



July, 2022

Early Morning Planet Hunters

Since the rare alignment of planets in June, a dedicated group of planet hunters have stopped by the MAS in the early hours this summer before sunrise to grab a glimpse of rising Jupiter and Saturn through the MAS "Planet Killer" 12.5 inch f/8.8 Newtonian reflector. This edition of the newsletter spotlights their experiences, images and workflows to planetary imaging in the Armsfield Observatory.

Starting in mid-August, all MAS members should begin to see Saturn at a much more convenient evening hour, followed by Jupiter in September. However, for diehards like our planetary imaging group, no hour is too late (or too early) to hone their planetary imaging skills and have a great time. As Lee Keith and Mike Hendren have described their in experiences, it's easy for anyone at the MAS should to pick up the hobby and begin gathering planetary images on to their USB flash drive.

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Images by Mike Hendren, July 9, A-scope



August Meetings

The **First Wednesday** meeting will be held in person at the Observatory grounds on **Wednesday, August 3rd at 7:30 PM**. New members are especially encouraged to attend this meeting. It is a chance to gain hands-on experience, receive tips on how to get started and/or get more involved in the Club's activities.

The **90th Anniversary MAS Picnic** will be held on **Saturday, August 6th at 4 PM** to celebrate 90 years of the MAS. The MAS will provide hot grills, soda, water, plates, silverware and napkins. Please bring a dish to pass!

The next **MAS Open House** will be held on **Friday, August 19, at 7:30 PM** rain or shine at the MAS. The topic will be the Perseids, Summer Triangle and the latest cometary activity.

The next **Board Meeting** will be held on **Monday, Aug 15 at 7 PM in person at the Quonset Meeting Hall**. Meetings will be in person going forward until further notice. All members are welcome to attend our Board Meeting with an interest in club happenings and news.

Observatory Director Report

There are no items to report this month.

Paul Borchardt, Observatory Director

Treasurer's Report

\$12,088.78	Starting Balance as of 06/19/22
	<u>Expenditures</u>
\$9.33	PayPal fees
\$1,016	Annual Expenses
\$58.80	WE Energies
\$130.00	Other Expenses
\$28.50	Water/Sewer
\$7.50	Water/Sewer
\$1,250.13	TOTAL Expenditures
	<u>Revenue</u>
\$456.00	Membership dues
\$50	Key Deposits
\$72	Public Donations
\$40	Other Revenue
\$6.00	Grants
\$624.00	TOTAL Revenue
\$11,462.65	Ending Balance as of 07/16/2022

Sue Timlin, Treasurer

Membership Report

Since the last Report we received 7 new membership applications and welcome: William Shadid & Family; Claire Bolda; Umar Jalaludeen; Glenn Kozicki & Family; John Atkins & Family; Sandra Bucholz & Family; Justin Kozlowski. The total number of active members is 216.

Matthew Ryno, Membership Chair

Minutes

An in-person board meeting was held at the Quonset Meeting Hall, on July 18th. The meeting was called to order at 7:02pm by MAS President, Jill Roberts. In attendance were: Dennis Roscoe, Jim Schroeter, Jim Bakic, Mike Bauer, William Gottenmoller, Lee Keith, Mike Wagner, Jason Doyle and Colin Boyton, Gene Hanson (FM), Paul Borchardt, Russ Blankenberg, Jill Roberts, Matthew Ryno, Sue Timlin and Brian Ganiere (FM).

Minutes of the June board meeting, and all reports were submitted by officers for review prior to the board meeting and approved by the board; including new membership applications.

New Business: Internet Service - Dennis Roscoe, chair of the Internet Committee, relayed the committee recommendation on Internet Service Providers for the MAS. A one-time cost of \$476 was recommended by the committee for setup of UniFi routers that would cover two buildings and the grounds, including \$75 for recurring monthly service fees at an Spectrum Ultra plan rate, which was "middle of the road" for high speed Internet, and would provide bandwidth to cover business meetings over Zoom and future needs. A short discussion followed. A motion was made to adopt the Internet and routing plans proposed by the committee, and the motion was passed by the board.

New Business: Mach 1 Mount Purchase - Observatory Director, Paul Borchardt, asked the board for permission to purchase an Astro-Physics Mach1GTO German Equatorial Mount, should it become available on the secondary market. He noted the Mach1GTO is more than adequate and will help fix what ails F-scope. Paul noted the Astro-Physics mounts are machined with precision, and "we need equipment that will last a long time ... we have scopes that are 100 years old and it'd be nice to have equipment that old." After a brief discussion, a motion was made to reserve funds and approve the purchase of a Mach1GTO mount, should it become available in the used market.

