

The MAS will install a corkboard of news and announcements in the main entry to the Quonset Meeting Hall, and will refrain from excessive QR code labelling or posters sticking to the wall.

The 2024 Keyholder assignments have been relayed via email to keyholders.

Staff Updates

Dhruva Kalyani was elected as a board member this summer.

Dennis Roscoe retired from the Board of Directors this summer.

Lee Keith is continuing as Acting Observatory Director, filling in for Paul Borchardt.

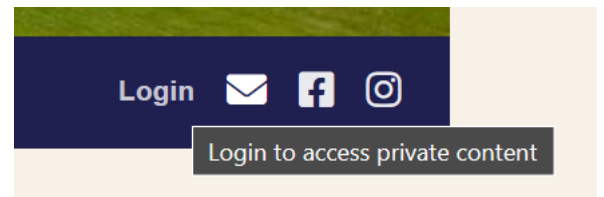
Tamas Kriska and Agnes Keszler will be retiring from keyholding duties. Thank you for your service!

Minutes and Board Presentations

Reports, presentations, notes, for meetings are uploaded to the MAS Members documents section on the Milwaukee Astronomical Society website. Login to access, then go to [members > documents](#).

Reminder: New Members Page Login Access

Once you have logged in to the website, click **Members** to access the members menu. From here you can scroll down the page to view the latest keyholder calendar and contact information; announcements; past *Focal Point* editions; files and much more, including the latest observatory weather and cloud predictions. Login to access the *Members* page at: <https://milwaukeeastro.org/members.asp>



Open House Committee Begins 2024 Planning

After many years of incredible service Sue Timlin is stepping down as an Open House Committee Chair. "I just want to thank all of you for being a terrific team that made our open houses successful," she said. I appreciated your ideas, the planning, plus all of the work you put into making our 2023 season a good one. I only feel bad that I wasn't able to contribute more and that the weather wasn't the most cooperative this year."

Gene Hanson: "One huge thing you accomplished was getting that schedule set much earlier than previous to your involvement. Thanks for all the great work you've done over the years! "

Jill Roberts: "You have done an amazing job with suggesting and analyzing the best dates for our Open Houses. We could not have done it without you. All your contributions will be unforgettable!"

Matthew Ryno: "I enjoyed the value you've placed on the astronomy outreach to the community, which really embodies what the MAS is about. Although I was one of the newcomers to the outreach squad in 2020, as I got to know you and the group here, I've gained a deep appreciation for the work required to keep focus on the mission while giving visitors to the MAS a great experience and educating people. Sometimes that runs in opposition to the best night for astrophotography, personal commitments, and energy, and it takes dedication, which you've demonstrated. This approach aligns closely to the kind of person I like to be with astronomy outreach."

Russ Blankenburg: "Thanks, Sue, for all the years of busy work on these open houses- especially the years where people would shoot down every day you/we would choose."

Matthew Ryno has been working closely with Sue on Open House planning and will be seeking to establish the next Open House committee meeting in December to set dates for next year. Please contact mattryno@gmail.com to be involved with this committee work, and indicate best virtual meeting dates.

NCRAL Newsletter Featuring the MAS

Retracing Steps

Editor's Note: This is an article written for the NCRAL Newsletter by our recent guest speaker, Chuck Allen, who is vice-president and past president of the Astronomical League. For editions of the North Central Region of the Astronomical League newsletter see: ncral.wordpress.com/newsletter-archive.

Some 58 years ago, I took a train from Louisville and attended the 1965 Astronomical League national convention in Milwaukee, my first ALCon. It was held at the Hotel Schroeder and was accompanied by a tumultuous beer parade! I was 17 at the time. With me was 18-year-old Richard Gott, my oldest friend in the universe (since age 11), a high school classmate, and a fellow officer of the Louisville Junior Astronomical Society. Richard is now professor emeritus of astrophysics at Princeton University and an author of at least seven books, some with Neil Tyson. We talk on the phone nearly every night.

The Milwaukee Astronomical Society ("MAS") performed a spectacular job as convention host. Observations through the 40-inch at Yerkes Observatory were arranged, and more than a quarter of the attendees were of high school and college age (a product of the nascent Space and Atomic Ages), so new friendships were forged.

