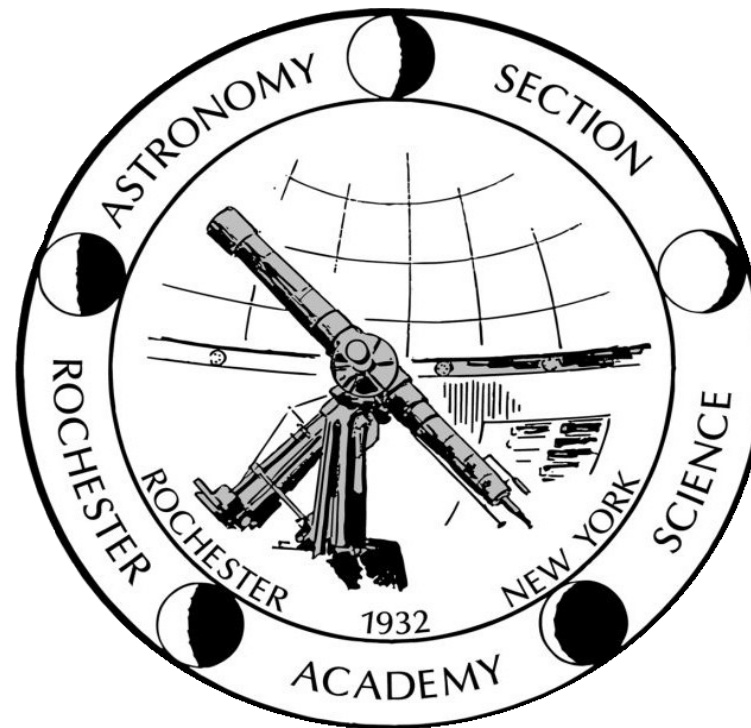


Astronomy Section of the Rochester Academy of Science

Annual Report 2022

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”.*



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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

Ranging from professional astronomers to amateurs to stargazers, our 226 memberships represent about 273 individuals who span all ages and a wide array of interests and abilities.

Farash Center Improvements

The Astronomy Section removed the old fire pit and cleared a new location off of the lower parking area to form a new fire pit area away from the groomed portion of our site. BSA Cub Scout pack and their leaders prepared the site and made benches for our new fire pit



We also hired Extreme Tree to clear brush from south of and below the Brewhaus Observatory, and from the north and western perimeter of the groomed portion of the Observatory grounds



ASRAS hired local tree service Extreme Tree & Landscape for emergency removal of a large (24" diameter) tree that fell across our access road during a windstorm this summer.



We repaired and refinished roll off rails on our Observatories

Lock replacements were completed in 2022, with: AA1 keys for Main Building, Garage, Cave Observatory, Wolk Observatory & the Brewhaus; and AA2 keys for Farash Observatory & the Solar Building. Keys for the Ureles Dome and the Tinsley dome are unchanged.



We put down Glow Stones along the main path to the parking area to facilitate after dark walking to your car after observing. The stones will glow for 12 hours after dark

Outreach and Education

Scouts

This year we are back into scouting! We had eight scout troops of several different ages at our observatory. Once again, we are showing scouts the stars!

Our focus continues to provide the tools and resources for the scouts to extend their learning outside of their classroom covering a variety of topics in Technology, Math, and Science. Projects are designed to accommodate their requirements and goals that revolve around community service, team building, and becoming responsible citizens.

This summer season brought about opportunities for scouts to explore, discover, and complete a number of their badge requirements with ASRAS Membership on hand. We provided presentations, hands-on training with tools for scientific development, life skills training, and of course, Astronomy-based experiences that brought the Universe into the palms of their hands.



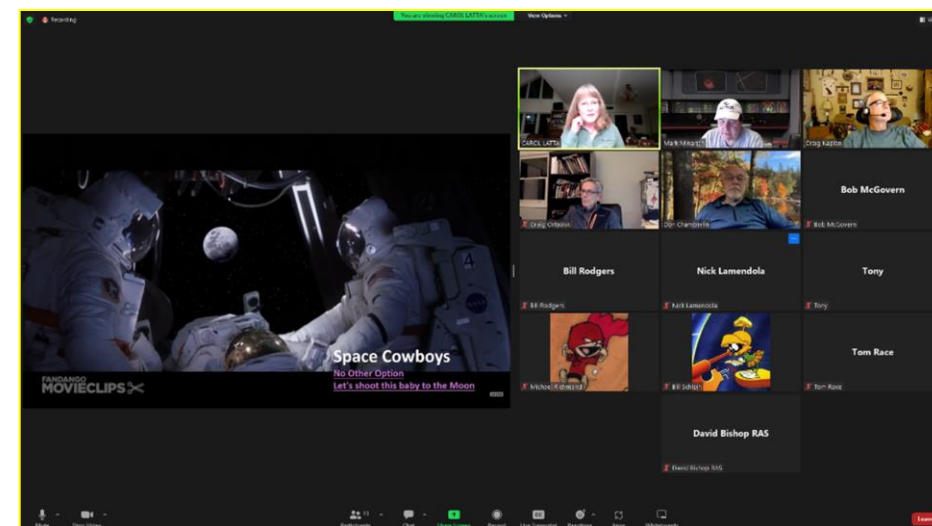
Telescope Day @ the Strassenburgh Planetarium

