

Capitol Skies

Madison
ASTRONOMICAL
SOCIETY

Autumnal Equinox Issue, September 2025

Image of the western Veil nebula by MAS member Wil Cox



From the President's Desk

By Laurence Mohr

It's nearly time for Moon Over Monona Terrace on Friday, October 3rd, 7:00 - 10:00 PM! Join us for one of the largest regional star parties, held on the roof of Monona Terrace in downtown Madison!

Volunteers and ushers will be needed to share their telescopes, binoculars, EAA rigs, and enthusiasm for astronomy with new friends from all over the area. In the past, public interest in this event has been enormous, so we could use all the help we can get. Everyone is welcome! And the Lake Vista Café will be open for refreshments, too.

We need volunteers to:

- bring telescopes to share with the public (15 or more volunteers are needed). And you might also bring step ladder or stools as needed.
- operate your electronically-assisted astronomy (EAA) equipment with a video display
- greet guests at the information tables and distribute information about MAS & MOMT (at least 2 volunteers)
- roving greeters/ushers to help guests find telescopes showing sky objects they would like to see (2-4 volunteers, or more)

- any members who would like to join us for fun!

If you would like to help, but haven't contacted me yet, please do so as soon as possible so I can send you important information and instructions. All volunteers with telescopes and EAA rigs will have assigned locations on the roof. Also, each EAA rig will have a TV monitor provided by the Terrace. Please contact me and I'll reserve your spot!

As usual, there will be an indoor option for the event in case the weather does not cooperate. There will not be a rain date. Anyone who volunteers is encouraged to plan an alternative activity in case it's too cloudy to observe the sky. The weather call (outdoors or indoors MOMT) will be made no later than 3:30 PM on October 3rd. Feel free to contact me if you have any suggestions or questions.

I hope to see you there!

Membership Renewals

All membership-renewal invoices for 2025/26 have been snail-mailed to members as of the second week of September. (Our membership year runs from October 1 to September 30.) Please watch for your renewal notice and respond promptly. They were sent to the address of record that's in our membership records. If you don't receive your renewal by the time you read this, contact Jurgen Patau (his email is in the Monthly Announcements sent out by Laurence Mohr). You will be sent an email with your invoice.

If circumstances keep you from being able to remain as an MAS member, please let Jurgen know. His email is in the invoice.

Moon Over Monona Terrace Star Party

Friday, October 3rd, 7:00 to 10:00 pm

On the rooftop of the
Monona Terrace
Convention Center

Madison
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MONONA TERRACE



Astronomy Podcasts for a Rainy Day

By Craig Jewell

I've been a fan of science podcasts for many years, and I'm always on the lookout for something new to listen to. But in the podcast universe, anyone can start up their own show and many of them lack production quality or content. Because of that, I've added and removed more podcasts than I can remember. I've put together a list of my current shows, along with a short paragraph about the theme and topics of the show, as well as the length and frequency of each podcast.

Short podcasts—10 minutes or less

Backyard Astronomer

Mike Murray from the Delta College Planetarium in Michigan offers a two minute description of a night sky item each week to entice pulling out the scope or binoculars. He keeps the conversation to items visible that week, making it a timely show to listen to before stepping outside.

One episode a week, Length: 2 minutes

Cheap Astronomy

Steve Nerlich is the host of this podcast. It's a show dedicated to getting into astronomy on a shoestring. Often he'll take random astrophysics questions from people who write in, and he has a wry sense of humor that goes well with the show.

1-2 episodes a week, Length: 10 minutes

Stardate

Hosted by Billy Henry, Stardate started as a telephone message service in 1977, and was picked up by an Austin radio station shortly after. In the current form, it covers night sky wonders that are observable that evening. It's similar in format to the Backyard Astronomer, but comes out daily, not weekly, offering up many more topics to explore.

Daily, Length: 2 minutes

Travelers In The Night

Dr. Al Grauer delivers a two minute podcast on various topics in astronomy. Recent shows have covered the search for Planet Nine, Big Bear Observatory, and the planets of Trappist -1. He doesn't go into depth with the time allotted, but offers up an appetizer on a topic that otherwise might be missed.

One episode a week, Length: 2 minutes

Full length podcasts—20 minutes or longer

Astronomy Cast

Hosted by Fraser Cane and Dr Pamela Gay, this podcast covers quite a wide variety of topics, including the James Webb telescope, the Neil Gehrels Swift telescope, the Euclid telescope, the Vera Rubin observatory. They also look at gravity waves, rogue planets, lunar time, elliptical galaxies, and exoplanet weather.

One episode a week, Length: 30 minutes



Night Sky Tourist

Vicky Derksen is the host of the show, and runs it as part of her night sky business. Topics vary, but have a common thread of being outside at night. She has guests who regularly take part in night hikes, camping, or road trips to dark sky locations.

Biweekly, Length: ~ 30 minutes

Planetary Radio

If you're a member of the Planetary Society, you probably already know about this one. It's been around about 23 years, and they do a great job of covering astronomy topics in depth and various space programs around the world, along with news and events from the Planetary Society.

One episode a week, Length: 1 hour

Startalk

Neil deGrasse Tyson is one of the foremost science communicators of the modern era. He has a comedian cohost for each episode, keeping the topics lively, funny, and interesting. He will often have quite famous guests on the show and the topics can range from astrophysics to space travel to general science themes.

1-2 episodes a week, Length: 1 hour

The Astrophysics Podcast

Professor Paul Duffell from Purdue University takes on various astronomy and astrophysics topics on a monthly basis. He covers black holes, supernovae, fast radio bursts, and recently he looked into the possibility of Betelgeuse being a binary star.

One episode a month, Length: 1 hour

The Supermassive Podcast

Topics on this podcast can run the gambit. Recent episodes include returning to the moon, stars orbiting another star, the speed of light, primordial black holes and space aliens. The bonus episodes are listener questions, and they cover many topics per episode.

Two episodes a month, Length: 50 minutes for main podcast, 15 minutes for the bonus podcast

I'd also like to give a nod to **Science Friday** (NPR), **Science Quickly** (Scientific American), and **The Skeptics Guide to the Universe**. All three podcasts are well produced and always interesting, and they cover a wide variety of science issues, occasionally covering an astronomy story.

I'm always looking to check out more podcasts. If you have any favorites, please send them to cjewell@gmail.com.