A motion to adjourn was made at 8:10 pm.

Matthew Ryno, Secretary

Planetary Imaging: Saturn and Jupiter

By Mike Hendren

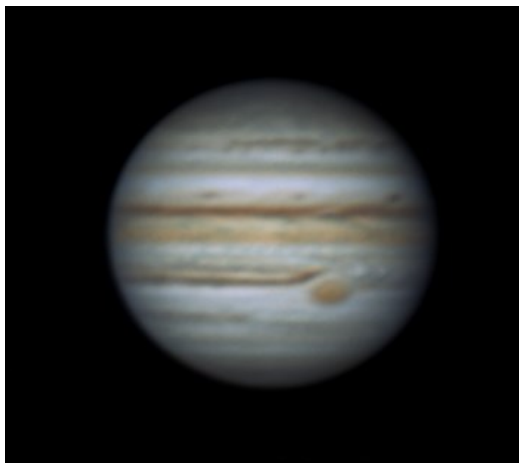
As a child growing up in the decade of the 60's, I was always intrigued by space and I felt like I had a front row seat to witness our country's mission, "to land a man on the Moon and return him safely to Earth". I was one of those kids, in first and second grade, watching on a 14" black and white TV while many of the project Mercury flights with Alan Shepard, Gus Grissom, John Glenn and Scott Carpenter took off in 1961 and 1962. For the rest of the decade, I paid close attention to the TV and radio as each of the remaining Mercury, then Gemini and finally Apollo flights left Cape Kennedy to move us one step closer to landing on the Moon. All attention was on the Moon and I was mesmerized by the thought of us landing on the Moon.

So, when I joined MAS and found out that I could image not only the Moon but other planets in our solar system and I wouldn't need to purchase a single piece of equipment, other than maybe a flash drive, I was pretty excited. Lee Keith was inviting members of MAS to join him at the observatory and he would teach us how to image Saturn and Jupiter. I really enjoy learning anything new and learning new things about space has always intrigued me. Here was great opportunity to combine astronomy with another interest of mine, photography. I began imaging Saturn and Jupiter with a couple of other MAS members and Lee as the Saturn and Jupiter 'season' began about mid-June. We imaged using the club's legacy scope, A-Scope. At first, we used the clubs' camera and computer with Lee showing us how to hookup the equipment and get the settings in FireCapture set to obtain good results. FireCapture is the software program used to control the imaging camera. We take a 90 second 'movie' of our target and FireCapture will send this file to a location of our choice, normally the video folder. From there all I needed to do was copy the file to my flash drive, put the

equipment away, hibernate the scope and we could all go home. Once home you can take the video file from the flash drive into AutoStakkert! where all of the individual images will be analyzed and stacked in order of quality. You can then take the best of these images into Registax, where you can further correct the color and sharpen the image to obtain the final image. The first time I obtained quality results of Saturn and Jupiter I was thrilled!

I enjoy the 'continuous education' aspect of planetary imaging as I was able to download FireCapture to my computer, along with the driver, to control the camera with Lee's help. FireCapture is not too complex of a program but there are certain complexities within the program that one needs to understand in order to get the

most out of it. Lee makes sure that you understand 'step one' before you move onto 'step two.' It's important to be very familiar with FireCapture's features in order to start capturing data quickly as time is of the essence, especially at 3:30 am. It's extremely helpful and greatly reduces the frustration level of learning this type of imaging when one's instructor has as much experience as Lee has in planetary imaging.



At first, I had a tendency to 'over sharpen' my images making them too noisy and crunchy but now I'm going with a 'softer' look to find the balance between extracting details while keeping a natural look to the final image. As I process more images, I get quicker and more efficient at it. Learning AutoStakkert! (AS3!) and Registax is essential to obtaining good results but I find that I prefer to be at the observatory working with the equipment and trying to focus Saturn and Jupiter in the scope and keep them in the cameras 'region of interest' than sitting at home processing the images. Seeing Saturn and Jupiter in the scope is always mesmerizing to me, just as thinking about landing on the Moon was back in 1962.

