Annual Report 2024

The Board of Directors and members of the Astronomy Section of the Rochester Academy of Science gratefully acknowledge the continuing support of the Marian and Max Farash Foundation which enables us to achieve our goals,

"the education of members and the general public in the knowledge and enjoyment of the wonders of the universe, and to furthering the understanding of astronomy in the Greater Rochester area".

CONTENTS

Who and what we are

Our Observatory

The Marian and Max Farash Center for Observational Astronomy

Ionia, NY

The Farash Center, comprising 17 groomed acres, 12 observatory, meeting and storage buildings, provides the central meeting place for our members and guests.

Our Membership

Our membership has grown by 8.5% since our last report. Ranging from professional astronomers and researchers to beginning stargazers, our 269 individual and family memberships represent 327 individuals who span all ages and have a wide array of interests and abilities. By coordinating with our Outreach activities, we continually make ourselves known to potential new members.

Image courtesy of ASRAS member Nick Lamendola

Farash Center Improvements

2024 saw additional maintenance and improvements at the Farash Center: A fire inspection was conducted on March 1st and provided recommendations that were promptly addressed. An additional smoke alarm was installed in the basement stairwell, two exit signs on the main floor were replaced with signs that have battery backup to remain on if there is a power failure, and new fire extinguishers were installed in the basement, classroom, and garage.

Some sleuthing to solve a communications issue with the Solar Telescope and the network, plus minor upgrades and reallocation of existing hardware, allowed us to stream live views of the Sun over the internet from our Solar Observatory, as well as from the observatory to the Education room. These were prepared for April 8, but have also been used to include members and other interested groups who couldn't travel, in live solar observing.

To smooth out the driveway, we added a 20 ton load of finer crushed stone over the load of coarse stone delivered in 2023. Branches of a large tree (cut later) contacted the upraised dump truck box, and prevented a smooth distribution of the new stone, resulting in a thicker layer than needed just north of the main building. Work parties were called to help smooth this finer stone out.

The tree that obstructed the dump truck, along with a number of others blocking the view to the southeast of the 20 inch roll-off, were cut in December *(shown at right)*. This job was hired out to a tree service for safety, since some trees were large enough to hit the main building or the 20 inch roll-off.

In December 2024, a number of trees obstructing viewing were taken down. (Left) Facing East, (right) facing west. Images: Roger McDonough

Finally, a Farash Observatory "Big Dome" clam-shell north pivot binding problem occurred in 2024 after 23 years of use. A temporary clamp was installed, and a more permanent repair was planned for the final weeks of 2024. Scheduling and weather delayed this to early 2025. *(Note: Bob McGovern, who was there when the dome was assembled in 2001, performed this repair, reinforcing both pivots January 13, 2025.)*

North Pivot

South Pivot

Scouts installed a new wood storage cabinet in the forest nearby. Image: Mark Minarich

Scouts helped edge, maintaining the path from the lower parking lot. Image: Mark Minarich

Outreach and Education

Scouts

In the past year, ASRAS Outreach has successfully hosted ten engaging events aimed at fostering an interest for astronomy and expanding understanding and appreciation of the Universe we live in. Our outreach initiatives have spanned a variety of community organizations, including Cub Scouts, Boy Scouts, Girl Scouts, Venture Scouts, and local libraries. Connecting with a diverse audience within the community has been a rewarding endeavor, and we continue to work with the local scout chapters to bring the joy and excitement of Science to all. Teaching science to children lays the foundation for appreciating the world around them and fosters a sense of curiosity and inquiry.

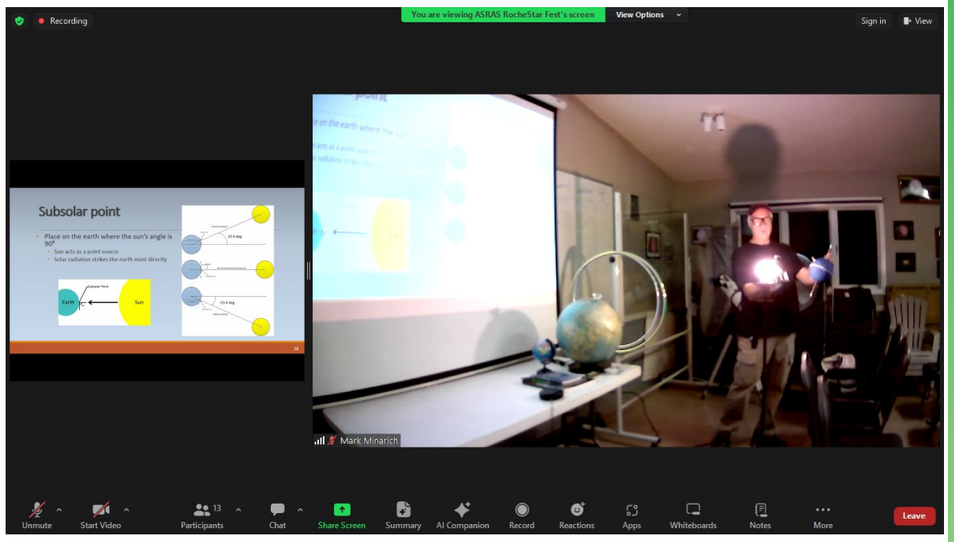
The programs we run at ASRAS encourage children to explore concepts of the natural world to help make sense of everyday phenomena. They are encouraged to think critically about the information they encounter which in turn helps them build those solid foundations of knowledge. Our programs also offer opportunities to become a lifelong learner. How children engage in learning activities, the interactions between them when solving problems, and how they build relationships with the community around them can energize them into becoming stewards of learning. Science education opens the doors to diverse perspectives and cultures, helping children to understand that knowledge is not static but evolves over time through collaboration and discovery.

Our overarching goal has always been to educate, inform, and excite the community about the significance of space exploration, the impact of technological advancements, and the rich historical context surrounding these topics. We strive to ignite a sense of wonder and appreciation for the universe, which we believe can inspire the next generation of scientists, engineers, and informed citizens. Moreover, our reputation as a reliable resource for astronomical knowledge and assistance is reflected in the consistent inquiries we receive for help with observing sessions, school visits, and project collaborations. This regular engagement from the community demonstrates the effectiveness of our outreach efforts and underscores the demand for astronomy-related education.

The Astronomy Forum

The ASRAS Forum, or “Astronomy 101”, is a monthly educational opportunity for all members, particularly those who are new to astronomy. Depending on the nature of the presentation, some sessions are blended (Zoom + in-person) and some are Zoom only. Most Forums are also recorded and posted on the ASRAS website for later viewing by members unable to attend on the date of the presentation. Many of these sessions combine didactic presentations with practice skills-based activities. We invite less experienced members to present topics with help and mentoring by more experienced members – “beginners teaching beginners” in many cases. Attendance is growing steadily, currently varying from 15-30 per session.