Happy listening!



MAS gets a New Website

By David Leiphart, MAS Webmaster

www.madisonastro.org

The Madison Astronomical Society debuted its new website on Monday August 11, 2025. Driving this was a desire for a new site where content could be easily added and refreshed. MAS also wanted a website with expanded functionality. The new site features information posts, event write-ups, interest articles, historical documents, and member photos.

Site Development: John Rummel and I worked together to create the new website, focusing on requirements gathered from the MAS board and other club members. I built the server and website while John created and refined the content. John and I share access to the site, which allows us to add and update content easily. Behind the scenes, we have an isolated area where we can do prototyping, experimentation, and development before pushing content to the public site.

Site Software: The new website was developed using open source applications including Linux, Wordpress, OpenLiteSpeed, and MariaDB. We use several other popular supporting applications as well. We chose to host the website on a Virtual Private Server (VPS) that allows us exclusive use and control, and we can easily add more CPU, memory, and storage as needed.

Development Challenges: Website security is a difficult issue that is not going to go

Possible Future Features

- Online payment feature
- News, notifications, and calendars
- Equipment reservation system
- Member articles
- MAS historical documents
- Member photo galleries
- Online suggestion box
- Chats and message boards
- Member-only area



away. The MAS server was built using industry standard security practices throughout. Wordpress provides effective security when guidelines are followed and the use of add-ons are carefully implemented and minimized.

Website costs can be a significant issue as well. Add-ons and services can significantly increase the cost of developing and maintaining a website. As the electronic footprint of MAS evolves it will be necessary to add some services and applications with

MAS would like to thank Jeff Shokler for overseeing our website for the past 8 years. Jeff singlehandedly kept our web presence alive and thriving. He maintained the site, the domain, and the infrastructure. Thanks Jeff!

Website Goals

The website is designed to support a broad range of objectives.

- Publicize MAS events
- Attract new members
- Support outreach efforts
- Share information and knowledge
- Community building
- Document MAS activities
- Central repository for all club archives and information

recurring charges. Because of this it is important to focus on keeping costs low everywhere we can.

Future Planning: Moving forward, a small group of MAS members is reviewing feedback and working to define how new features will be added to the site. Please let John and me know if you have specific features you think would be beneficial for the website.

Upcoming MAS Meeting Topics

October 10, 2025 Meeting

Madison Astronomical Society

October 10, 2025

Chuck Allen

President, Astronomical League

Perspectives on Distance

7:00 pm, UW Space Place



Chuck Allen is president of the Astronomical League with past service as president from 1998 to 2002. A League Lifetime Member, he founded the National Young Astronomer Award in 1991, received the G. R. Wright Award for service in 1998, and holds the League's Master Observer-gold, Herschel Society-gold, and Master Outreach awards.

"Perspectives" is a popular program that examines relative distances in the universe and the possible distances achievable through manned and unmanned space flight and through amateur and professional telescopic observation. Examining scales from the human altitude record to the four cosmological horizons, the program discusses astrophysicists' current thinking about several profound questions.

- Nov 14, 2025 — The return of TRIVIA NIGHT!
- Dec 12, 2025 — MAS solstice party and telescope clinic. Speaker: Craig Jewell
- Jan 9, 2026 — Jordan Marché: A Polar Telescope in the Spirit of Russell W. Porter"

Editor's Note

By Jack Fitzmier, *Capitol Skies* Editor

This Fall Equinox edition of *Capitol Skies* completes our first full year of the reborn newsletter. Many astronomy clubs *have* newsletters, and many *had* them. If you ask why the latter are no longer around, the frequent answer is that the publication "ran out" of contributors and content. Happily, that is not a problem for *Capitol Skies*! We have developed a crew of regular contributors and guest essayists, and we have actually

"banked" some seasonal content for future editions. This quarter we hear from four Board members – Laurence, Jurgen, Dave, and Dan – as well as MAS members Rick, Craig, Norm, John, and two Alexes – Samuel and Langoussis. I am grateful to all our contributors and I remind you that you can join us as well. If you have ideas about a contribution, let me know!



Want MAS branded merch? Visit our store at Madison Top Company. Men's and women's apparel, a mug and a ball cap currently available. Each purchase puts a tiny donation back in MAS's general fund to help us in our nonprofit mission to educate the public about astronomy.

<https://madison-top-company.printavo.com/merch/madison-astronomical-society/> or just click [here](#).

MAS Merch!



Capitol Skies is the quarterly newsletter of the Madison Astronomical Society. Members of the Editorial Committee include Jack Fitzmier (Editor), Bob Hamers, Alex Langoussis, John Rummel, Alex Samuel, Rob Strabala, and Rick Wayne. Interested in contributing? We'd love to have you participate! Contribute an essay, an equipment review, a book review, or another piece of astronomy-related material. And feel free to send comments, feedback, or other ideas along as well. Contact [Jack Fitzmier](#) for more information.

Tell us about yourself.

My name is Alex Langoussis and I am retired. I was born and raised in Rockford, IL. I earned a B.S. in Psychology at the University of Illinois, then moved to Atlanta, GA for 45 years. Over the years, I've been a bookstore manager, publisher's rep, camera salesman, stay at home dad (real life Mr. Mom), substitute teacher, owner of an astronomy outreach business, and finally, I was an astronomy lab instructor for 11 years at Emory University in Atlanta. Nowadays, I live in Tucson 7 months out of the year for the clear, dark, skies of Arizona and I live in Madison 5 months out of the year to spend time with my grandkids.

How did you become interested in astronomy?

In my 20s, I saw the Voyager Jupiter pictures in *Astronomy* magazine. One night after I had a bad day at work, I went home, opened the magazine, and ordered a Criterion RV-6 telescope, and never looked back! This then led to joining the Atlanta Astronomy Club, volunteering at the local science center, supernova hunting, observing trips to Africa and Australia, and teaching astronomy. A long slippery slope!

How long have you been a member of MAS?

I joined MAS even before I arrived in Madison in 2019, to get a feel for the astronomy community in the area. I've found the people in the club to be a very relaxed, friendly group, and so I consider MAS my "home club" even though I also belong to the Tucson astronomy group. I enjoy observing from YRS, though I wish I could go more often. I enjoy occasionally writing for the newsletter as well, as it helps clarify my thoughts.

What is your favorite astronomical object or phenomenon?