(Continued with Lee Keith on the next page)

Morning at the Observatory: How to Image Planets

By Lee Keith, Assistant Observatory Director

When many people first join our great Society often the first thing they want to do is take pictures of galaxies, star clusters or nebulae like the ones they see online or those from the amazing Hubble Space Telescope. They expect to put their DSLR camera or smartphone on a telescope somehow and press the shutter. How hard could it be, right?

Well, like many things in life, it is not as easy as that. Imaging deep sky objects like galaxies, star clusters and nebulae is complicated and takes a long time (hours over many nights) to accumulate enough light to get a good picture and then much manual computer processing to combine and enhance the images. Dark frames, flat fields, Photoshop, oh my! Not only that, but despite what you may think, it is not really very dark at the Observatory which makes imaging dim, fuzzy things more challenging, though not impossible.

But imaging planets is much simpler and can be done in just a few minutes, even from a highly light polluted site since the planets are very bright. To do a single image can take as little as 10-15 minutes and all the software is free! Not only that but the "processing" is fairly automatic with few decisions to make or artistic skills needed.

My purpose with this article is to give you a taste of what it is like imaging planets at the Observatory, even if you can't come out early in the morning and to introduce you to a few relevant concepts in astronomy and planetary imaging. You may find that it is something you would like to do once the planets make their way into the early evening sky. Just remember that even if you don't want to take pictures, you can still look through one of the large telescopes at our observatory and still experience the excitement of seeing Saturn's rings, Jupiter's many multicolored cloud belts and the Great Red Spot in all its glory with your own eyes!

First, I want to explain why I am getting up at such an ungodly early hour to image the planets. Simple! It's currently the best time to observe

them because they are at their highest in the sky, which is when they are due south on an imaginary line called the meridian. The meridian runs from the horizon due south to overhead at the zenith to the horizon due north and cuts the sky in half. When an object is in the south on the meridian it is at its highest in the sky it can be.

Currently, the planets Saturn & Jupiter are on or near the meridian in the early morning but over time, they will wander farther from the Sun and cross the meridian earlier and earlier in the night until they reach a point called opposition, when the planet is opposite the Sun in the sky. This year, this happens on August 14 for Saturn and September 26 for Jupiter when they rise at sunset, cross the meridian at midnight and are visible all night. This is also the time at which they are closest to us and their disks are largest in our telescopes. Prime time, baby! After opposition, the planets continue their annual wandering earlier into the evening but the nights are becoming cooler. All the better to go out now despite the early hour.

So what's it like coming out to the Observatory early in the morning? Getting out of bed is the hardest thing, but once you are up, it gets easier. After doing this for many years, I have found that missing an occasional couple hours sleep is not as big a deal as people think. Going to bed a little early helps.

You should have everything you need organized and ready to go so you don't waste time looking for things or deciding what to wear or take along. If you have not driven in the early morning since your school days, it is peaceful with little to no traffic so your trip should go quickly. The observatory gate is not locked so you can let yourself in if I have not arrived yet. While you wait, stand on the grounds and listen...silence! Above you, the planets are waiting.

When I arrive, I'll open "A" dome, start the exhaust fan in the auditorium to draw air from outside, through the dome and out the fan. This is to equalize the temperature in the dome with the outside. Next, I open the ends of the telescope tube to let outside air to circulate and equalize. I

will then find the planet we are to image in the telescope and center it in the eyepiece. This must be done fairly precisely because, unlike a DSLR which has a large chip, planetary cameras have small chips and a small field of view. This is all that is needed for the tiny size of the planets even in our large 12.5" "A" telescope. Jupiter, at its largest at opposition, is only .65mm (less than 1/40 in) in diameter at the focus of that scope! Saturn is even smaller, though its rings appear almost as large as Jupiter's disk. That's what an eyepiece is for; to magnify that tiny image so we can see it. Lastly, I'll put replace the eyepiece with the bright red planetary camera, pictured here.



There are two types of planetary cameras, "one shot" color and monochrome (black & white). While you can take perfectly good images with the monochrome camera alone, to make a color picture with it you need to take 3 images using a red, green and blue filter and combine them to get a color image.

For Jupiter, since it rotates so fast, you need to take the 3 videos in rapid succession, optimally within 2 minutes or less. Then these 3 videos need to be processed separately and recombined in Photoshop. It is this added complexity that makes the one-shot color camera the choice for beginners and impatient people like me. The MAS has both types.

If you have your own laptop with the software installed (FireCapture, Autostakkert!3, Registax6 and drivers for the ZWO ASI cameras, all free online) you can put it on the platform between the legs of the ladder and plug in the camera to a USB3 port on the laptop. If you don't have a laptop with the software installed, you can use one of the two MAS laptops. Whatever laptop you use, you will do the following process entirely on that laptop and no internet is required.