On October 15, 2022 ASRAS hosted a Telescope Q&A and tune up event at the Strassenburgh Planetarium to provide guidance on Setting up, using and even repairing telescopes



The Astronomy Forum

On October 26, 2022 ASRAS kicked off a series of Astronomy 101 talks . October's talk was by Carol Latta on Gravity and Orbits. We're planning on a Bi-Monthly cadence of these types of talks through 2023.



Outreach and Education

Public Star Parties

As COVID 19 waned, and we were able to gather safely once again, ASRAS was able to open up our observing site to the public offering five months of Dark Sky viewing from the Marian & Max Farash Center for Observational Astronomy. From June through October 2022 on the Friday evening closest to a New Moon, 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 150 people attended these five events to find many celestial beauties each of these nights through our club telescopes and members' telescopes.

Night Sky Network
Astronomy clubs bringing the wonders of the universe to the public

CLUBS & EVENTS NIGHT SKY PLANNER OUTREACH RESOURCES

Astronomy Section, Rochester Academy of Science

About Astronomy Club Website Events Locations Request an Event Join Club Register Contact Club

ASRAS Public Observing Night
Friday, 9/23/2022

SHARE Facebook Twitter + More

Event Event Report

Join us for Public Observing on Friday September 23 at The Farash Center for Observational Astronomy 8355 County Rt 14 Ionia, NY from 7:30 PM to 11:00 PM. Come visit to see our Dark Sky site and perhaps look at deep sky objects through our telescopes. Sunset is at 7:05 PM and it will be "very" dark after 8:40PM. We hope you'll come out to enjoy the heavens with us!
Date: Friday, 9/23/2022
Time: 7:30 PM - 11:00 PM Eastern
Location: Marian & Max Farash Center for Observational Astronomy, 8355 County Route 14, Ionia, NY

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FRIDAY, AUGUST 26, 2022 AT 7:00 PM - 11 PM

ASRAS Public Observing
Marian and Max Farash Center for Observational Astronomy

Fri, Jun 24 Fri, Jul 29 Fri, Aug 26

Details

38 people responded

Event by Astronomy Section, Rochester Academy of Science (ASRAS)

Marian and Max Farash Center for Observational Astronomy

COVID-19 health and safety requirements

- Outdoors

Learn more about COVID-19 guidelines

Duration: 3 hr 30 min

Public - Anyone on or off Facebook

IMPORTANT UPDATE looks a little "iffy" for the weather this evening. If it's cloudy we'll open up the Walk Education center until 8:30 pm to answer astronomical questions an... See more

Meet Your Host

Marian and Max Farash Center for Observational Astronomy

42.82816, -77.489572

Guests

7 Went 29 INTERESTED

Outreach: Mees Observatory Tours

In the same way that 2022 provided opportunities to return to in-person and on-site activities, while still maintaining the ability for remote participation, our outreach efforts in Mees Observatory Summer Tours followed suite. On-site tours resumed, with 9 ASRAS members joining the combined ASRAS/UR team. In that format, 16 tours were supported, and nearly all included telescope observing, thanks to many nights with clear skies.

Additionally, several tours were scheduled using 2021's zoom format and remote operation of the 24" telescope. As expected, this option was much less popular with guests, since the experience of being at a first-class observatory, and actual photons hitting one's eyeballs directly can never be exactly duplicated remotely. While 3 remote tours were initially scheduled, low demand for these offered the conversion of 2 of these to on-site tours. All tours were fully reserved and long waitlists built up, as witness to the high degree of interest in the tour offering.

ASRAS member Carol Latta stepped down - after 21 years as Tours Director - at the end of the 2022 season, but the ASRAS connection will continue, as Past President Mark Minarich is assuming that role, after many years as a member of the Tour Guide team and backup to the prior director.