My favorite objects to observe are things that change. Planets, comets, and special events like lunar and solar eclipses. I love solar observing, both white light and H-alpha. I've seen a lot of faint

MAS Member Spotlight: Alex Langoussis

By Alex Samuel

fuzzies over the years; one can only take so much! I now prefer showpiece objects.

What equipment do you currently use for observations?

I have an 18-inch Zambuto dob in Arizona, along with a Televue NP127, Televue NP101, and an Astro-Physics Stowaway in Arizona. I use an 8-inch Zambuto dob and an Astro-Physics Traveler here in Madison.

A typical night of observing in Arizona is to go to my backyard observing pad (Bortle 3) for an hour or two, viewing some highlights and favorites, but also trying to view a new object each time. Here in Wisconsin, I just try to grab any clear sky I can and view from my driveway.

Have you had any memorable observing experiences or "wow" moments when stargazing?

I've seen so many wonderful things in the night sky over the years. Probably the most memorable was viewing the southern hemisphere Milky Way night after night, for 3 months, from the Namib Desert in Namibia, where I was the guest astronomer at a nature lodge. The center of the galaxy was straight overhead, and so bright that it cast shadows. Also in the southern hemisphere, I observed Omega Centauri through a 24-inch, and the

Tarantula Nebula and Eta Carinae through a 30-inch. Other lifetime highlights include the 1991 solar eclipse from a ship off of Hawaii's Big Island, and the Comet Shoemaker-Levy 9 crash into Jupiter, where the impacts were visible for many weeks. The night I saw Comet Hyakutake stretch 68 degrees across the sky, from the Little Dipper to Virgo, will also be forever etched in my mind.

What was the most challenging or rewarding observation you've done?

The most rewarding thing I've done is hunt supernovas with my friend Tim Puckett. He started a search in the 1990s, and I joined him. It was a time before the large surveys when a lot of the supernova hunting was not yet automated. Astronomers studied supernovas as standard candles to measure the expansion of the universe. This is when they discovered the universe was accelerating! I did the search for several years, before my teaching got in the way. I ended up with 24 supernova discoveries. This, along with my astronomy teaching, led to being nominated and accepted as a Fellow of the Royal Astronomical Society.

Are there any specific projects or goals you have in the world of astronomy that you're currently working on or that you would like to achieve?

I'd like to learn the basics of imaging but the learning curve for me is now pretty steep. I am not as interested in pretty pictures so much as doing something scientific, such as variable stars, or asteroid or exoplanet follow-ups.

Outside of astronomy, what are your interests?

Besides astronomy, I enjoy vegetable gardening (so if it rains, I've got a hobby that benefits!). I



Alex under the stars (note the Pifinder mounted on his scope, see page 11).

also enjoy playing chess (even when John Rummel beats me!), swimming and biking. On cloudy nights, besides logging onto CloudyNights.com, I enjoy reading short stories, including mysteries and science fiction. I can't stay awake long enough for novels anymore!

Do you have any advice for new members of MAS?

I find clubs a bit hard for people (and me) to settle into. What has worked for me is to volunteer. I became much more involved in the Atlanta Astronomy Club when I took on the task of observatory chair. That led to many different positions

in the club, and meeting so many nice people. Even if you don't volunteer, find people who appear to be doing the same sorts of things you would like to be doing, hang with them, ask a lot of questions. I learned SO much from the many advanced amateurs in the Atlanta club simply by doing that.



Membership Report

By Jurgen Patau, MAS Treasurer

As you may know, in addition to serving as the MAS Treasurer, I also function as the club's de facto Membership Director. I maintain the membership roster, generate renewal invoices, collect dues, and share limited Astronomical League liaison duties with Jack Fitzmier.

We are a paid-membership organization. We always lose some members who do not renew, and we welcome new members to offset that. For a while, those numbers balanced, but recently we've been attracting more new members than non-renewals. **The result is that we currently have 155 members, an all-time high.**

Advances in amateur equipment (optics, cameras, automation, software) over the last two decades have been eagerly embraced by growing numbers of amateur astronomers. They can do things today that would have been inconceivable in the past. This reality helps attract members to MAS and helps drive MAS changes to meet their needs.

So the question is: how to explain this growth? Many factors contribute; in my personal opinion, the most significant include the following (in no special order). You may have your own reasons, and I welcome hearing them, including why members choose to **not** renew: how **aren't** we meeting their needs? (While I name people below, most of the following are actually team efforts.)

- **Our programming.** Our monthly Space Place meetings include seminars covering diverse topics presented by a diverse crew of academics, researchers and MAS members (thanks, John Rummel). Meetings went virtual with Zoom during the pandemic. Once pandemic restrictions were lifted, we went back to live Space Place meetings that were simultaneously streamed virtually, first by Zoom and then over YouTube. Terry Warnke (thanks, Terry) oversaw this YouTube transition and the creation of an MAS YouTube channel. It lets us archive meeting videos for later viewing. We also host a new-members session before each meeting.
- **Space Place.** Having a welcoming venue for our monthly meetings is crucial. For years, Space Place has filled that need. Its Director (now retired), Jim Lattis (many thanks, Jim) has worked with the UW Astronomy Department (thanks to it!) to allow us to use its space. This has been a mutually beneficial ongoing relationship. It gives us great stability in our planning and gives us a semi-permanent home.
- **YRS.** The upgrades to our dark sky site (see the previous issue) has made it a much more attractive observing site to our members. And we continue to improve and repair our infrastructure to meet the evolving needs of our members (thanks, Dave Leiphart).
- **Facebook.** It gave MAS a place to let others know who we are and what we do, and gave our members a place to share their work and thoughts. Through it, we introduced ourselves to a broader audience. The result is a healthy Facebook following (thanks, John Rummel and others).
- **Capitol Skies and our website.** Our newsletter, Capitol Skies (CS), was relaunched in 2024 after years of neglect (thanks, Jack Fitzmier). It's distributed to members by email and is posted on our website. Member contributions fill its pages, explaining what they're doing and how they're doing it, as well as conveying other useful information to readers. Additionally, our website is being relaunched with a new, more modern look and expanded capabilities (thanks, Dave Leiphart). It will be easier for members share their work. And our administrative goal is to finally permit online enrollment, online renewals and online payments. Both CS and our website give us a more modern and welcoming online appearance and presence.
- **The pandemic.** It forced a radical change in how MAS operated. Pre-pandemic, we met in person only. The pandemic forced us to embrace technology to connect with members, especially those who hadn't been able to attend in-person. It also affected us because people found time to expand their interests and some found their way to us. Our Facebook presence helped that happen.
- **MAS's outreach events.** Many thanks to Laurence Mohr, Rick Wayne, and others who organize them and who deal with the vicissitudes of weather. We sponsor our own parties and also respond to

outside requests to staff them. Our biggest outreach effort is the annual Moon Over Monona Terrace event which is jointly sponsored with Monona Terrace and has over a thousand local area attendees. This is a growth area.