The MAS is one of the most successful and longstanding astronomy organizations in the country and is a critical founding member of the League. The first meaningful attempt to organize amateur astronomy societies into what would become Astronomical League took place in 1935 when Edward Halbach and Luverne Armfield of the MAS cobbled together a dozen midwestern clubs called the American Amateur Astronomical Association and linked its constituents with a common newsletter. At AAVSO meetings during that period, Halbach met the famous Dr. Harlow Shapley, Director of Harvard College Observatory and famed participant in the Shapley-Curtis "Great Debate" about the nature of the spiral nebulae on April 26, 1920. Recognizing the significant role played by amateur astronomers in public education and astronomical discovery, Shapley avidly supported the Milwaukee group's effort to create a national amateur organization.

In 1939, the Amateur Astronomers Association of New York organized a three-week exhibition at the 1939 New York World's Fair. That event was the brainchild of Charles A. Federer, Jr., Secretary of the AAANY and volunteer editor of *The Sky* magazine, a joint publication of the AAANY and the Hayden Planetarium where Federer often lectured. At this meeting, Federer and Shapley led a discussion on the formation of a national body of amateur astronomers. Because of Shapley's connections with both groups, Armfield, Halbach, and Federer led a joint gathering in Pittsburgh in 1940 to create a "League" of amateur astronomers. Their efforts were finalized at a meeting in 1941 but the project was soon shelved because of Pearl Harbor and World War II. At war's end, though, the two groups gathered again, and the League sprang into being in 1946. Ed Halbach of the MAS became the first elected president of the League (1947-48), succeeding interim president Shapley.

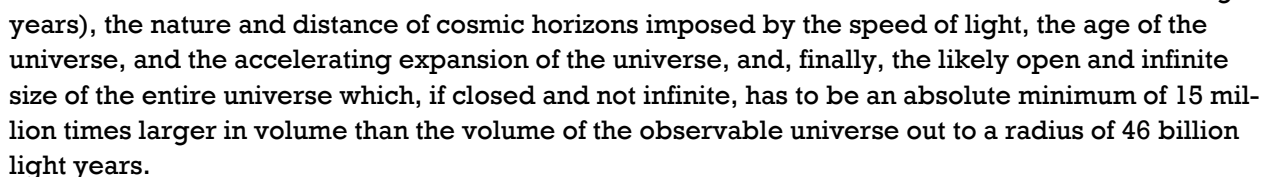
I had the privilege of returning to the MAS on October 14, 2023, to participate in a public open house centered on the annular eclipse (partial in Milwaukee). I was also scheduled to speak that evening. Both events were held at the club's extensive observatory southeast of Waukesha. My host

Watching the Annular Eclipse in between clouds at the MAS:



was a young and incredibly enthusiastic amateur astronomer named Matt Ryno, a man of 38 who could easily pass for early 20s. He is literally the club's factotum—Secretary, Membership Chair, Open House Chair, Publicity Chair, Board Member, media contact, Focal Point newsletter editor, observatory keyholder and trainer, and Solar Eclipse Ambassador.

is mostly empty space (99.9999999999996 percent empty to be exact). I also brought along a foot-wide bowl containing one million beads, a gift from Richard Gott and his late mother, Marjorie. I use the bowl to make a point about the distance to the Andromeda Galaxy, namely that, if each bead represented a mile, you'd need bowls of beads side by side in a line extending from Milwaukee to the planet Neptune to have enough miles to reach M-31. The talk culminated with discussions of the vast distances to quasars that are readily visible in 10 to 20-inch amateur instruments (some with light travel distances of 9 to 12 billion light



After the program, Matt took me on a tour of the club's many observatory facilities which include visual, photographic, solar, and radio telescopes (in the past). Most fascinating, perhaps, was a lit-

NCRAL Newsletter Featuring the MAS

Retracing Steps (cont.)

the 4-inch electronic Unistellar EVScope 2 that was set up outside with a connected tablet atop a music stand. Matt asked me what I wanted to see. Making a choice that I felt would severely test the little instrument, I chose Maffei 1, a galaxy in Cassiopeia that is so faint and heavily reddened by the plane of the Milky Way that it eluded discovery until 1967. Light pollution is certainly a factor at the observatory with the proximity of Waukesha and Milwaukee (the Sky Quality Meter read a rather sketchy 19.4), so I did not expect Maffei 1 to show up well if at all. For about 30 seconds, the tablet did not even reveal the little trapezium of foreground stars in which the galaxy is found. Then, suddenly, the screen went black, the number of stars quadrupled, and Maffei 1 appeared in full bloom in a little warped box of stars. I was stunned. He later dialed up M-27 that produced an image of substantial size and revealed incredible red and green features—simply beautiful.

My thanks go to Matt and to the other MAS officers, Jill Roberts, Lee Keith, Russ Blankenberg, and Sue Timlin, for their hospitality and for a day that produced the same excitement I enjoyed there as a teen so many years ago.