Comet C/2017 K2 near M10 in July, 2022

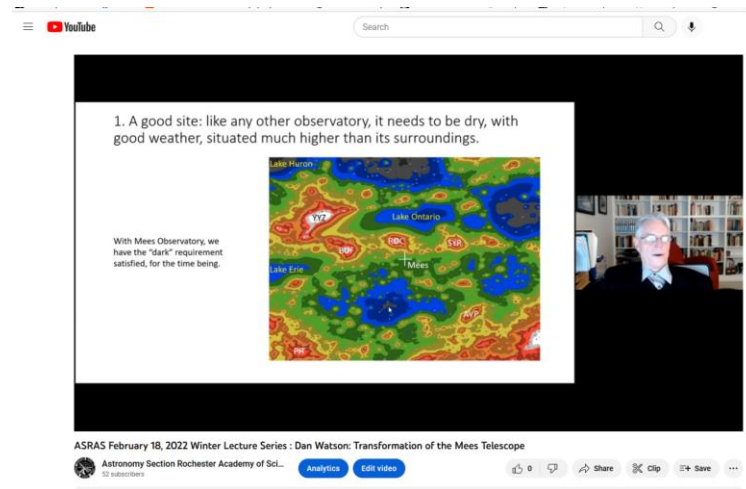


Comet Image Credit: Astrophotography Group "Volkssterrenwacht A Pien", Ghent (Belgium)



Member Activities

ASRAS Monthly Meetings & Lecture Series Talks In-Person & Virtually



When COVID-19 hit in 2020, we lost our ability to meet in person and our access to meeting spaces. ASRAS recovered quickly and began using online meeting services for our monthly meetings. We've continued to meet in a Hybrid manner: In-person and virtually in 2022. We held 12 monthly meetings and 2 Winter Lecture Series Sessions in 2022 attended by over 700 people, and viewed 768 times on YouTube:

<https://www.youtube.com/playlist?list=PLUKWxnvjYq6ir1s1dpz86HiwAfx0yp2MX>

Open Houses



Observing a set of site gathering protocols, we held 12 regular monthly open houses hosting a total of about 200 people. Open houses are typically held on Sundays from noon until 3p.m. or later if the skies are clear.