- **The Astronomical League.** The AL is an umbrella organization of amateur astronomy clubs that offers benefits and challenging programs to its affiliate clubs' members. MAS helped found it but

dropped out some years ago. In 2024, Jack Fitzmier (thanks, Jack) led the effort to bring us back into the fold. MAS members join the AL at a steeply discounted rate. This program has proven popular; over 40% of our members have joined.

- **Volunteerism.** We are a volunteer-driven organization. We depend on volunteers to run the organization, maintain our infrastructure, maintain our online

presence, maintain our dark sky site, staff outreach activities including star parties, offer advice and guidance to others, share expertise with inquisitive members, and generally convey their enthusiasm to others about astronomy and maintaining dark skies.

Amateur astronomy is always evolving and that poses challenges to MAS. Adapting and responding to them and what our members need is what MAS does.

Overheard: "I Gotta Yanna"

By John Rummel

It was seen on our MAS Observer's email list. It's a bit of homegrown slang, courtesy of Rick Wayne, turning the name of our observatory into a verb. It means, "I *really* want to go to YRS tonight." The enthusiasm for our observing site is having an affect on the evolution of language, right in front of our eyes.

This gives me the opportunity to remind everyone that "Yanna" is a proper name.

LeRoy Yanna (1919-2005) was a member whose impact on MAS is hard to overstate. The club's current observatory site, the Yanna Research Station (YRS), was named in his honor after Yanna donated much of the Green County land on which the observatory rests. He became interested in astronomy around age 14 but said he couldn't find much information to feed his curiosity. Growing up between Fennimore and Montfort in eastern Grant county, it was a local veterinarian who came to his assistance by recommending a book on telescope making. Yanna sent away for the book and began studying, and soon after began making the first of 14 telescopes he would build during his lifetime. Yanna joined MAS around 1960 after being invited to give a talk on telescope making. By 1964 he was on the board and eventually would serve as vice president. He is last listed as being on the board in 1969. Yanna's involvement with the group in the 70s is not known but he rose again to prominence in the early 80s when the



LeRoy Yanna. Photo taken at an MAS picnic, summer of 1993.

light pollution in Fitchburg was increasingly making the Oscar Mayer Observatory (just off Fish Hatchery Road, two miles south of the Beltline) a poor location for astronomy. Yanna heard that the club was looking for a new site and approached the officers with the idea of selling a parcel of his land in northeastern Green county, about 20 miles south of Madison, to the club.

At the September 1984 meeting of the Society, that offer to sell turned into a gift when Yanna stood up and announced his intention to donate the land outright. The club's prime observing site has been known as YRS ever since.

Yanna was a fixture at our annual picnics, sitting in his lawn chair under a tree near the clubhouse. He remained active in the group until his death in 2005.

(Excerpted from History of the Madison Astronomical Society, 1935-1988)

MAS Leadership

Board of Directors

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Laurence Mohr

Vice President

Kevin Santulis

Treasurer

Jurgen Patau

Secretary

Dan Hyslop

Observatory Director

David Leiphart

At-Large Directors

Chris Zeltner

Martin Mika

Non-Board Positions

Outreach Coordinator

Rick Wayne

Webmaster

David Leiphart

YRS Grounds Manager

Chris Zeltner

Program Coordinator and Society Historian

John Rummel

Astronomical League Liaison and Capitol Skies Editor

Jack Fitzmier

To contact any of the above individuals, send an email to: madisonastro.info@gmail.com

On Wednesday night, September 3, into Thursday morning, September 4, approximately 20 members of the Madison Astronomical Society gathered at the Washburn Observatory on campus to use the venerable Clark 15.6-inch refractor to observe the transit of Titan's shadow across the cloud tops of Saturn.

Navigating the narrow, 13-foot high set of wooden steps that give observers access to the eyepiece, we took our turns assessing the view. Conditions were a bit hazy when our group started arriving around midnight but the seeing gradually improved



Above, Eric Thiede inspects the disk of Saturn. (iPhone pic by John Rummel)



Titan's Shadow and the Washburn Refractor

By John Rummel

throughout the evening until we were routinely pushing the magnification above 600x for views of the planet, moons, and shadow.

The Washburn Clark Refractor has an aperture of 15.6 inches and a focal length of 6,172 mm, or 20.25 feet (its focal ratio is F/15.5). It was installed in the brand new Washburn Observatory on the UW campus in 1879-80.

Once the seeing steadied and when the shadow transit was well underway, I found the views through the Washburn refractor to be so good that discerning the shadow was relatively easy. On first glance, the image of Saturn was a bit blurry and indistinct, but tweaking the focus and being patient for those moments of clarity were rewarded with easy and unmistakable views of the shadow.

We alternated throughout the evening between a 26mm eyepiece, yielding about 237X and a 10mm, yielding about 610x. Early on, pushing the magnification over 600 was clearly too much but later, I found the views at 610x extremely satisfying. There are not many telescopes capable of sustaining such high magnifications. The Washburn refractor is clearly one of them.

Later in the evening, Dan Hyslop was able to put his planetary camera on the 15.6-inch and gather some imagery of Saturn. See Dan's wonderful report below.

Jim Lattis, recently retired astronomy department faculty and director of Space Place, graciously opened the observatory and hosted us for this MAS members-only event. For more info on the Washburn Observatory and the Clark refractor, check out Jim Lattis and Kelly Tyrrell's book, [Chasing the Stars](#).



Planetary Imaging with the Washburn Refractor

By Dan Hyslop

I had the rare opportunity to image Saturn through the Washburn Clark refractor using my modern planetary camera when MAS visited the university observatory on September 4th for the transit of Titan's shadow. Planetary photography is very different from the deep sky imaging that most of our members do so I thought I'd provide a brief description of how I acquired and processed Saturn. I am not yet an expert in this field! There are detailed tutorials elsewhere that will give you more

actionable information, this is meant to be an introduction.