-- Chuck Allen

Catch the Talk Here

To catch a recording of Chuck Allen's presentation, view online via our YouTube page, here: <https://youtu.be/lnDBYVjS2e4?si=NwkinQ4r5tuAS7Vh>

Dumbbell Nebula, M-27 below, as seen that night:



Maffei 1 was once thought to be in our local group but is now considered an influencer of it, but part of the IC 342/Maffei Group or our closest galaxy groups, just outside of our local group, and it is a large elliptical galaxy, shown above. It is in the Zone of Avoidance and is hidden a bit by the Milky Way's arms, including stars and dust. It is made up of older metal-rich stars more than 10 billion years old, and is thought to contain many globular star clusters.

Star Analyser and Spectroscopy at the MAS

Tom Field, author of Rspec spectroscopy software (rspec-astro.com) spoke to the Milwaukee Astronomical Society this fall on how you can do science with spectroscopy, using a special filter called a Star Analyser. This presentation followed an initial meeting with Matthew Ryno and Mojgan M. Haghanikar, a Science Education Research Affiliate from the SETI Institute and City Colleges professor from Chicago, to help assist and collaborate with Milwaukee Astronomical Society members using eVscopes to do spectroscopy and collect scientific data. Later, the board of directors approved the expense to add a Star Analyser to our equipment list and processing software.

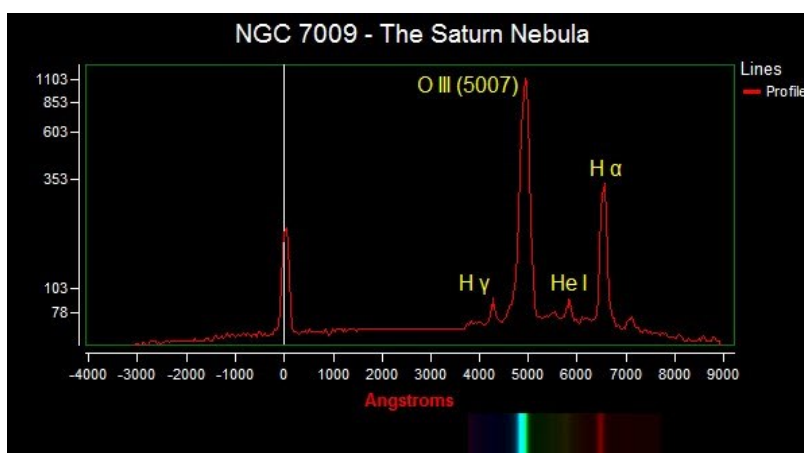


The Star Analyser 100 grating screws onto your camera nose or filter wheel

For more information on how to get started with spectroscopy, start by watching Tom's presentation hosted here on our MAS Youtube Page: <https://youtu.be/chQVjg3dIV4>

Here is a look at what the emission lines might look like on a nebula, surrounded by a gas shell that is excited, with the Saturn Nebula, for example.

By leveraging the Unistellar eVscope, and a special 10mm C to 1.25" adapter to allow a threaded star analyser to attach to the camera, it is easier to navigate to a night sky object and record data. Then, use our MAS laptop or computer to run a copy of Star Analyser and begin an analysis. You can also use one of our planetary cameras.



When you collect data, you are looking to get a horizontal line of a bright streaking rainbow for a bright object. This is what rSpec looks to in order to generate a graph.

Dr. Haghanikar has offered to return during clear skies to help instruct future users on this technology, as she aims to test a SETI Institute college coursework on amateur astronomers. If you're interested in completing a periodic table of Spectra and learning how to do this exciting topic, please reach out to our Google Group (milwaukeeastro@googlegroups.com) to express interest, or contact Matt Ryno (mattryno+MAS@gmail.com) for help getting started.

Glass Tree Festival at the Yerkes Observatory

Meet MAS Volunteers, Scott Lancelle, Dhruva Kalyani and possibly Matt Ryno at the Glass Tree Festival at the Yerkes Observatory in the Milwaukee Astronomical Society booth on December 17th in the vendor village, and potentially out observing on the lawn if skies are clear. The MAS will join the Madison Astronomical Society, Lake County Astro Society, and the UW-Madison astro department, in supporting this multi-weekend event with volunteer staff. It's not too late to get involved! Email mattyryo+MAS@gmail.com for more information. Or, come on out as a visitor and enjoy the festivities.

373 WEST A HOLIDAY TRADITION GENEVA ST

YERKES OBSERVATORY **THE WORLD'S TALLEST GLASS TREE** FREE TO THE PUBLIC!