The 2024 Forum schedule included the following:
January *Quadrantid Meteor Shower* by Tony Golumbeck
February *DIY Making Solar Filters* by Nick Lamendola
March *DIY Making Solar Funnels* by Mark Minarich
May *The Life and Death of Stars* by Craig Kaplan
June *Cleaning Your Telescope Mirror* by Frank Bov
September *Understanding and Navigating the Celestial Sphere* by Craig Kaplan
October *Beginner’s Guide to Constellations* by Steve Fentress
December *A Deep Dive into the Big Dipper* by David Bishop



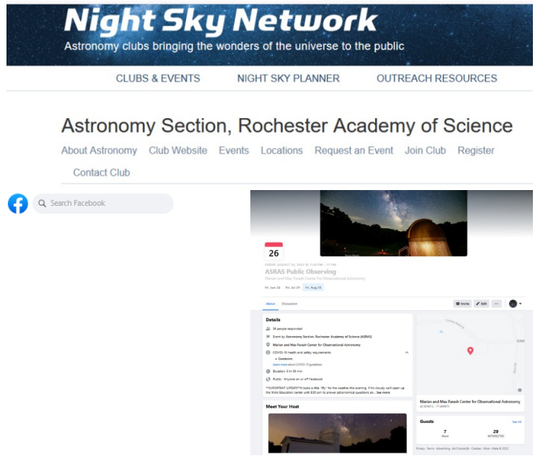
(above) ASRAS member Craig Kaplan does a live demonstration on what a “subsolar point” is, using a light bulb, at the September Forum, to both an in-person and zoom audience. *(Image: Tony Golumbeck screenshot)*
(left) “Never stop looking up”- scouts on the Farash Observatory learning about how to capture the night sky. *Credit: Joe Altieri*
(far left) Scout “Cave Selfies”- learning about Reflector Telescopes. *Credit: Joe Altieri*

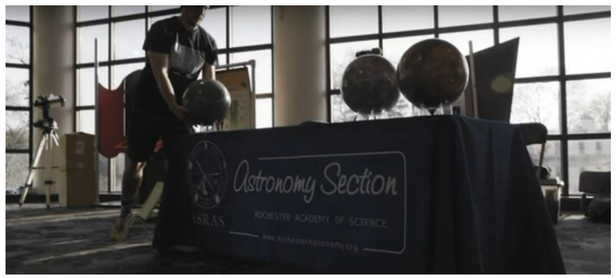
Outreach and Education

Public Star Parties

ASRAS was able to open up our observing site to the public offering six months of Dark Sky viewing from the Marian & Max Farash Center for Observational Astronomy.

From May through October 2024, monthly on a Friday evening, the Astronomy Section advertised on Facebook, our own Website, the Night Sky Network, and the AstroSpheric Weather App that our site was open to the public for observing popular, and even some rare, celestial objects. Over 180 people attended these six events to find many celestial beauties each of these nights through our club telescopes and members' telescopes.





Strasenburgh Planetarium Observing

ASRAS was excited to collaborate with new RMSC Planetarium Director Jim Bader, while also paying homage to Steve Fentress who retired from that role at the end of 2023. The primary challenge to observing at the Strasenburgh Planetarium in 2024 was a lack of good targets in Spring and much of Summer. Still, Jim Seidewand and Don Chamberlain persisted (with a regular new cast of helpers that included Craig Kaplan and Frank Plavec), providing 22 Saturday nights for public observing on top of the Strasenburgh Planetarium using the two roof top scopes, with around 1200 visitors.

These numbers are down still from pre-pandemic levels, which were typically 30+ nights and 2,000+ visitors. In 2024 this was mostly due to the lack of targets in spring and summer (no planets were visible preventing viewing when the Moon was also not visible), and the late twilights in summer leaving not much to look at before needing to close due to security policy.

While observing numbers were down, volunteerism was up, with a total of 77 nights worth of volunteer time.

Outreach: Mees Observatory Tours

ASRAS Past President Mark Minarich lead a Tour Guide team of 23 ASRAS and University of Rochester volunteers facilitating our outreach efforts with Mees Observatory. Summer on – site tours were quite successful in 2024, with sixteen ASRAS members and nine students/ faculty joining the combined ASRAS/UR team. In that format, 19 tours were supported, and 56% of those included telescope observing, thanks to many nights with clear skies.

All tours were fully reserved, and long waitlists built up, as witness to the high degree of interest in the tour offering. In all, 364 guests visited this summer and were delighted with their time at the observatory.

(left) ASRAS at an RMSC event in Rochester.
(above) VP David Bishop leads an observing session in Ionia.
(right) Past President Mark Minarich continues to schedule and lead Outreach for ASRAS in 2023. He also took over as Mees Summer Tour Director.

Image credits: Quinn Freidenburg, documentarian, RIT Photojournalism student in 2023

Member Activities

ASRAS Monthly Meetings & Lectures
In-Person, online

Throughout 2024, ASRAS hosted monthly membership meetings primarily In-person, but also simulcast over the internet. Because some members attend virtually only (due to health complications, travel, or where they reside), we continue to offer virtual as an option. This is also helpful when the weather is poor for travel. After each meeting we send out the meeting slides to the members, and we post a video of most Presenters' talks online, for viewing at the convenience of members: https://www.youtube.com/playlist?list=PLUKWxnvjYq6ir1s1dpz86HiwAfx0yp2MX

2024's meeting talks included:
Keith Havey, *Chandra X-ray Observatory*
Larry Henry, *Edwin Hubble: Surveyor of the Universe*
Dr. Michael Richmond, *Strömgren Spheres*
David Bishop, *Astronomy Year in Review*
Hernan Rincon, *"Cosmology Results from the Dark Energy Spectroscopic Instrument"*
Nitya Ravi, *"Observing Dark Matter"*
Dr. Dominique Segura-Cox, *"The Many Size Scales of Star Formation"*
Steve Fentress, *"How Meteor Showers were Discovered"*

RocheStar Fest 2024 group photo. (right) Keynote Speaker Roxanne Kamin poses in front of the custom "Occultations" cake from Sweet Solutions. Image credit: Peter Blackwood

Open Houses

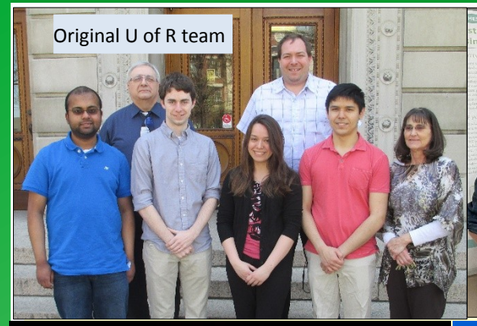
Led by Site Manager Roger McDonough, in 2024 ASRAS held 12 open houses, one each month, hosting hundreds of people total, and giving members an opportunity to learn the buildings and equipment in the daylight. Generally, they occurred on a Sunday from noon until 3p.m. or later if the skies are clear.