Planets are small and bright, but constantly shifting with the seeing. Deep sky photography requires dozens of long sub-exposures to collect as much light as possible which are then stacked to increase the signal-to-noise ratio.

Planetary imaging uses thousands of short exposures taken as video. I use an ASI678 camera, built around a Sony dash-cam sensor. Because a planet is small we can isolate it into a narrow "region of interest" or **ROI** on the camera sensor and

ignore all the sky around it. I recorded a patch of sky around Saturn about 1900 x 700 pixels on a 3840 x 2160 sensor. At its full resolution, my camera's maximum specified frame rate is about 50 fps, but limiting the ROI allows it to reach 150 fps. The computer is important here: acquiring these videos requires high speed USB, a large solid state hard drive and fast RAM. Slower equipment will reduce the rate you collect data. My refurbished business laptop with 16 GB RAM and 1 TB SSD cost \$400 and performs well for planetary work. FireCapture is freeware designed for planetary capture that allows many tweaks and adjustments. The most important is shutter speed. Ideally you should choose a shutter speed that fills the pixel wells to about 70%. On Saturn that turned out to be about 10 milliseconds (ms). Because the seeing was poor I also took a 5 ms video with the gain pushed higher to reach

the same brightness. Higher gain means more noise but the shorter exposures capture less atmospheric turbulence. I wanted to cover both bases and see which data looked better later: you can't always predict what the best compromise will be on any given night. Both videos were five minutes long, the 10 ms video contained 29694 individual frames and the 5 ms had 46817. This is a lot of data, both videos together are over 100 GB. Advanced planetary photographers making animations can easily collect a terabyte of data in one night.

I stacked both of my videos using another planetary freeware program called Autostakkert. First it will analyze and rate each frame by contrast. In **figure 1** you can see two graphs: the gray ragged one shows the frame quality over time for the

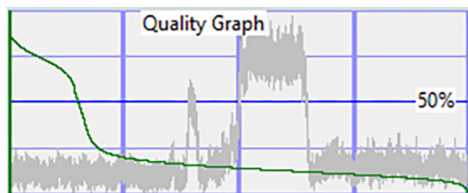


Figure 1, Autostakkert's frame quality graph.

video while the green one sorts them best to worst. The gray line shows a burst of good seeing starting about halfway through the video and lasting about a minute. The green line shows those same frames at the left as the best ones, with quality dropping off quickly. The shape of this green line is important because we must decide how many frames to stack for our final product. If all our frames are excellent we might stack many. In this case we can see our image will suffer if we stack more than 12 or 15%. I chose to make two stacks here, top 5% and top 15% then compare later. Surprisingly, my 10 ms video ended up being better than my 5 ms video because of this burst of good seeing. **Figure 2** shows the best and worst frame from my 10 ms video. Not as much difference as you'd expect, but if you

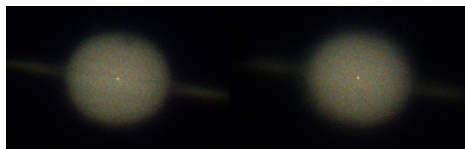


Figure 2, best and worst frames compared.

squint at both you can see the rings, major cloud bands, and Titan's shadow. The software needs landmarks called alignment points to compare between each frame for stacking. Each point is more like a region that it will look around in to see if it can find a similar point between multiple frames. A planet like Jupiter can use small alignment points because it has a lot of surface detail and contrast and this makes stacking fast. Saturn has fewer surface features so we choose larger points. I find it best to choose the size myself based on the target and then let the software place them automatically across the surface. Stacking took about an hour on my desktop PC.

The stacked output (**figure 3**) looks much better than the individual frames but is

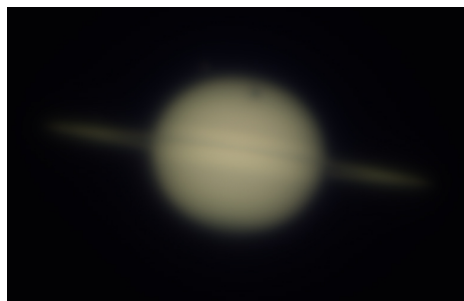


Figure 3, initial stack, prior to sharpening.

still soft and needs further processing in Wavesharp. Wavesharp is an evolution of Registax and uses a wavelet process, similar to a fast fourier transform. An image has detail at different scales and wavelets allow you to selectively sharpen these details by size. Big details are easier for telescopes and cameras to capture, so they're over-represented in our images and small details are hidden. If we sharpened the entire image until those small details look right, the big ones would

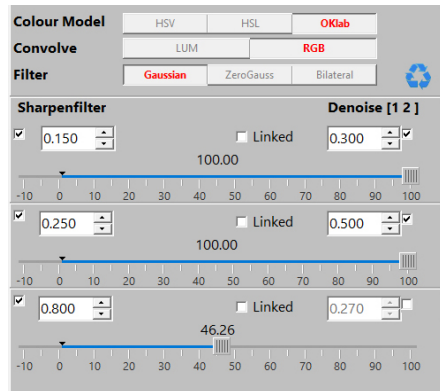


Figure 4, Wavesharp's wavelet sliders.

be harsh and unnatural. Wavelets allow us to choose how much we sharpen at these different scales. **Figure 4** shows the wavelet window. Each slider selects the magnitude of sharpening to apply and the left input window selects the scale. Using wavelets well requires considerable skill and experience. New users will find the process similar to reading tea leaves or chicken entrails. Results are not always



Figure 4b, image improvements are obvious after adjustments using Wavelet sharpening.

intuitive and you should expect to spend a lot of time experimenting. If I revisit this image next year it may look very different. Wavesharp also has some very useful color correction and noise reduction tools.

After all this, I made some small adjustments in Adobe Lightroom to brighten Titan, Tethys and Enceladus and remove a little red fringing in high-contrast areas to produce the final image (**figure 5**).



Figure 5, final image.

I'm very thankful to Jim Lattis for allowing me to use the Clark refractor for this project and opening the observatory for MAS members in the wee hours of the morning for the transit. Thanks also to John Rummel for organizing the event and everyone present for letting me monopolize the scope for about twenty minutes.