PRESENTED BY MACK GLASS & THE ELLIOTT ORGANIZATION

WITNESS THE STAR TOPPING EVENT SUNDAY DECEMBER 17TH AT 2PM

YERKES OBSERVATORY UNIVERSITY OF CHICAGO

WORLD'S TALLEST GLASS TREE 2012-2013

JOIN US! DECEMBER 1ST - 17TH
FRIDAY 4-7 ★ SATURDAY 12-7 ★ SUNDAY 12-5
373 WEST GENEVA STREET WILLIAMS BAY, WISCONSIN
YERKESOBSERVATORY.ORG WORLDSTALLESTGLASSTREE.COM

Award Winners!

Dhruva Kalyani and William Gottemoller won the Astronomical League's Youth Awards categories this year, including the Horkheimer/Parker Youth Imaging Award, and the Horkheimer/Smith Youth Service Award, featuring back to back youth imaging awards for the MAS.

The Jack Horkheimer Youth Service Awards are presented to any Astronomical League member who is under the age of 19 on the date of the application.

Congratulations to Dhruva Kalyani for first place in the AL Youth Imaging Award, for his image of the Jellyfish Nebula, taken in SHO ([astrobin link](#)), and William for second place for the Crescent Nebula, right below ([Astrobin link](#)).



Dhruva Kaylani was a Junior from New Berlin High School, and he won first place in imaging, and is entering his senior year this year, with college recommendation support by Matt Ryno, who will also be working with Dhruva as a Solar Eclipse Ambassador this year. Dhruva is a new board member for the MAS, and received training and support in being nominated from last year's first place winner, William Gottemoeller, who took second place this year as well since they were taken the year he was a senior. William has also received a second award for service and went off to Harvard at the end of this summer, with MAS recommendations, and has been seen recently in town by members!

As a congratulations, Brian Valente of Astro-Physics Inc., recently sent congratulations to Dhruva Kalyani on his recent win, and also to William Gottemoller for helping lead the charge on calibrating and testing an imaging system on G-scope's Astro-Physics AP1600 mount. Astro-Physics Inc., is also the manufacturer of a Mach 1 mount we are now using on F-scope which Mike Bauer recently completed software control systems for, which gets used by Dhruva and other imagers regularly. The MAS is looking forward to installing a third imaging telescope in the upcoming year, a Stellarvue refractor purchased from observatory director, Paul Borchardt, on a donated Mach 1 mount.

"I hope you will pass along my contact information to them so that we may send them a small token of our congratulations, and hope we can speak further with them to hear young people's views on astrophotography," said Valente. Astro-Physics then awarded William and Dhruva with imaging time on a telescope in the Atacama Desert in Chile. Details on the LCRO instrument the two collaborated on to image and then process the image is here: <http://lcro.duckdns.org/>

Milwaukee and Madison

Collaborative Imagers Group

The letters, MAS, carry a rich legacy of collaboration with it in Wisconsin, and tell a tale of two over 90-year-old astronomical societies that have repeatedly worked together in our past to represent astronomy in Wisconsin, and bring value to our members who have gone on to study the stars, engage their communities, and enjoy the night sky. Read about [Madison here](#) and [Milwaukee here](#).

It is in that spirit of collaboration that I'm happy to announce we will be combining forces to host an [inaugural Wisconsin Imagers Group meeting virtually](#), open to members of the Milwaukee and Madison Astronomical Societies, which will recur every second Wednesday of the month. It's our hope that the knowledge sharing between our two groups inspires future Images of the Day, photometry or citizen science collaborations, and star parties where we share meaningful experience between our memberships, and we invite others from Wisconsin to join us and collaborate on virtual tools like Slack as well in between our recurring meetings. There's a wealth of astro imaging expertise between our two groups, so let's start sharing! T

[Take a look at the recording from our first](#) virtual meeting of amateur astronomers, just starting out or deeply involved in astrophotography, and learn from each other! We'll start off with introductions, and a round robin on the projects we're all working on, and then we'll introduce our free collaborative Slack space, where all astrophotographers in Southeastern and Central Wisconsin can join to collaborate, chat or get help at any hour of a clear night, agnostic of your local astronomical club membership homepage. It is a truly interactive opportunity to get to know fellow astrophotographers in the state, share projects and images, and start discussing your passion in a wider community of veteran imagers and beginners alike. Then join our standing meeting, regularly held on the second Wednesday of every month, via this Google Meet link:

MAS Imaging Interest Group Meeting
Every Second Wednesday of the Month! · 7:00 – 9:00pm
Google Meet joining info
Video call link: <https://meet.google.com/mvr-jgwz-fft>

To join our Southeastern Wisconsin Imagers Group Slack space, [please click this link to join our Slack space](#). This is a Slack space with astro imaging as a unifying factor – whether you're conducting Electronically Assisted Astronomy, Deep Sky Astrophotography, Solar Imaging, having trouble with equipment at 2am, considering imaging equipment, or looking to go observing at a community dark sky site with other astrophotographers, this is a community to be a part of and load on your phone as a chat application. We recommend adding all channels when joining, and saying hi once you log in!