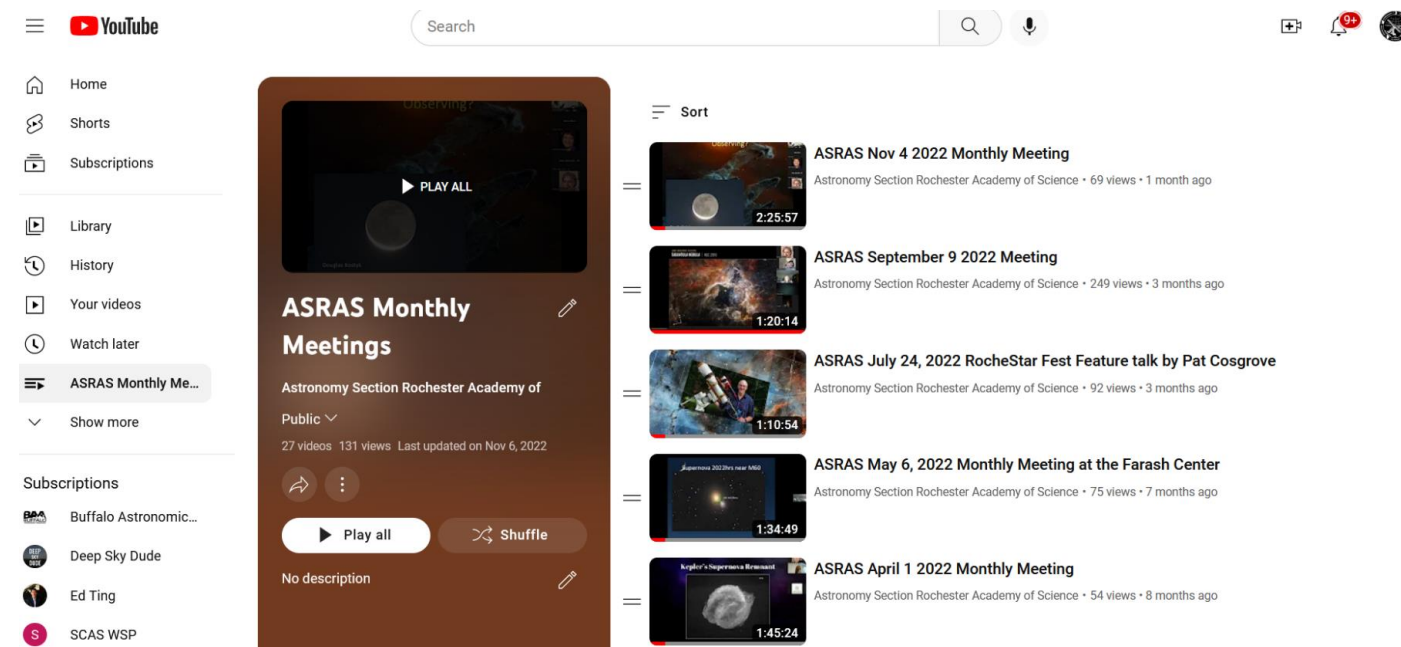
Observing Nights at Farash Center



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, all of the many observatories are in use, as well as equipment members bring for the evening. Besides these scheduled events, on numerous other occasions, members came to observe under the Farash Center's clear, dark skies.



Special events in 2022 included TWO observing sessions during Total Lunar Eclipses!



Science: Radio Telescope

Project ART: Autonomous Radio Telescope

The Farash Foundation's educational outreach grant has enabled RIT engineering students to research, design and build a Solar Radio Telescope that will study the Radio Frequency signature of solar disturbances (Fig 1).

Sunspots, Prominences and Coronal Mass Ejections (CMEs) present a significant danger to Earth's increasingly electronic world, especially as they interact with Earth's magnetic field (Fig 2).

It's not a matter of if we will be impaired by these events, but when. It's no longer a possible inconvenience, but a serious potential commercial and military disaster. Weather, security, communications, banking, and even airline flight operations increasingly use satellites to enable day to day operations. We've been lucky that major flares have not directly hit the Earth, but at the best just grazed us. We need a better early warning indicator, as the satellites that study the Sun operate in various optical bands, but none in the RF spectrum.

An Autonomous Radio Telescope (ART) has been in development at RIT for the Farash Center site in Ionia, NY. Its mission is to detect and relay coronal mass ejection warning data from the Sun to the solar (helio-) scientists of the e-Callisto Project in Zurich, Switzerland. This will enhance our understanding of Solar Physics dynamics. Additionally, it will put the ASRAS organization on the global astronomy stage. This is a sizable undertaking in the professional world, let alone in the world of college students. This work has been an uphill effort, given the COVID challenges of the last two years. It's extremely difficult to teach a 'hands-on' lab remotely.



Fig 1; Radio Telescope @ Ionia, with flowers

Each new school year a team was assigned a new critical module to develop. The location in Ionia, is rather remote to the Rochester city center (away from noise & interference sources), and, almost an hour from the RIT campus. This logistics ruled out productive daily and weekly visits to Ionia by the students, especially since there are no appropriate labs, test equipment or model shops nearby. Further, imagine the challenge of having to dis-assemble the entire system and transporting it back to campus each new school year, for the incoming development team, a very time consuming and slow process. (Ionia Dish, Photo #1, above)

The first few years were spent in developing 'proof of concept' ideas for basic functions. This part was one of frequent frustration and dead ends. Ideas that seemed (theoretically) logical just didn't pan out with real world hardware and data. Example, most Callisto systems use a standard Log Periodic 'Yagi' like design. In our location, however, a strong local TV station swamped the rear lobe of our LP design. Thus, we are developing a modified feed, 7' (2M) TVRO dish, for its superior front to back ratio. The next few years saw many system partitioning 'paper' concepts of basic functions. Finally, we settled on prioritizing the most difficult functions first.

By far, we viewed the autonomous tracking feature the most difficult function to automate. Waking the system up in the morning, pointing it to the east and acquiring the Sun was the starting point. Tracking during the entire day, until sunset, was the goal, without needing any human operator intervention.

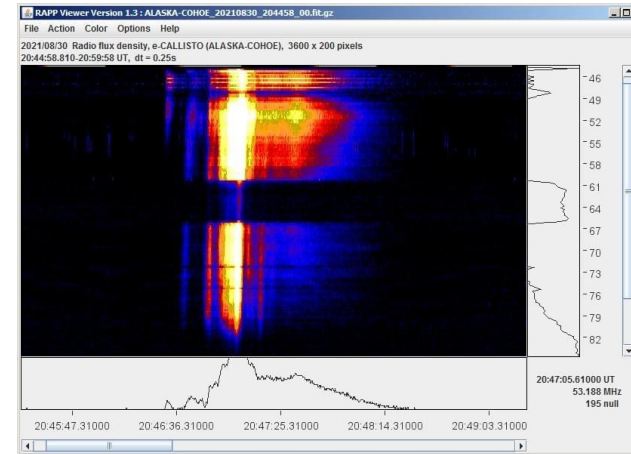


Fig 2; Radio Flux Density of e-Callisto station

maximizing the related 'local' RFI signal. The goal is to increase the system's signal to noise ratio as we have seen significant RFI even in remote Callisto stations (i.e.; Africa) from their 'local' industries (ex; Horizontal bands in radio data above).