I look forward to more planetary imaging with my LX200: Jupiter's opposition is only a few months away.

Astronomical League Observing Program: The Bright Nebula Challenge

By Jack Fitzmier, Astronomical League Liaison



In previous issues of *Capitol Skies*, I have described AL Observing Programs and invited MAS members to participate.

This quarter, I want to invite you to work in parallel with me on the AL's Bright Nebula Observing Program, which I have recently begun. The full description of the program on the AL site is [here](#). As I explain below, I have prepared some materials that should help you get a jump start on this program, and I'd be happy to share these with anyone who is interested.

Nebulae are among my favorite celestial objects, and this program, which I will pursue photographically with my Seestar smart scope, features some of the night sky's true beauties like the Horsehead, Thor's Helmet, M42, and the Jellyfish, just to name a few. But there are also some much lesser-known nebulae on the list. Ever hear of the Cederblad (CED), Sharpless 2 (SH 2), or Lynds' Bright Nebula (LBN) catalogs? Though less famous, the targets in these catalogs are delightful.

To complete the program, you must photograph 100 bright nebulae from a list developed by the AL. To the photos you add some basic logbook material, like the date, time, and location where you took your photos. I have completed a number of AL programs and know the ropes pretty well; I'd be happy to review your work or answer questions as you move along. When complete, I can submit your work to the program Coordinator (who serves as a peer reviewer) on your behalf, or you can submit it yourself. After the Coordinator approves your submission, you are awarded a certificate of accomplishment and a handsome lapel pin.

I am guessing that some of you, perhaps newer to the hobby or to imaging, might have some doubts along these lines: "Gee, the photos I see from our members on the Facebook page are fantastic. And all that gear! All that software! I could never do anything like that." My response? Nope. I am perfectly confident that smart scopes (of which there seem to be many in the MAS neighborhood), as well as "big rigs," would be perfect equipment for this

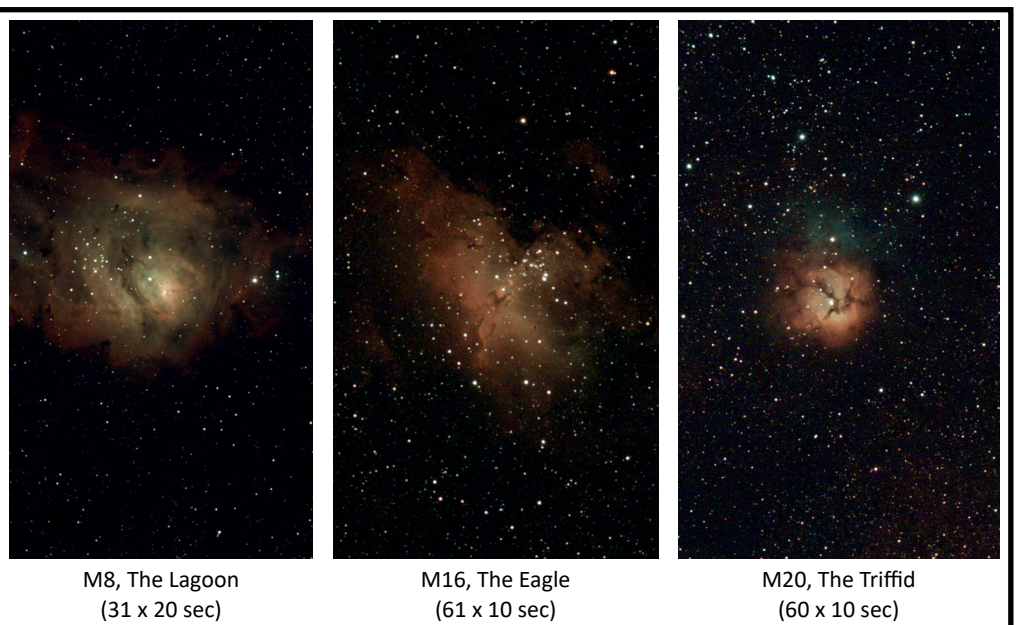
challenge. To wit, I took the images below with my Seestar S50 at YRS. No long exposures. No huge stacks done outside the Seestar app. No equatorial mount. No post-processing save a bit of contrast adjustment in Apple Preview. And I can assure you that these photos will suffice for this program. I plan to submit them!

The AL provides a list of 205 targets from which you can choose any 100. By my count, however, only about 130 of the 205 targets can be seen from the Madison area. To help you along, I have developed several resources. I wrote up a list of the targets we can see from Wisconsin and tried to sort out some catalog names, which can be a bit confusing. I also came across a Sky Safari skylist file that maps all the targets on to the Sky Safari planetarium. Very handy. Before I begin an imaging project, I find it helpful to see a photo of the object I hope to image. To that end, I have collected images (all in the public domain) of most of the northern targets on the AL list. I will gather all of these files on a shared drive

and would be happy to get you access if you are interested. Just drop me a line at jfizmier@gmail.com.

There is no sign-up to start this program. Just study the list and begin taking images. There are no time limits for completing it either. I've taken years, *literally*, to complete single AL programs. It's not a race against yourself or anyone else! And though several of us may be doing the program at the same time, this need not be a team sport. While it would be nice to compare notes as we go along, or to image our targets while together at YRS, feel free to launch your own program and go for it.

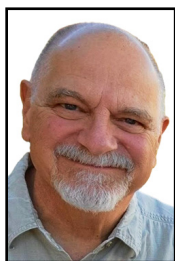
Please consider joining me on this photographic adventure. The only formal pre-requisite is that you are a member of the AL. And yes, I believe that photos you took prior to becoming an AL member can be used. Of course, if you have any questions or comments feel free to be in touch. I am happy to help and look forward to working with you.



M8, The Lagoon
(31 x 20 sec)

M16, The Eagle
(61 x 10 sec)

M20, The Trifid
(60 x 10 sec)



PiFinding Your Way Through the Night Sky

By Alex Langoussis, FRAS

First, a bit of recent history. Not many decades ago, to find something in the night sky, one would look at a star map, then star hop with a finder scope to their target. While I would argue that this is still the most satisfying way to find things, in our hurried world, with much brighter skies, it's nice to have easier, quicker ways. Before the computer age, many telescopes were on cumbersome equatorial mounts aligned to the poles. One would look up a target's celestial coordinates (Right Ascension and Declination), and then move the mount's setting circles to those coordinates.