We're looking forward to having you join us every second Wednesday of the month at 7pm, for our inaugural combined online meeting, which will continue every second Wednesday of the month! To view an archive of past meetings, you can browse our [recent playlist here](#).

-Matthew Ryno

Unistellar eVscope Smart Telescopes are a hit with Members and Citizen Scientists

By Matthew Ryno

It's been since spring when the Milwaukee Astronomical Society board members approved a purchase of a [Unistellar eVscope 2](#) smart telescope—an Internet-connected robotic telescope, wirelessly controlled by phone or tablet, with an onboard computer and positioning system and camera for color deep sky images. Months later, thanks to generous support by Gene Hanson, the board acquired a second Unistellar eVscope, originally owned by myself, and frequently brought out to the Milwaukee Astronomical Society in 2020 - 2022, and an instrument for a few Messier Marathon attempts and case study of this telescope for open houses and general outreach and excitement.



Unistellar eVscope Status (cont)

On any Saturday night, this second eVscope gives us more options and will allow us to keep an eVscope running on a science mission for example, while our new Unistellar eVscope 2 is being used by members to tour the galaxy, take pictures and enjoy exploring the sky, as an example. The eVscopes are a brand of smart telescope offered by the telescope company Unistellar, and they allow us to cut through light pollution and to view color images of deep sky objects on a tablet, phone and in the eyepiece! As some of us have been pleased to witness, we've been able to do this in high clouds, smoke haze or full moon glow, which is a time when visual observing is more difficult.

This additional eVscope has a special history, since 2020, as owner of this eVscope, it was involved in **124 scientific observations** mostly in Riverwest, Cudahy and at the MAS to date.

Here is a breakdown below by campaign data collection history—we have surpassed this since, as a club scope with regular citizen science activity.

Exoplanet Transits: 38
Cosmic Cataclysms: 31
Cometary Activity: 30
Planetary Defense: 16
Asteroid Occultations: 9

As some of you may know, this scope was also the data contributor to the Nature article earlier this summer, on the NASA Double Asteroid Detection Test ([arxiv.org link here](https://arxiv.org/abs/2008.01148)) So, we've got a nominally performing machine with a record of data results on our hands! Sensor and capability is very similar between the scopes, although the eV1 will have a very slightly narrower field of view with more pixels concentrated in that smaller area. Basically - they are both fun scopes to use! If anyone remembers from earlier in the year, this was the same scope we all saw a very bright green comet through, while we stayed warm inside of the MAS. It's a scope I'd been bringing to outreach in the community,



MAS Member, Volunteer and Citizen Scientist, Jericho Kuehl sets up an eVscope for an Open House
Photo by Glenn Sarlitto

Unistellar eVscope Status (cont)

or to MAS for members for a few years now, so I'm proud to have it back at the MAS, where I'll be available to be a resource on using these amazing telescopes for members.

To use these smart telescopes at the MAS, you can utilize our tablets available next to the telescopes in the Quonset after you've become trained on setting the scopes up (come see it done some Saturday night). Otherwise, you can also download the Unistellar application on your cellular phone to follow along as someone is controlling the scope, to take pictures onto your own phone and follow along and get to know how it's done if someone else is operating the telescope. You just connect to the local wi-fi the scope produces when you arrive, then just power up the app you downloaded and start snapping pictures. Then come to our first Wednesday meeting this week, or a Saturday night members night, to learn more and get trained. App links here: [Google Play store link](#) \ [Apple link](#).