Observing Nights at Farash Center

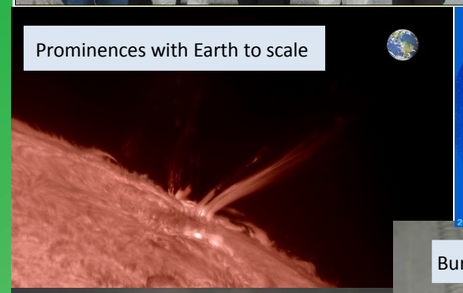
Picking the optimal Moon phase for deep sky observing and imaging, we schedule a series of observing nights at the Farash Center for members. On these evenings, the many observatories are put to use, plus members' personal equipment. Besides these scheduled events, on numerous other occasions, members came to observe under the Farash Center's clear, dark skies.

For the first time in years, RocheStar Fest (RSF) had two clear nights for observing. Nick Lamendola took advantage with this shot of the Milky Way featuring the Farash Observatory "Big Dome" in the foreground on Saturday July 27.

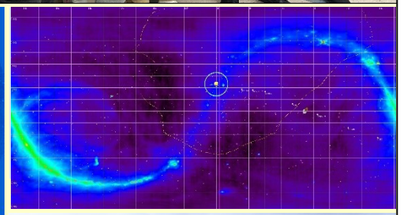
Science: *ART* – Autonomous Solar Radio Telescope

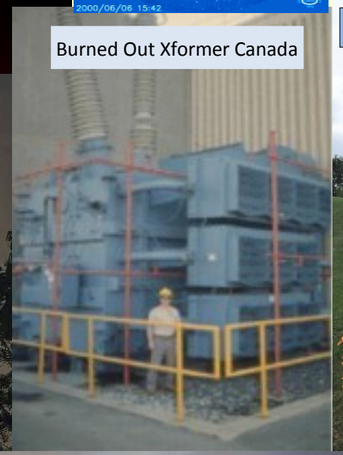

Original U of R team

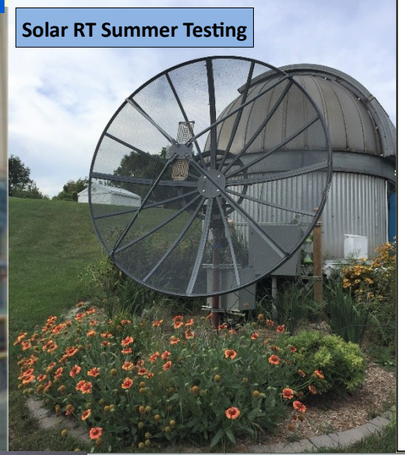

Present MSD team

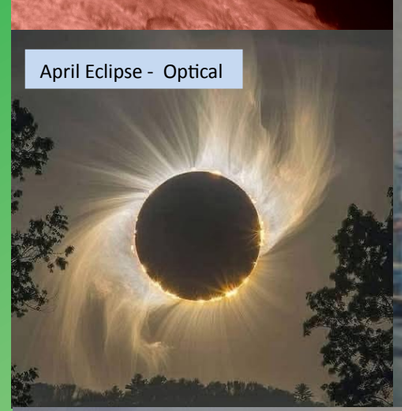

Prominences with Earth to scale

CME Launched From Sun




Burned Out Xformer Canada


Solar RT Summer Testing


April Eclipse - Optical


Main Building (West)

Progress ! This year's engineering team has worked very hard to achieve significant milestones, collecting radio data during the April 8 eclipse and ***installing*** the hardware for the Solar Radio Telescope at ASRAS's site in Ionia. ☺

Recognition goes out to the Farash Foundation, for their continued STEM support, and a very special thanks has to go to Al Ureles specifically, for having faith in our multi-year effort. Additional recognition has to be given to the MSD program at RIT, whose Lab & Facilities at the Kate Gleason College of Engineering has made all this a reality. It has been a very long journey, from the first U of R team characterizing the Ionia Site's horizon {far left} , to ***NOW***. A total of **54** undergrad students have had a piece of this project. Something this size, would have taken a large NASA team a long time, and a much bigger budget $$$.

ART is the very first Solar Radio Telescope to record, in stereo, the Sun's RF signal, with a Dish and the local related 'ambient noise' with a DiPole, mounted on the back of the dish as it tracks the Sun, every 15 minutes. Why go through all this trouble? Even remote areas are electrically quite noisy with RF interference, crowded Europe is especially bad at these operating frequencies. Our RF data spans from 45 MHz to 890 MHz, in 1/16th (0.0625) MHz 'slices', or 13,202 data points for VERY fine detail, for EACH channel. You've seen the Solar System in the visible (Stellarium, etc.) now we can model it in the RADIO Spectrum (~ 408 MHz) of the Solar Eclipse (Apr/8/24) {*center right*}. This system tracks the Sun from the morning Sunrise to Sunset, **Autonomously**, with **NO** human intervention or supervision.

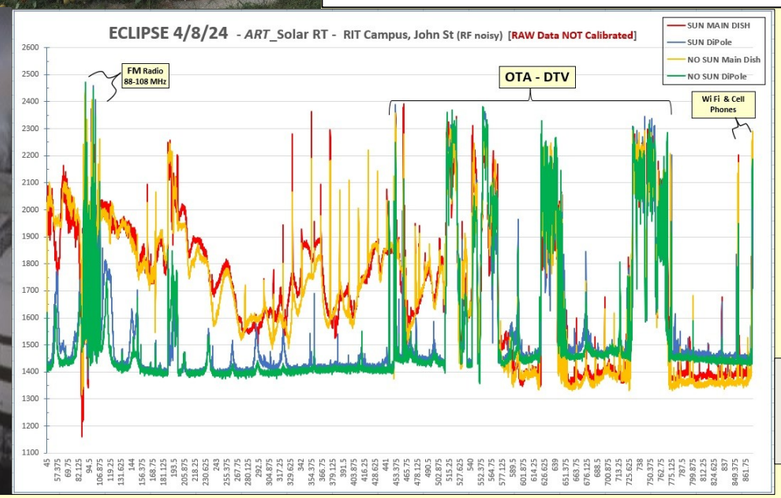
While we can't prevent Solar disturbances from happening, the scale is way too grand, {Mid Left} this solar radio telescope can act as an 'early warning indicator' that a storm is incoming with a 2 – 3 day notice {Mid Center} . In our increasingly sophisticated electronic world this can help us minimize disturbances and outages to our electrical grid, satellite operations, and transportation (both air & rail). Its not a matter of ***if*** it will happen, but a matter of ***when***! *None* of the present solar satellites look at the Sun in the **RF** spectrum. A direct hit, can be especially damaging. The one that happened in Canada in 1989 burned out a large transformer {*Lower Center*} and blacked out all of Quebec in the middle of winter. In the past, these solar storms have wreaked serious havoc on this little blue marble we call home.