In the 1980s, digital setting circles (DSCs) were introduced. DSCs use encoders attached to the telescope axes to measure the scope's movement. The encoders connect to a small computing unit with a database of objects. You would enter the target name, and the DSC unit would tell you in which directions to move the telescope until you were centered on the target. Examples of these you may have used or heard of include the Sky Commander and JMI's NGC-MAX. Later, the Argo Navis and the Nexus Pro came along. In the 1990s, computerized go-to telescopes made their appearance. These mounts have become smaller over the years, but they are still expensive and sometimes complex to use. For reflecting telescopes, these go-to systems are a pricey add-on. *And, they still need encoders.*

Fast forward to today, and plate solving has now matured as a method to find things. With plate solving, the finder takes pictures of the sky, and matches the pictures to its data set, so that it knows

where the scope is pointing. One of the latest to hit the market is the **PiFinder** (BBlabs, <https://pifinder.io>, \$590). This is a small, self-contained unit (about 6 x 10 x 8 cm). It includes a digital camera, internal battery, Raspberry Pi circuit board, WiFi, GPS, accelerometer, screen, keypad, and a



Alex's PiFinder mounted on his 8-inch reflector.

Synta-style finder foot. Being totally self-contained, *it requires no encoders*, so the setup time is much quicker, and there are no cables to connect or get tangled! Since it mounts onto a standard Synta finder shoe, it can be mounted onto a variety of telescopes.

The first set up takes only a few minutes. Subsequent uses have a very quick setup. Initially, you want to mount the unit so that it is parallel to the telescope axis. On my dob, it attaches to a truss pole with a clamp (supplied by Pifinder on request). The unit simply slides into the finder shoe like any other finder. The GPS will find your terrestrial location, which is what takes the most time, but still not long. The final initial step is to focus the camera, using

the image on the screen. Once the location and focus are established, these settings should be good for all future uses, unless you relocate the scope a significant distance.

A typical viewing session is as easy as 1,2,3. Turn on the unit. Aim the scope at a bright star. Tell the unit which star the camera is pointed at by using the arrow keys. Done! Once you're aligned, you can use the database to find targets. When a target is chosen, the screen will tell you in which directions to point the telescope (left, right, up, down). Since the unit is

matching its pictures to the sky, the pointing is very accurate. That's it! Unlike encoder-based systems, the PiFinder pointing does not drift, since it uses the plate-solve. It will nail the target every time.

But wait, there's more! With the WiFi, you can connect to the PiFinder with apps like Sky Safari. Once you're aligned, connect via WiFi, and then just use your app the rest of the night. Click on your intended target, hit the goto button, then move the scope. You can go an entire evening and never need to realign the unit.

One can be hesitant about the cost, but it's no more expensive than a premium eyepiece.

Considering what you probably have invested in equipment over the years, the PiFinder is a bargain. I can roll out my telescope, slide the PiFinder into the finder shoe, and be up and running in a couple of minutes. More importantly, when I'm finished and in a brain fog, there are no cables to worry about when packing up. Everything is back inside in 5 minutes.

Whether in the bright skies of Madison, or the dark skies of Arizona, the PiFinder has been a game changer for me. No muss, no fuss, just a quick set up and then start viewing the sky with precision pointing. You too can Pi-Find your way across the night sky!

Taking Care of the Yanna Research Station

By David Leiphart, Observatory Director

The Yanna Research Station projects from spring 2024 into 2025 focused on facility repairs, preventative maintenance, and landscaping additions. At the start there was a lot of unprotected and deteriorating wood on the clubhouse, observatories, and the privy. All structures but one had areas with significant rot.

Preventative Maintenance: At the 2024 YRS cleanup event MAS volunteers applied wood protection on all exposed observatory wood and the privy ramp. Several volunteers scraped the peeling paint from Doc G and applied two coats of primer and a topcoat of paint. Future YRS maintenance will include reapplying wood protection.

Tree Planting: Wide corridors were cleared in the woods along the North and East sides of YRS. MAS volunteers planted 60 white spruce trees in double rows. The plantings were done now due to the time it takes for the trees to mature. Christine Zeltner, Martin Mika, Kevin and Carol Santulis, Laurence Mohr, and I routinely helped with watering and caring for the trees.

Why plant trees now? Planning for the future. MAS is growing and at times the YRS observing area is full. There is useful

land around the perimeter of YRS, particularly along the North side. Past discussions about expanding into these areas has raised concern about light intrusion due to tree and brush removal. These new trees will help address that concern.

Clubhouse Soffits and Fascia: A significant project done last fall replaced the deteriorating soffits and fascia of the clubhouse. There were gaping holes and rotting wood on the four box corners of the clubhouse roof. The soffits and fascia had numerous woodpecker holes and insects filled the interior cavities. Mice were very active in these areas and burrowed into the solid foam roof insulation.

Planning for the soffit and fascia replacement started in July 2024. This was a challenging project that used most of the YRS maintenance time during the fall. James Hardie cement board was selected to prevent woodpecker damage. The cement board was difficult to install and new framing was required. Painting and drying racks were built to support this effort.

Several people helped with this project. Rob Strabala assisted me with building the painting and drying racks. Eric Lien, Jay Weik, and I applied a coat of primer and two topcoats to the 32 cement boards. Eric Lien and his dad Ron built the new framing and also installed the soffits and fascia boards. Jay Weik and I assisted

during the framing and Hardie board installation. Eric and Ron have professional experience with roofing and home building in construction companies owned by Ron and other family members. Assistance with the framing and installing the cement boards is very much appreciated.

Other Projects: There were several other YRS projects completed over the last year. Jay Weik replaced the deteriorating wood on the picnic tables. Jeff Western and his grandson Kardell Owen installed an inline fan in the privy vent pipe to reduce smell. Jeff and Kardell also worked with me to set up the Rubbermaid cabinet in the parking area that will hold snow shovels, brush shears, and other equipment.



Top: Repairing the soffits. From left: Jay Weik, Eric Lien, and Eric's dad, Ron. Bottom, the clubhouse, after repairs were completed.



Detail view of the old soffits and fascia.