Presently we are involved with developing a noise strategy for dealing with the new cell phone and wi-fi frequencies, looking at concepts to perform noise removal in real time, and concepts to expand to nighttime operation of the top 40 or 50 brightest objects in the RF night sky.

The dish photo (#1 left), was taken between build blocks, shows the installation of our Callisto station in Ionia, NY, called 'KROC-USA' located at [N 42.929826, W -77.500156]. Our hope is that we will be 'on the air' with some actual Sun data to Zurich, before the WNY total eclipse in 2024 (fig 3).

Recognition and credit(s) must be given to those supporting this effort. Funding was provided under an 'educational outreach grant' by the Farash Foundation thru ASRAS. Site selection and characterization was performed by students from the University of Rochester (U of R). Development and Lab facilities were provided by RIT Kate Gleason College of Engineering. A special thanks is owed to Frontier Communications for donating the DSL internet line that benefits the entire ASRAS community. The Farash foundation's foresight has given ~40 students the chance to 'get their hands dirty' and apply their 'book' knowledge into actual hardware & software delivery, to the benefit of everyone involved.

Besides the direct involvement of the mainline student teams, additional thanks, recognition must be given to the many students, professors and backing personnel who have given us their continued support over the (many) years of its incubation and development.

Sincerely,
Martin Pepe

Do you know what your Sun is doing today?



ART does!