We plotted the data from the April WNY Solar Eclipse at the RIT Campus. It clearly shows a pronounced difference between the Main Dish Signal and the DiPole, the MID frequencies being the RF Signal from the Sun. Also notice that the higher dish frequencies are LOWER than that of the DiPole which verifies the Front to Back Ratio of the Dish, for rejection of the DTV signals coming out of the City of Rochester (Ch 8, etc.) Our efforts have not been without peril, a wind storm came up a week before the Eclipse, crashing our Dish. ☹

Our Callisto station in Ionia, NY, is called '**KROC-USA**'. Years of temporary summer testing at the site (lower left) have paid off.

Our hope is that we will be sending actual Sun data daily to Zurich, SZ for the professional HelioScientists to use, **soon**.

Will this be the dawn of a new age for Solar Science ? ***We certainly hope so.***



Do you know what your Sun is doing today? **ART does!**

Sincerely,
Martin Pepe

Cut & Paste This Link to the team's Video !
https://www.rochesterastronomy.org/wp-content/uploads/2025/02/ART_Solar_RT_20965_L_Talk_2025Feb22.mp4

Science

Supernova Webpage

For the year 2024 we reported 22,644 supernovae and 57 extragalactic novae.

Of those, only 2,137 were confirmed as supernovae. 1,780 object turned out to be non-supernova events, such as variable stars or asteroids.

Our brightest object was supernova 2024ggi in NGC 3621, which got as bright as magnitude 11.7. This was not even close to last year's 2023ixf in M101 at magnitude 10.9.

Other bright objects were 2024inv in NGC 3524, 2024muv in NGC 4699, and 2024any in NGC 1222, all bright enough to find in an amateur telescope.

Our most prolific galaxy had two more supernovae in it, bringing the total up to 13. This works about to be about 1 every 2 years since the automated surveys have started.

In little distant LEDA 20001870, supernova 2024pgd and 2024npr (both of the common Type Ia supernovae) went off at once. At magnitude 19 this was far beyond the ability of an amateur telescope, but still an interesting event.

The supernova web page sponsored by ASRAS is the only place on the web where you can find what supernovae are currently observable. Visit it at **www.rochesterastronomy.org/supernova.html**

We started a new service for cell phone users this year which has substantially increased our web hits.

Image Credit: Andy Casely https://www.flickr.com/photos/snimages/53681354872/

ASRAS member David Bishop has made the cataloging of supernova a study of his. A quarter of a century ago Dave made a list of the currently observable supernovae (plural of supernova). The list was designed so that people could easily see what objects were visible. His webpage is the only source of supernova reference images on the web http://www.RochesterAstronomy.org/snimages). It has been cited in many technical papers.

Astrophotography

Member Astrophotography

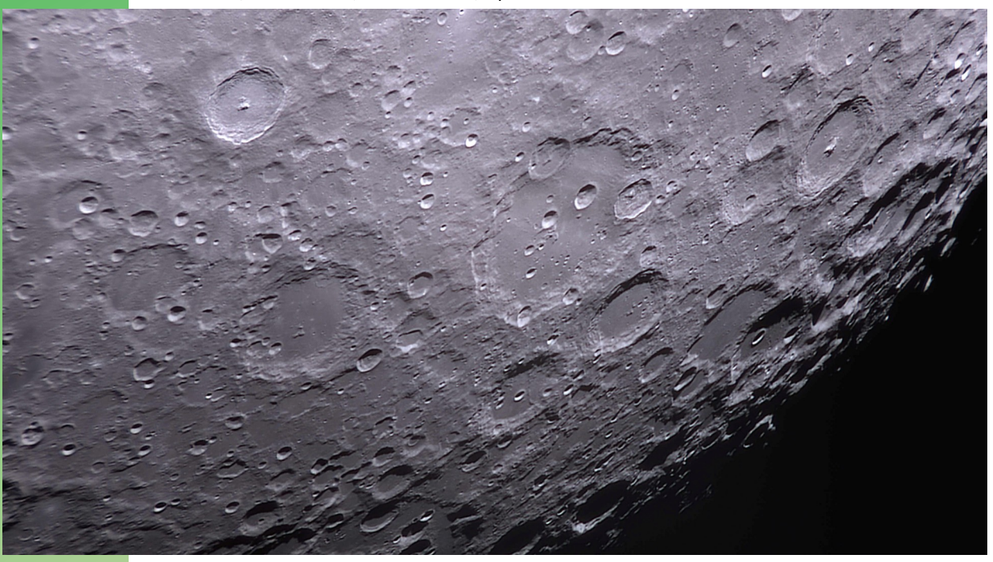
ASRAS members continue to refine and improve their astrophotography skills using their own equipment or equipment available to them at the Farash Center. Techniques learned from experience and fellow members who enthusiastically share their knowledge help create images such as these, which are included on our website and newsletter, shared online with members, and routinely posted to online sharing sites.

(left) Pacman Nebula NGC281, Rick Albrecht, November 2024

M81 and M82, John Larysz, March 2024

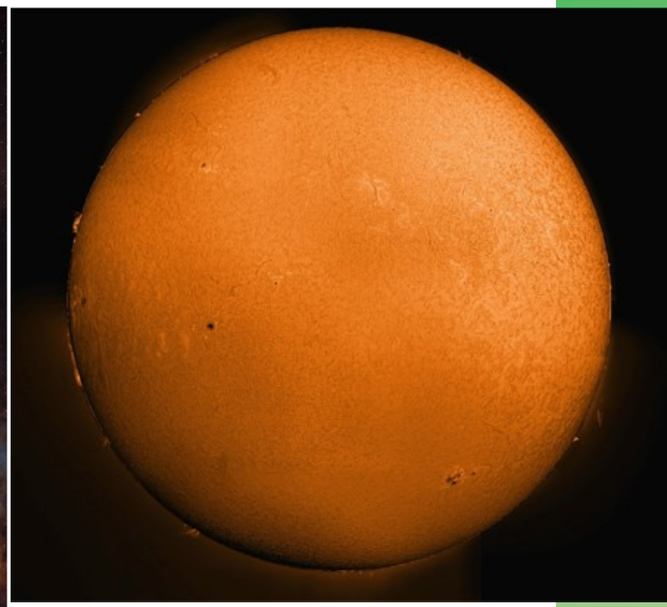
Comet 12P/Pons-Brooks, Rick Albrecht, April 5 2024

(above) Comet Tsuchinshan-ATLAS (C/2023), Burney Baron, October 2024



Lunar Surface, Kevin Lyons, February 2024

NGC 7822 The Central Region of the Question Mark Nebula, Patrick Cosgrove, October 2024