As a reminder, post some of your pictures to our showcase when you're out observing - we've started some picture sharing there already, so look forward to collecting many more fun pictures in the future: <https://milwaukeeastro.org/showcase/eVscope.asp>

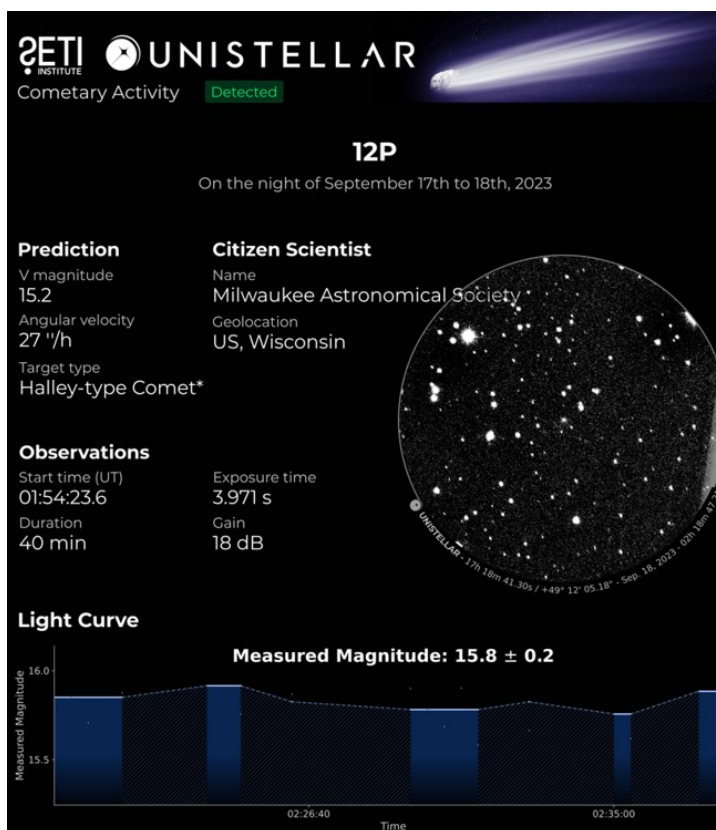
Matthew Ryno has also saved the nearly 1,000 images we've collected since May with these telescopes, which you can browse here: <https://photos.app.goo.gl/ALfWtsZ6CzRm7QVj8>

Recent Citizen Science Results

We're also continuing to generate scientific data with the telescope, including joint observations of Comet 12P/Pons-Brooks (which is about 400 million kilometers away), with two other MAS Members Jericho Kuehl and Dhruva Kalyani, joining me to add our collective observations with either the Milwaukee Astronomical Society Unistellar eVscopes, or our own, to the results tables that lead researcher at SETI.org, Ariel Graykowski, is constructing from data of about 70 total observers throughout the world so far via our Unistellar network, to study outbursts from this very distant comet, 12P/Pons-Brooks.

Comet 12P/Pons-Brooks has undergone multiple outbursts, "as comets move toward the sun, radiation from our star heats material within them, causing solid ice to transform directly into gas. This process, called sublimation, blasts from the comet's surface and blows away solid material. Sublimation is more explosive and dramatic for the 12P than most other icy bodies. The cryovolcanic nature of 12P/Pons-Brooks allows the interior of the comet to be superheated, letting pressure build-up until it explosively cracks the comet's outer shell and sprays matter into space." - more background via this [space.com article](#), including the date when this comet will make a close approach to the sun on April 24, 2024, and it will be a comet people talk about during the total eclipse April 8, 2024.

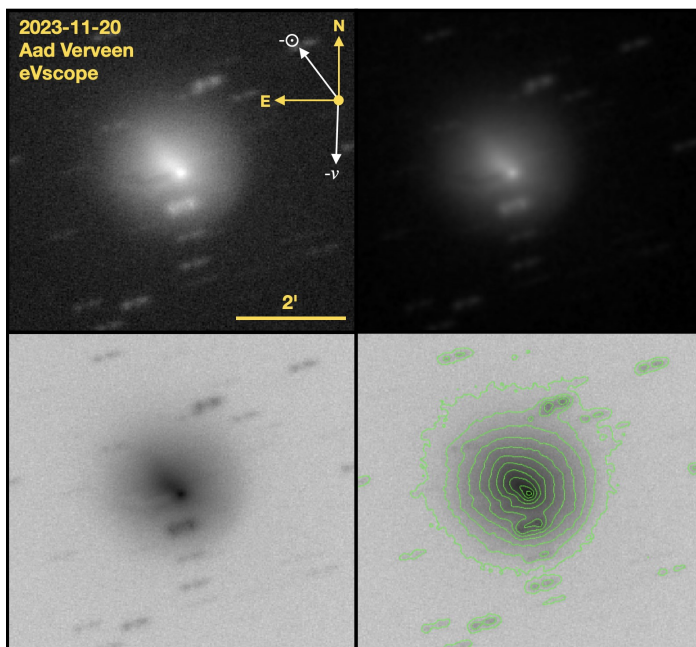
Lead SETI and Unistellar comet researcher, Ariel Graykowski, noted via Slack in a thread to contributors this week, "I have