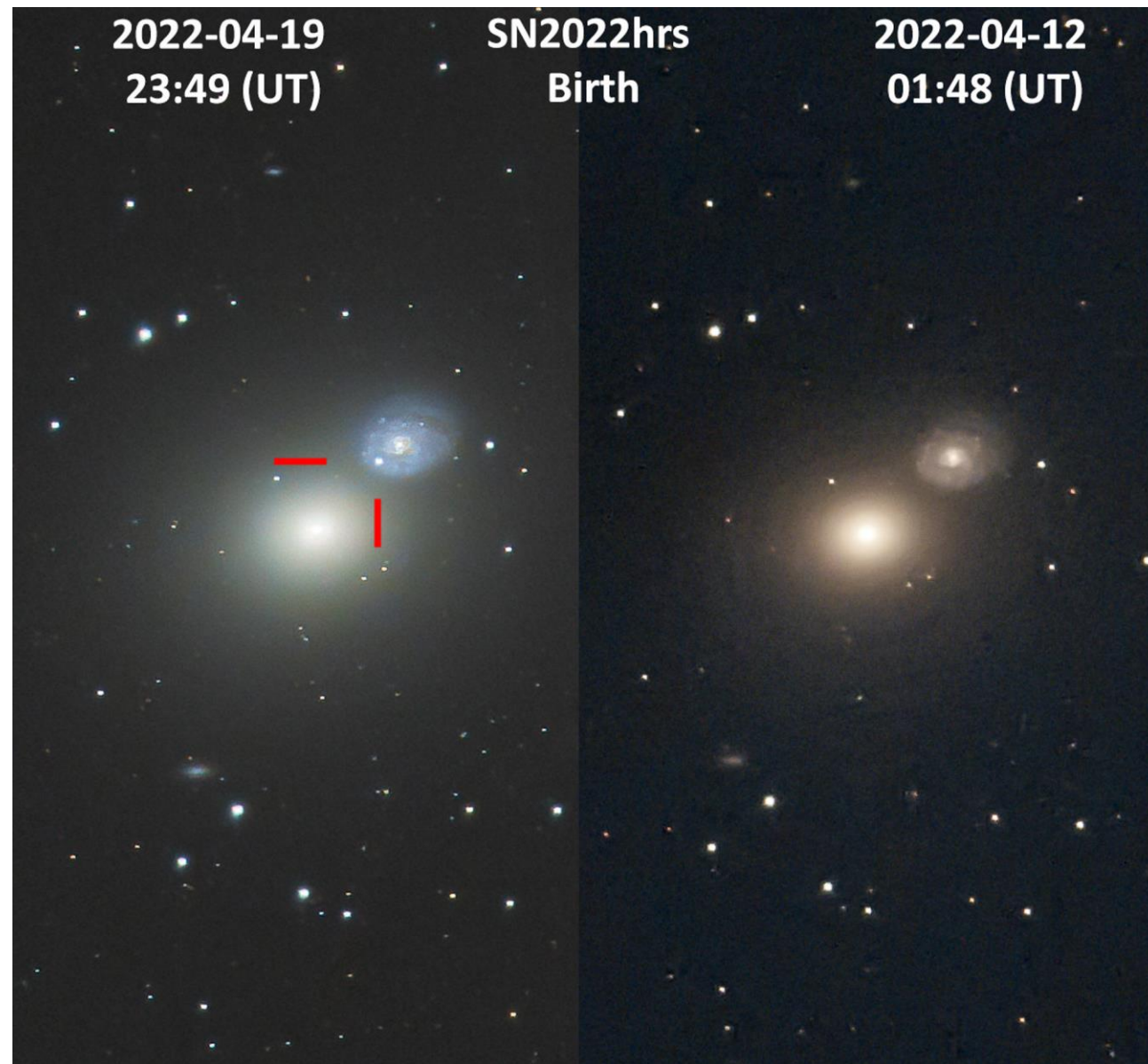


Fig 3; Total Solar Eclipse of 2017

Supernova Webpage

Another interesting year.

M60 is a bright galaxy in the Virgo cluster. Sitting just next to it, slightly closer to us is NGC 4647. This spring a supernova went off close to the core of NGC4647 called 2022hrs. Below is an image taken by Rafa Ferrando. This supernova got a bright as Mag 12.4.

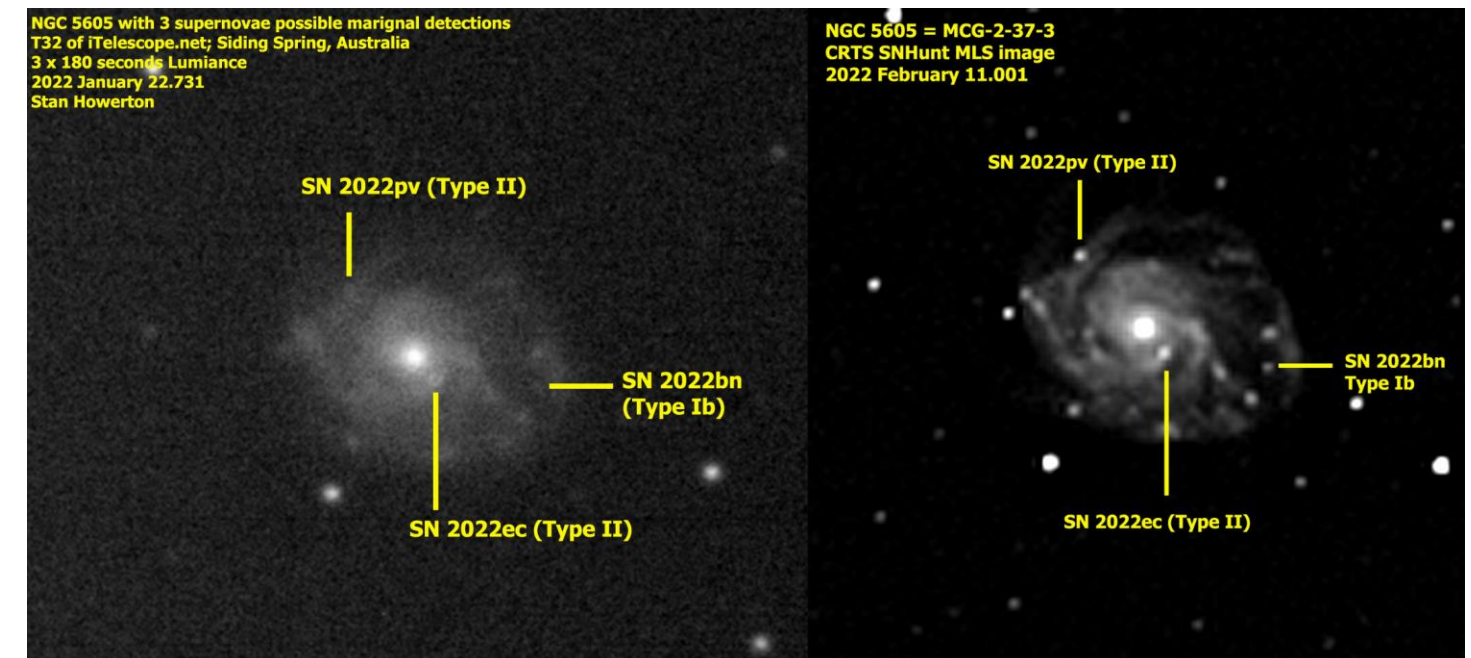


Ours is the only web page that keeps track of and can keep up with the pace of discovery.