Sun in H-alpha, Douglas Kostyk, February 2024

Historic April 8 Totality

Preparations

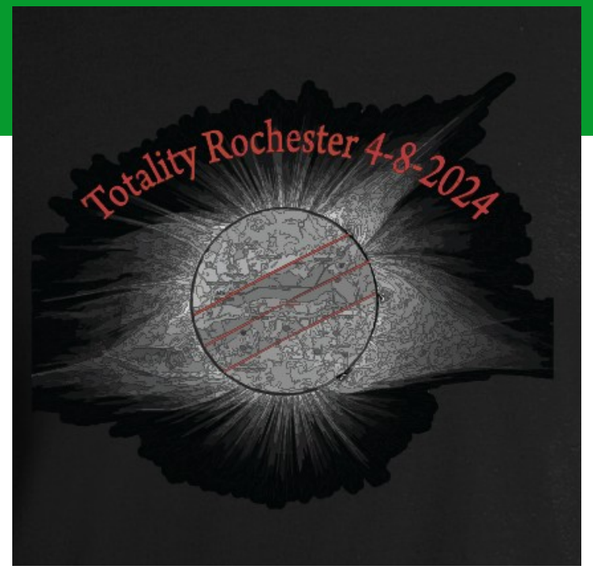
For the first time in 99 years, Totality, the umbral shadow of the Moon on the Earth during a Total Solar Eclipse, came to Rochester, NY, as well as Ionia, NY (3 minutes 14 seconds).

Eclipse Glasses were ordered in bulk to obtain the best pricing, through an ASRAS partner, the Rochester Museum and Science Center (RMSC). RMSC hosted numerous community planning events that ASRAS contributed to over the 7-years leading up to Totality.

Solar Filter material was ordered and made available, for as little as $3 for a 6-inch by 12-inch piece, to retrofit people's existing telescopes for safe solar observing.

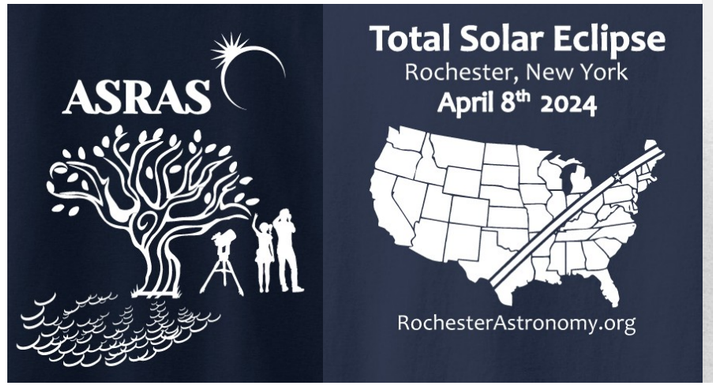
An ASRAS Totality Shirt Contest was announced at RSF 2023. The submitted designs were so excellent, that the Board voted to have four of the designs made in early 2024 to commemorate April 8 (*winning designs shown at right*).

Expecting major interest, the ASRAS Board evaluated the capacity of the Farash Observatory Ionia site and determined that local Parking would be the limiting factor on the number of people we could host. Work details were called to clear brush along the side of the driveway, creating addition parking spaces. A reservation website was created. Additional parking arrangements were made with the Ionia Fire Company, and the Church. Alas, on April 8 we did not get the clear skies we hoped for, but those present had the darkest Totality experience of their life. In Ionia, the Sun shined through the clouds for brief periods during the partial phase, and we streamed the NASA Live Feed in the Education Building.

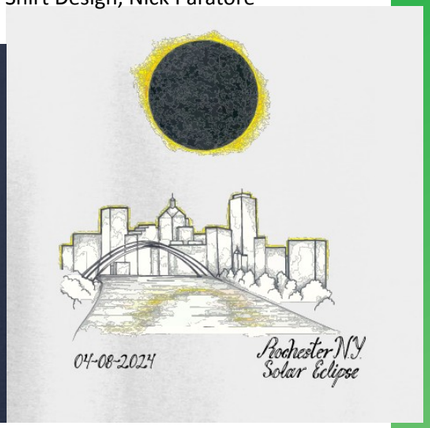


1st Place Shirt Design, Nick Lamendola

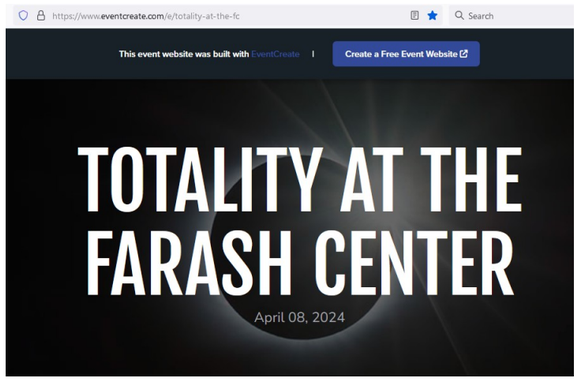
2nd Place Shirt Design, Nick Paratore



3rd Place Shirt Design, Callie Brown (front and back)



4th Place Shirt Design, Tania Day



Reservations to attend could be made online

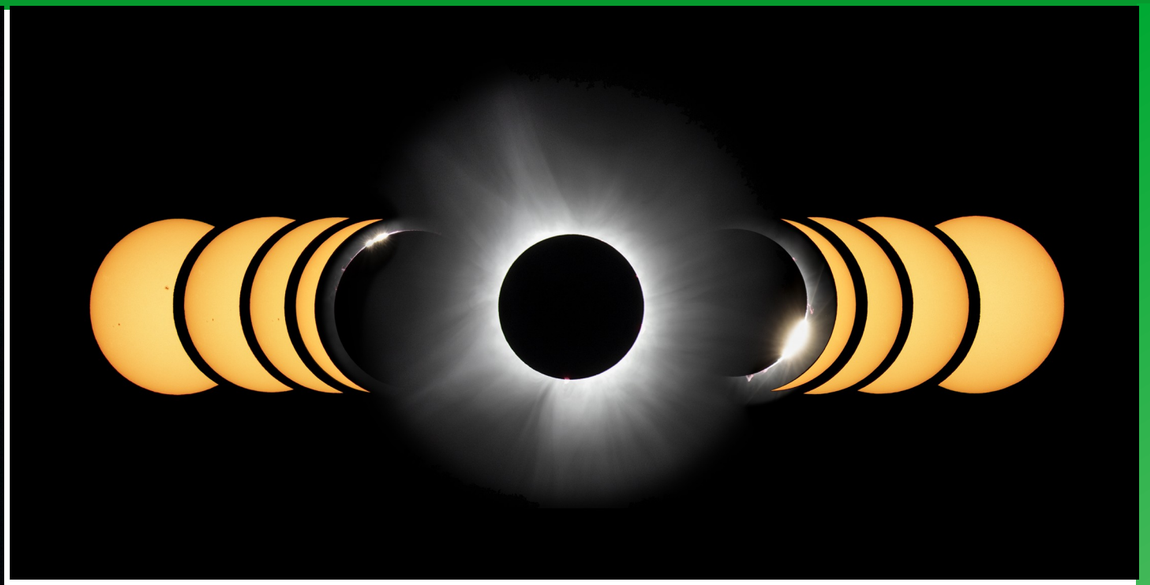
Cloudy Farash Center on Eclipse Day

Historic April 8 Totality

Images

2024 was one of the most special years in the history of ASRAS, as we experienced an event that had not happened here since 1925 and that won't return here again until 2144. While we did not get the clear skies we had hoped for on April 8th in Rochester and Ionia, those who observed from those locations did experience (what was for most) the darkest Totality of their lives. Many traveled for clearer skies, and most found them. Whether they found them or not, they have tales of their journeys and experiences they'll be telling for a lifetime.