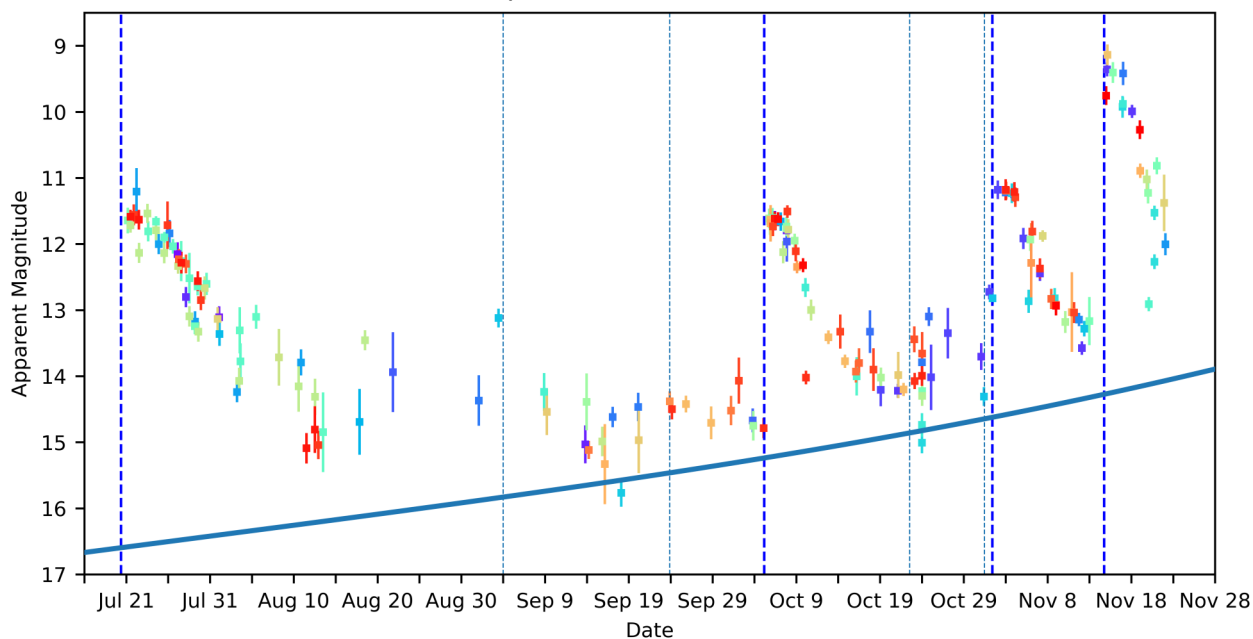
Unistellar eVscope Status (cont)

been amazed at the level of detail we've seen in eVscope images. We can see the shadow and the jet structures in the coma. I'm impressed and amazed at the enhanced vision images you all have been posting! There are two obvious jets that I can see in your images. At the bottom of this thread is a screenshot of @Aad V. Netherlands's science observations from November 20th, where you can see the two large jets, which appear as concentrated streaks within the coma."

Here is a look at the various outbursts we've been able to observe globally, charted. Recognize a few names in the data contributors, corresponding to our scopes? Apparent magnitude is noted on the y axis, and dates on the x axis, with contributors in color below the chart. I'll be printing this off to add to our results wall in the Z-dome hallway this year!



12P/Pons-Brooks Outburst



Unistellar's Pre-Outburst Prediction	John Archer	Randall Blake	Baptiste Montoya
Outburst Jul 20, 2023	Scott Kardel	Martin Smallen	George Dvorsky
Outburst Sep 04, 2023	Peter Black	Club D'Astronomie Bois De Belle-Rivière-Mirabel	Fabrice Mortecrette
Outburst Sep 23, 2023	Bryan Tobias	Fadi and Sophie Saibi	William Turnipseed
Outburst Oct 05, 2023	Anonymous	Jean-Marie Laugier	Joel Reyes
Outburst Oct 22, 2023	Rachel Knight	Stephen Lawrence	Jean-Paul Costes
Outburst Oct 31, 2023	Laurent Millart	Nicola Meneghelli	Franck Marchis
Outburst Nov 01, 2023	Eliud Bonilla	Bruno Guillet	Chelsey Logan
Outburst Nov 14, 2023	Masao Shimizu	Petri Kuossari	Michael Primm
Wataru Ono	Milwaukee Astronomical Society	Sophie Saibi	Keiichi Fukui
Stephen Lawrence	Nicolas Delaunoy	Georges Simard	Michael Primm
Cliff Wexler	Bruce Parker	Keiichi Fukui	Stefan Will
Jean-Michel Ladruze	Nicola Meneghelli	Axel Blenefeld	Rachel Knight
George Dvorsky	Robert Arnold	Matthew Ryno	Bruno Guillet
Mike Mitchell	Eliud Bonilla	John Bradley	Phil Yehle
William Turnipseed	Julia Kamenetzky	Tateki Goto	John Bradley
Ariel Graykowski	Petri Tikkanen	Petri Kuossari	Masao Shimizu
audio Vantaggiato	Jennifer Siders	Anonymous	Baptiste Montoya
Laurent Letot	Takaya Okada	Sam Hemmelgarn	Patrick Huth
Davy Martin	Tateki Goto		