Bottom Line: These repairs along with minimal routine maintenance will allow MAS continual use of these facilities. All this DIY work has saved MAS thousands of dollars. These savings will be used for telescope equipment, electronics, and observatory upgrades. Lastly, there are a number of ongoing projects not mentioned here and these will be announced in the coming months. Stay tuned.



Outreach Update

By Rick Wayne

Summer gave us one event that didn't happen, and another that wound up way bigger than expected. Our annual star party at Donald Park was canceled due to clouds, which is a shame. It's one of my favorites, with lots of returning attendees. Our Lake Mills/Korth Park star party a few days later, however, was a howling success. 80 people were there to listen and look. See Norm and Dave's report below.

Coming up in the fall, we have Moon Over Monona Terrace on Oct. 3, which of course is the focus of the year. Even if you don't have a scope, or don't feel as if you can

lead sky tours, you can have a great time there, just hanging out and being helpful. The crowd is invariably sweet, patient, and enthusiastic. Refer to Laurence's article page 1 to see where you might help.

Two weeks after MOMT, we will be helping the Yerkes Observatory with an outreach event — basically a star party. That's the 17th of October. Then Lewiston School in Portage on the 21st (rain date 10/22). That weekend, Saturday the 25th, we'll be at Schumacher Farm Park in Waunakee. And we're probably going to reprise our hugely-successful 3rd-grade



Part of the observing field at Korth Park. The park is located on a small rise above the lake to the west of Lake Mills, with good views to the E, S, and W. A nearly ideal spot for a star party.

event at Horizon School in Sun Prairie, but we're still working on the date.

For anything other than MOMT, contact me to volunteer. Remember, no special equipment or knowledge required, we can absolutely use you and you will absolutely have fun.

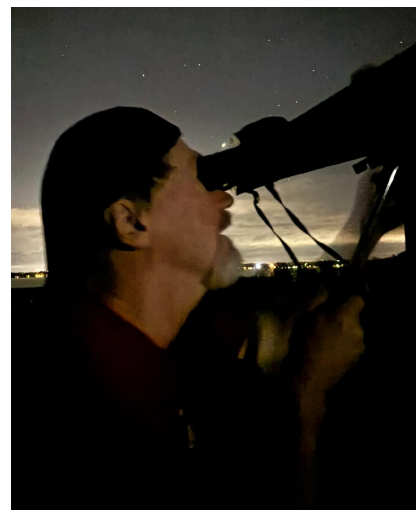
Korth Park Event in Lake Mills

Report by Norm Goeschko and Dave Leiphart

On August 20th, about 80 people attended an MAS event in Lake Mills. Before dusk, families congregated around the picnic shelter, and children were running around the playground. We set up the binoculars and telescopes on the hill overlooking Lake Mills. It was overcast during dusk, but the sky cleared not too long after. The sky around Lake Mills was clear and unexpectedly dark. Visitors were engaged

and enjoyed the presentation. The event lasted until about 10 p.m. — this was a very successful outreach event. Comments were made about making this an annual event. I think the last of us left around 11:00 with the last of the very engaged stragglers.

Members of the *Friends of Korth Park* group hosted us and provided an introduction to the evening. Several people asked if this could be an annual event. We'll see!



Norm steals a view through the large binoculars at the Korth Park event. Photo by Annalis Goeschko.

Upcoming Observing and Outreach Opportunities

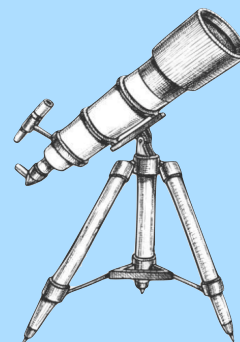
Oct 18 will be the last regularly scheduled YRS star party until spring. Watch announcements for any new additions to the list.

Other opportunities for outreach and observing

Anderson Dog Park (Oregon)	Sept 25
Moon Over Monona Terrace	Oct 3
Lewiston School (Portage)	Oct 21 (22)
Schumacher Farm Park	Oct 25

Outreach events are a blast! To get involved, contact [Rick Wayne](#) or reach out to club officers.

Monthly star parties at YRS are open to MAS members and their guests. All events are weather dependent. In advance of a star party or outreach event, keep an eye on the MAS Observers email list. Based on weather conditions, we will post a "Go" or "No Go" decision to the list on the afternoon of the date in question.



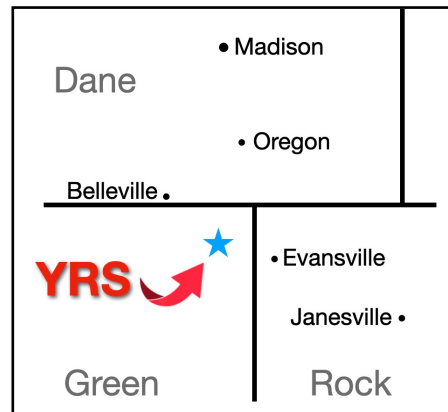
What is YRS?

Thinking about joining?

No special preparation is needed to join the ranks of the MAS. The only requirement is a genuine interest in any phase of astronomical observation or study. Our members are amateurs with skill levels from novice to experienced observers.

Madison Astronomical Society members are active in sharing the pleasures of astronomy with the public, acting as a resource for students and teachers, and exchanging information at Society meetings which occur monthly. The Society continues to pursue its original goal to "promote the science of astronomy and to educate the public in the wonders of the universe." For more information about the Society, please visit us on the web at madisonastro.org.

YRS stands for *Yanna Research Station*, which is our Society's dark sky site. It is in northeastern Green County, about a 30 minute drive south of Madison. It has a heated and air conditioned clubhouse, a pit-toilet, several observatories, and plenty of concrete pads with electrical service for setting up equipment. There is no water available on site. It is for MAS members and their guests, and it is where we hold our star parties and other events. YRS is located in northeastern Green County. If you'd like to visit, send a message to madisonastro.info@gmail.com.



Interested in learning more about AL Observing Programs?

By Jack Fitzmier, Astronomical League Liaison

A number of the AL Observing Programs have printed guides that help observers as they plan and collect observations and images. I have a number of these and would be happy to lend them out to interested MAS members. The following are available: Carbon Stars, Universe Sampler, Globular Clusters, Galaxy Groups and Clusters, Messier Objects, The Herschel II Program, Observing Stellar Evolution, and The Local Group and Galactic Neighborhood. Let me know if you are interested at jfitzmier@gmail.com