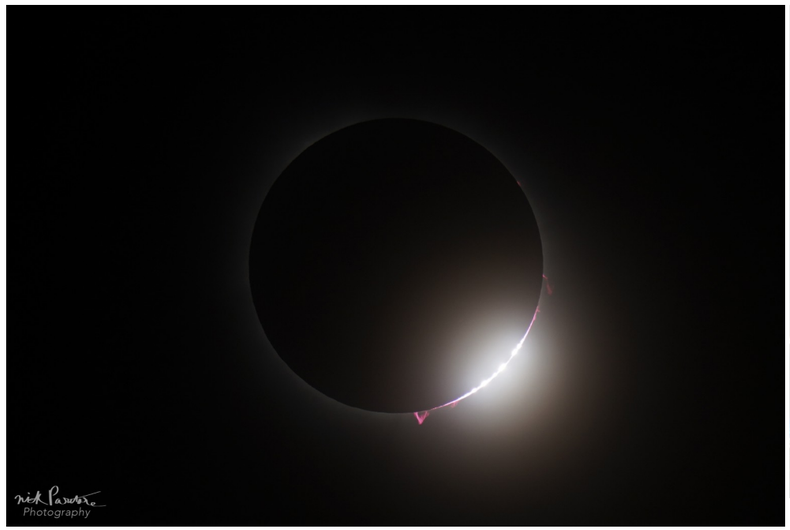
Gaylon Arnold's Totality image captures the Solar Corona – April 8 2024



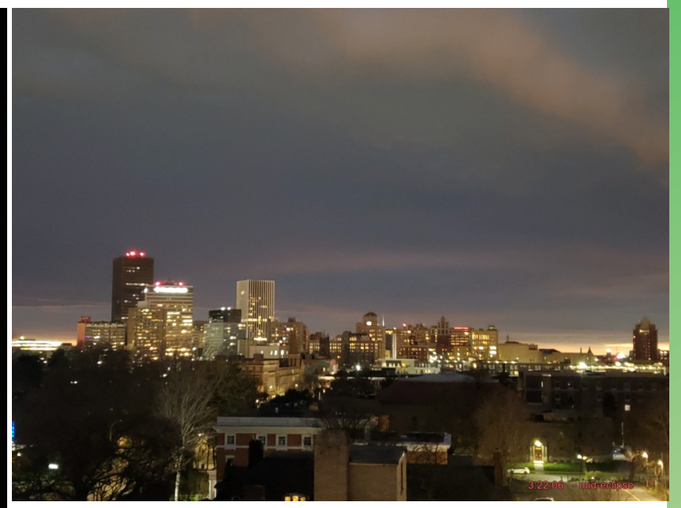
Composite of April 8 Eclipse imagery from ASRAS Member Joe Altieri, imaged from Sherbrooke, Quebec

Time lapse images of the Farash Center show the darkness of Totality come and go. *Credit: Mark Minarich*

Contact, Chris McNiffe, April 8 2024



Bailey's Beads, Nick Paratore, April 8 2024



The Rochester Skyline, mid-Totality, by Bob Berch, April 8 2024

Solar Maxima, Aurora

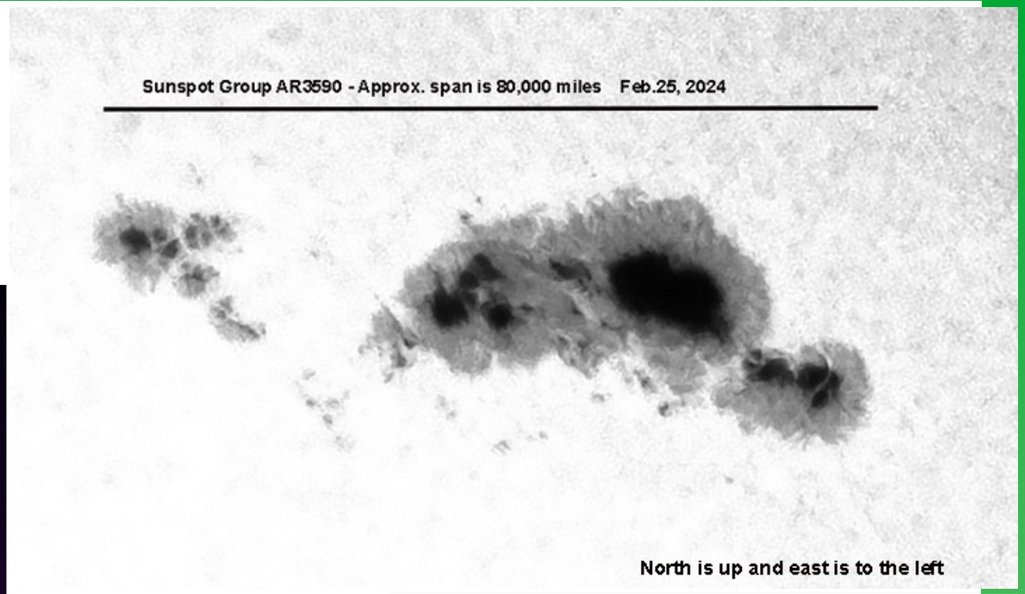
Solar Cycle 25 reached Solar Maxima in 2024

2024 also coincided with an extremely active Sun, which approached and then reached solar maximum during the year. The year 2024 had the highest number of solar flares in decades (particularly X-class, the most powerful), and numerous Coronal Mass Ejections that triggered auroras, including historic multi-day auroras! Worth noting is that this was, and continues to be, the first solar maximum where the majority of the country's population (and beyond) were equipped with camera's (in the form of smartphones) that are more sensitive to aurora than the human eye. Members and non-members alike observed, imaged, and raved about auroras in 2024. Sunspots and Active Regions (AR) as large as the famous 1859 ones that caused the Carrington Event were observed (2024's AR3590) and imaged with solar equipment at the Farash Center.