Check it out: www.rochesterastronomy.org/supernova.html

Something happened this year that never happened before. Usually a supernova happens once about every 100 years in a galaxy. 2 supernovae at the same time has happened 6 times so far. This year we got 3 supernovae visible at the same time in the same galaxy! NGC 5605 was the host of 2022bn, 2022ec and later 2022pv, all visible at once.

A truly beautiful shot was made by JWST during its deployment phase. It took a look at the Cartwheel galaxy (aka ESO 350-40). Two galaxies collided, forming a ring. This supernova occurred on the southern rim of the ring. Supernova 2021afdx.



In years past hundreds of supernovae were discovered. Then it was thousands. So far this year: 20,208. I was able to eliminate 1,545 of them as galactic objects, and 1948 confirmed a supernovae. I continue to collect this data as I have for the past 25 years.

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

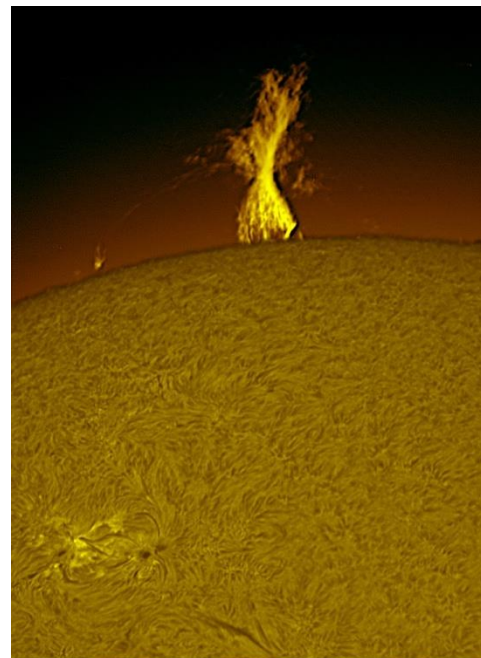
Astrophotography

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.



The Crescent Nebula, NGC6888, Michael Druzynski, November 2022



Solar Prominence Douglas Kostyk, September 2022



Lunar Eclipse Composite, Joe Altieri, November 8, 2022

Michael Naven
The Milky Way
September 2022



The Little Rosette Nebula, Patrick Cosgrove, May 2022

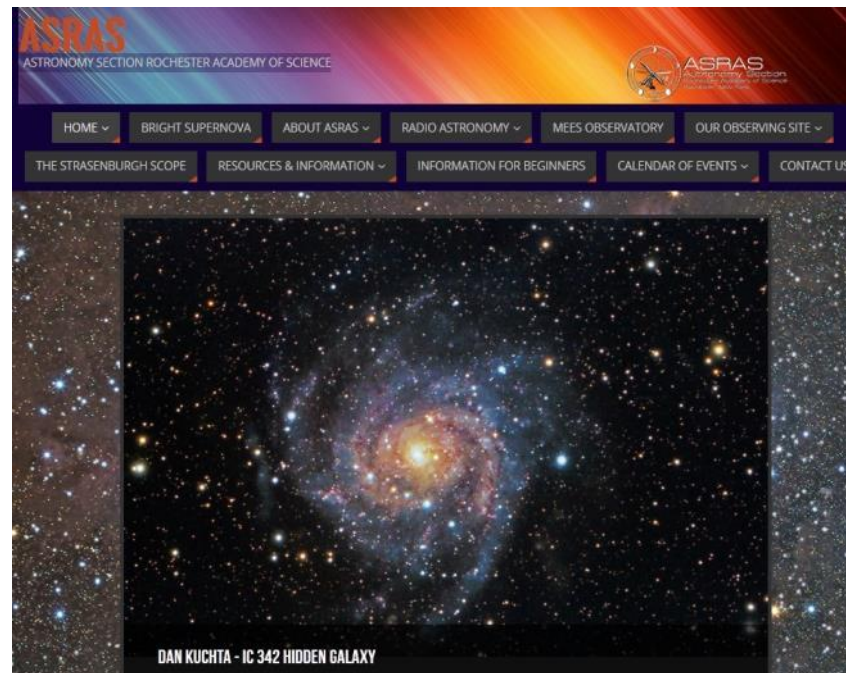
Communications

ASRAS Website

www.rochesterastronomy.org

Our website continued to provide information about astronomy-related events and happenings in the Rochester area. This year, it had over 10,000 visitors from the public and ASRAS members.