What's Everyone Imaging?

If you haven't checked out our MAS site, go there first, via: <https://milwaukeeastro.org/showcase/whatsnew.asp>

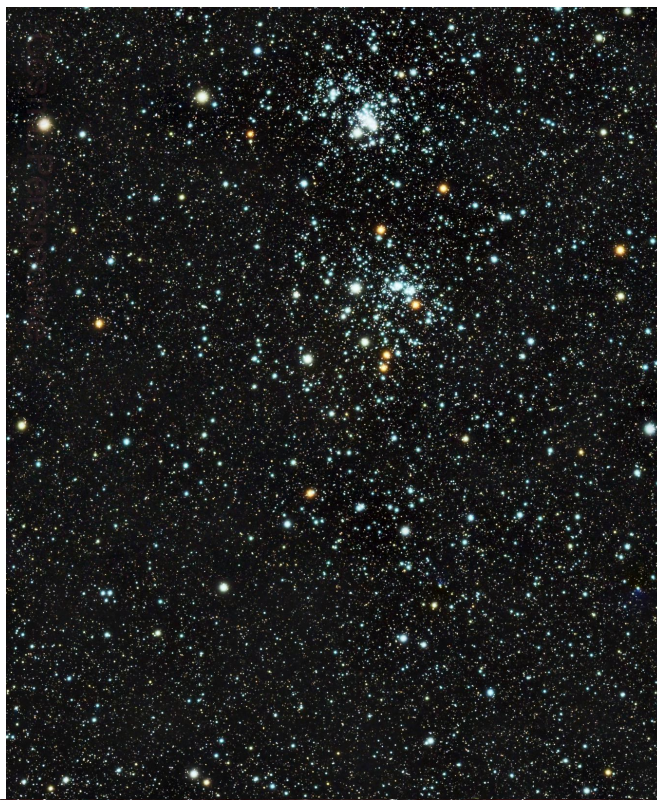
Did you know you can submit any of your pictures via our website? It's a benefit of being an MAS member. To submit a photo, go to <https://milwaukeeastro.org/showcase/submit.asp> and you may be asked to log in next.

You can also join our Astrobin group! Submit a request to join here, and enjoy the latest pictures too from other members: <https://www.astrobin.com/groups/123/milwaukee-astronomical-society/>

We also enjoy it when you post in our Google Group on completion of a processed image, or ask for opinions in our Slack Group. Enjoy some of the latest Astrophotography!



Arun Hedge,
[Thor's Helmet](#)



Matt Ehresman
[Perseus Double Cluster](#)



Gabe Shaughnessy,
[The Methuselah Nebula](#)

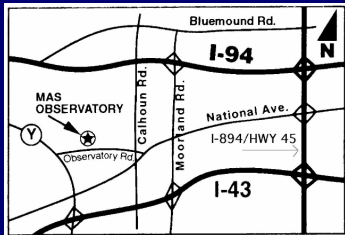
Renew Your MAS Membership!

**Renew your membership at www.milwaukeeastro.org/renew!
Membership for 2024 is due by December 31, 2023.**

We have connected with more members than ever, but need your continued support! Our Milwaukee Astronomical Society Observatory is funded entirely by you, our members, and we would love to see you around in our meetings, our email group, and at the observatory any Saturday next year. We have [Stripe and Paypal digital payment options](#) this year to easily renew, or a check may be sent by [PDF renewal form](#) in the mail to our Treasurer.

Rates remain the same as last year, at \$23/yr. student, \$46/yr individual, \$52/yr. family, \$28/yr non-resident memberships. Optional donation amounts are accepted also by form.

If you're considering giving the gift of MAS Membership to friends, neighbors and co-workers, please visit our [Gift Application Form](#), which also accepts Stripe/Paypal.



MAS Observatory

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