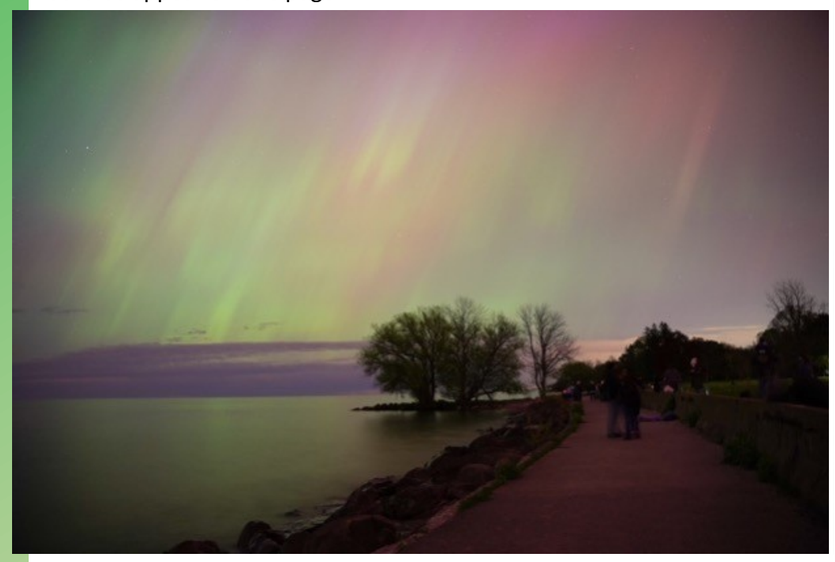
Solar maxima occurs as part of the 11-year solar cycle. The maxima features increased numbers of sunspots as well as increased numbers of associated magnetic phenomena including solar prominences and filaments, flares, and coronal mass ejections (CMEs). If oriented towards the earth, CMEs can result in geomagnetic storms. These storms produce beautiful aurorae but can also severely interrupt satellite function, electric networks, communication, and geolocation.

Through it's communication network, ASRAS members notify each other when such events occur. Several ASRAS members specialize in solar observing and regularly post pictures of interesting sunspot formations. In May and October 2024, powerful aurorae visible from Rochester occurred because of CMEs, and many members were able to travel to sites where the northern horizon was easily visible. A sample of a large number of member photos of auroras appear on this page.

Michaal Naven October 2024

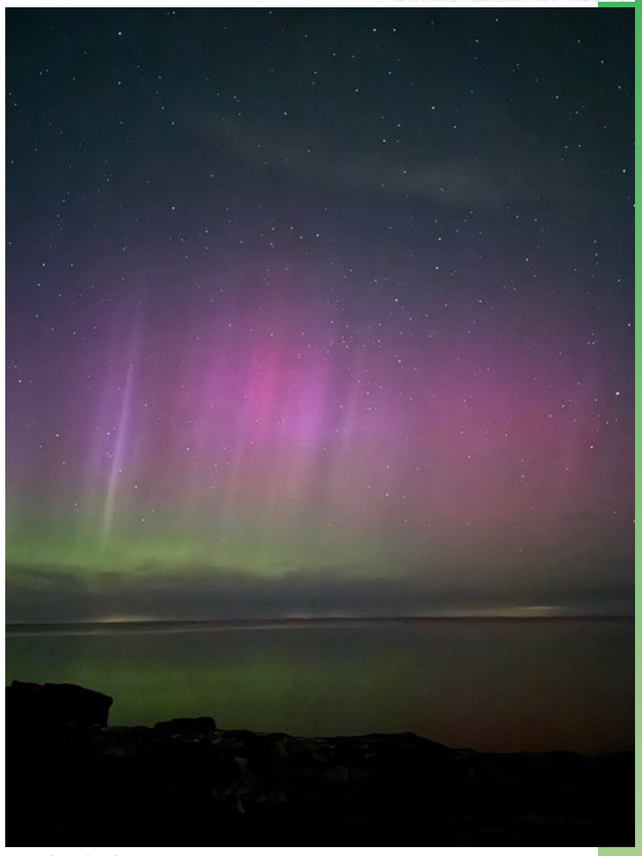


(above) Giant Sunspot Group AR3590 by Bob McGovern, Feb 25, 2024. Solar Observatory - Farash Center. AR3590 is among the largest sunspots of Solar cycle 25



Nick Paratore, May 2024

Joe Altieri October 2024



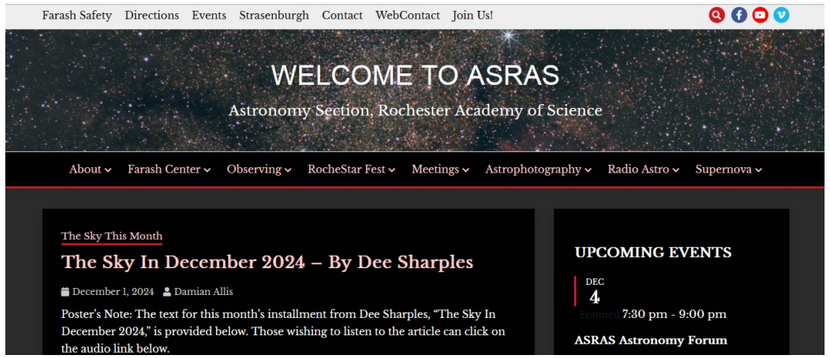
Seth Zebrak, May 2024

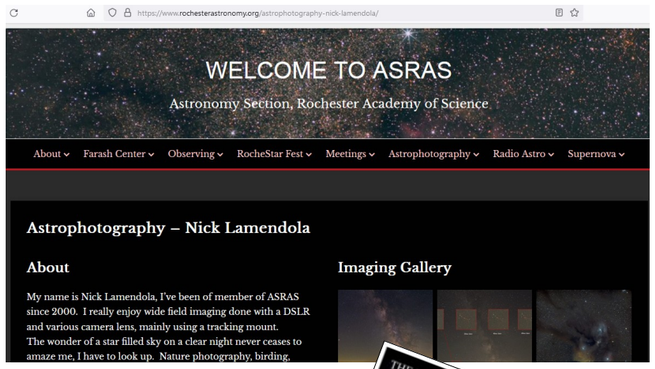
Communications

ASRAS Website moves to a new host!

www.rochesterastronomy.org

In 2024, the ASRAS Board approved changing our website host to one that included many services, such as secure socket layer (SSL), by default, rather than continuing to pay extra for those. Thanks to Damian Allis, Ph.D., this transition went smoothly. Treasurer Eric Day and Supernova site manager David Bishop also made contributions. We continue to provide information about astronomy-related events and happenings in the Rochester area. Including the supernova page, this year there were an estimated 100,000 unique visitors.





ASRAS internet provided by:

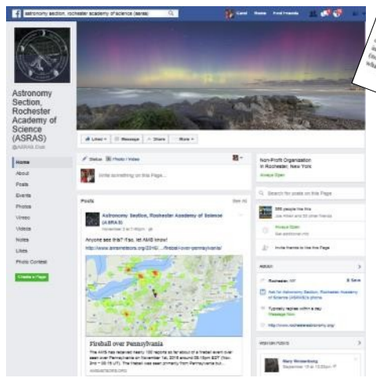
frontier Communications

Monthly Newsletter

The Rochester Astronomer is our monthly newsletter, keeping members connected with ASRAS. It features reminders about upcoming events, activity recaps, fascinating astronomy articles, and essential member updates. With a 74% open rate among 253 subscribers, it's a valuable resource for staying informed about what's happening in ASRAS.