ASRAS internet provided by:



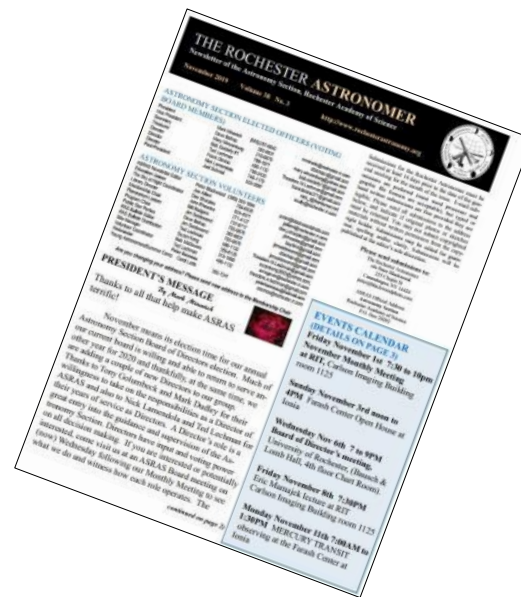
ASRAS Historical Information Project (AHIP)

With the creation of the history project in 2020, there is now a base of historical files, stored on OneDrive and backed up on a hard drive. The Digital Age has made it easier to collect and store files as we add the most current versions of newsletters, Board minutes, meeting presentations, Outstanding Astronomer citations, etc. For the earlier years, scanned documents and also hard copies are part of the collection.

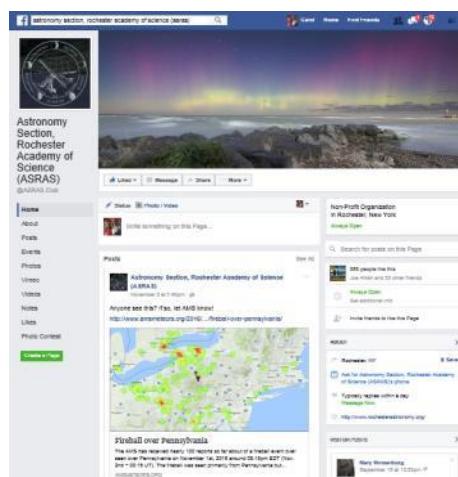
Key 2022 documents will be added as soon as final versions are available, and additional categories of documents (e.g., images) will be added over the next several years.

Monthly Newsletter

The Rochester Astronomer is our monthly newsletter with reminders of ASRAS upcoming events, recaps of activities, interesting Astronomy articles, and critical member information. It's a handy monthly connection to what's happening at ASRAS. The newsletter continues to be distributed in an all-digital format, both to be more "green" and also because members preferred it. We've had a 52% open rate of this format among our 272 subscribers.



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 1,127 Likes and 1,281 Followers. (up 35% from 2021)



Achievements and Plans

2022 Achievements

Member Events

- 14 member events with talks
- 15 member observing events
- 12 member social events and open houses
- 8 work parties
- 12 board meetings

Outreach Events

- 5 Public star parties
- 8 Scouting events
- 3 School and community events
- 1 Community festival

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

Scientific Achievement Areas

- Radio astronomy
- Supernova website

Farash Center Improvements

- Installed glow stones for pathway visibility in the dark
- Reinforced the roll off tracks of two buildings that needed repair.
- Treated exposed wood on roll-off buildings with sealer to extend the life of the roller tracks.
- Removed the old fire pit and cleared a new location off of the lower parking area to form a new fire pit area away from the groomed portion of our site.
- Acquired 12 traffic cones to corral parking areas for Public Observing nights.

ASRAS Financial Position

Receiving funds from the Farash Foundation has been fundamental to our growth. Our financial position has been strengthened incrementally by the Farash Legacy Fund, so that ASRAS has been able to pay for needed site repairs/improvements and keep dues at a level that is affordable to the individuals and families in the Rochester community. At year end, the value of our total funds is \$102,817. That critical contribution to our accounts provides an adequate cushion to support the large site expenses, insurance, etc. in case of economic downturn or large unplanned repairs as well as to continue to support our many community programs.

2023 Plans

- **Expand our partnership with RCSD to provide classroom and hands-on experiences for students**
- **Support L3Harris' satellite tracking refinement project at the Farash Center**
- **Upgrade website to be more user friendly, including a robust Calendar of events and current activities**
- **Our Telescope Inquiry Group to create web links and white papers to address new member & public telescope inquiries**
- **Train Astronomy Section on Total Solar Eclipse Outreach for April 8, 2024 Eclipse, to include hands-on activities and projects**
- **Add crushed stone to the Farash Center driveway**
- **Add solar powered ventilation fans to select observatories to aid in more rapid equipment cool-down**
- **Upgrade security at the Farash Center through the purchase of a private server to control the site security cameras**
- **Continue implementation of radio telescope projects**
- **Continue to support our full spectrum of educational & outreach programs**