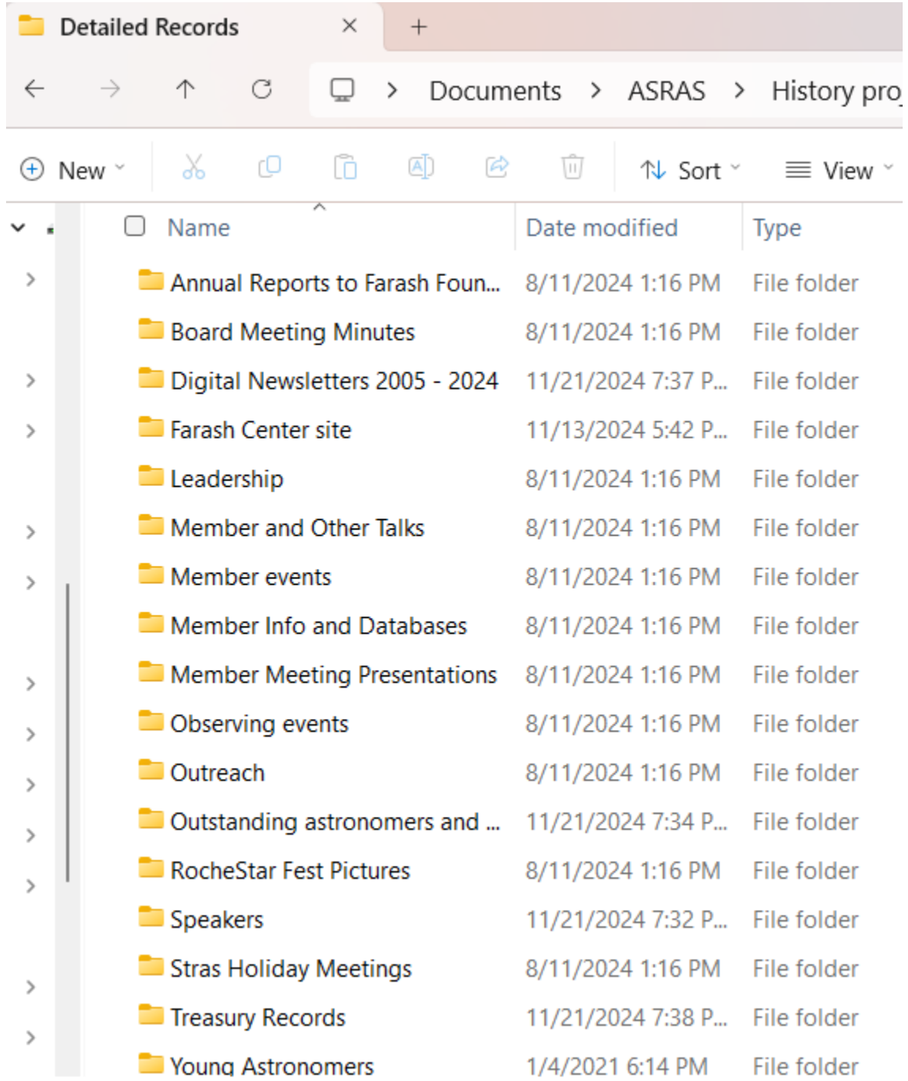
Facebook

The ASRAS Facebook page continues to function as a public outreach and serves as an avenue to draw local interest to our public star parties, Farash Center open houses, monthly lectures, and more. Many of those who attend our public events become members! Currently, our page has over 1600 Likes and 1976 followers, up 18% from 2023.



ASRAS Historical Information Project (AHIP)

ASRAS Historical Information Project (AHIP) is refreshed annually with formal and informal records of our Section. All vital 2024 documents and records will be added to the previously- stored files when those items are finalized, and not later than January 31, 2025. Each is converted to PDF format as it is added, to avoid software version level from becoming a barrier to retrieval of the information in future. All AHIP records are backed up on OneDrive and on a hard drive for safekeeping.



Achievements and Plans

2024 Achievements

Member Events
- 20 member events with talks
- 9 member observing events
- 14 member social events and open houses
- 6 work parties
- 13 board meetings
- 1 Totality Viewing Event

Outreach Events
- 6 Public star parties
- 10 Scouting events
- 22 Observing Saturday Nights at the Planetarium
- 7 School and community events
- 3 Community festivals

Thousands of individuals were touched by astronomy-related experiences provided by ASRAS

Scientific Achievement Areas
- Supernova website
- Radio Telescope Project
- Helped train community to observe and experience Totality
- Hosted 100+ people for Totality on April 8
- RAS Fall Paper Session at SUNY Brockport

Farash Center Improvements
- Moved website to a new host, for better pricing and service.
- A new indoor-outdoor 5G cellular modem to support high bandwidth activities (such as streaming telescope views) was installed
- Additional finer crushed stone added in 2024 to smooth out the driveway after larger size crushed stone added in 2023.
- Continued replacing boards in the deck of the Louis Wolk Education Building
- Tall trees obstructing views from observatories and pads were taken down
- Eagle scout Project improvements

ASRAS Financial Position

In 2024 ASRAS continued to be financially sound, thanks primarily to a robust and growing membership base. ASRAS funds were stable in 2024 and at year's end the total of our assets remained around $107,000. However, site repairs and maintenance were again major expenditures in 2024, with tree removal and other building and infrastructure maintenance. ASRAS continues to provide a wonderful astronomical resource to the community while keeping dues affordable and without increase from 2023 levels.

ASRAS Awards

Past ASRAS President, and longterm contributor Carol Latta was named a Fellow of the Rochester Academy of Science (FRAS) in 2024 and honored as such at the RAS April Annual Meeting.
Eric Day was the ASRAS Outstanding Astronomer in 2024.

2025 Plans

- **Continue to upgrade the computers at the Farash Center**
- **Streamline online dues renewal and expand our electronic resource offerings on our website**
- **Expand our partnership with RCSD to provide more classroom and hands-on experiences for students, including incorporating new portable solar outreach capabilities.**
- **Continue to address new member & public telescope inquiries**
- **Build a new wooden eyepiece cabinet for the 20" Dobsonian building**
- **Acquire and install a new mount to put 6" Melior Refractor donation into service for member use**
- **Continue implementation of radio telescope projects – the Solar Radio Telescope is expected to come online at the Farash Center in early 2025 and collect data.**
- **Continue to support our full spectrum of educational & outreach programs**
- **Explore recent technical advances for add-ons to our existing large aperture "push" telescopes at the FC that make finding objects easier for new astronomers. (Examples: PiFinder, Celestron StarSense Explorer app and smartphone dock)**