Fire up FireCapture, which is used to capture thousands of snapshots of the planet and store

them as a video. Once you have the planet visible on screen you need to focus using the remote control on the focuser which allows you to focus without shaking the telescope. Yes, this is high-power, high-resolution work where the planet will shake if you merely touch the telescope! After setting your exposure, (typically less than 1/100 sec) gain and choosing the number of frames (typically 10,000 or more) you can press the "Go!" button to begin your data capture. This should take no more than 90 seconds or so because of Jupiter's rapid rotation (less than 10 hours). Longer and you risk smearing small details on the planet.

My usual sequence is this: 6-8 color videos, 6-8 with a red & infrared (IR) filter and then 6-8 monochrome videos since the seeing (steadiness of the atmosphere) can vary quite a bit over just a few seconds or minutes. Infrared light is longer in wavelength than visible light and is invisible to our eyes but our skin can sense it as heat. This is the same light that the new James Webb Space Telescope (JWST) uses to image the universe. It is useful because it penetrates dust & gas better than visible light, letting us see deeper into



Jupiter's atmosphere to see what is going on underneath the surface cloud tops as well as being less affected by bad seeing compared to visible light. The IR views look different because we are seeing Jupiter below the visible cloud tops seen in the color images. Warm areas are bright and cool ones are dark. The Great Red Spot looks bright in infrared light because it is warm due to gas upwelling from deep within the Jovian atmosphere.

You are now done with the data capture phase. The rest of the imaging process can be done away from the telescope, say in the auditorium as others capture their videos. The next step is to use AutoStakkert!3 to find the sharpest frames in the video, stack them on top of each other to reinforce details and reduce noise. It will analyze all the frames and put them in quality order so you can scroll through them to determine how many to use in the stacked image. This takes only a couple of minutes. The resulting image looks pretty fuzzy but wait, we are not done!

Start Registax6 and load the fuzzy stacked image. Still looks fuzzy. Registax6 has a feature called wavelets that "magically" sharpens images. You can sharpen it manually using a series of 6 sliders but if you are lazy like me, you can choose a set of presets that get you pretty close to perfect. When you do -- stand back -- because this is when the magic happens. What we all have been waiting for!

Sharpening is not necessarily the last step. You can apply other enhancements to the image like auto color, gamma, contrast, noise reduction, rotation, etc. If you are really ambitious, you can use other image processing software like Photoshop to do additional things but this is

optional. What you can do in Registax6 is more than sufficient for excellent results.

When you are finished, you can save the final result to your flash drive and take it home to impress your friends and post on social media! While the initial video files are multi-gigabytes in size, the final jpeg files are much smaller.

My "workflow" is to pick the best one of each set of videos (color, infrared, monochrome) to save, then make a rotation animation from all of them. The animation is quite dramatic and can show the true dynamism of the "King of the Planets". Note that I put south at the top of the images as seen in a telescope. My favorite feature to see is the Great Red Spot. I prioritize nights when it is going to be visible around the time it is crossing the meridian. But watching the continuously changing clouds and moon shadows transiting the disk is an ongoing fascination for me and others who watch it.

A process like this is done for the Sun and Moon. The Moon is easier in that it is brighter and larger than the planets with lots of high contrast details so you can get excellent results with the smallest of telescopes. The Sun has additional requirements such as appropriate filters and imaging during the day! A monochrome camera is appropriate since there is little or no color involved.

The sky is lightening by now and the birds have begun to sing so I guess it's time to hop back on my bike and head home for a few more hours of sleep. Since I took so many videos, when I get home, I will have my PC do the initial stacking of all the video files so I can do final sharpening when I get up.

Good night, all!



90 Year Anniversary Picnic!

Jill Roberts, MAS President, has proposed a picnic to celebrate the 90th Anniversary of the Milwaukee Astronomical Society!

We will be having a picnic on **August 6, at 4 pm**. The MAS will provide the hot grills, soda, water, plates, silverware and napkins. There will be a few raffles, and tickets will be available at the picnic.

Please bring a lawn chair and a dish to pass. You can bring anything you'd like to grill. If you don't want to grill out, you can bring food with you as well. Feel free to bring your own choice of beverage too. The family and kids are welcome.

If you're interested in a fairly comprehensive history of the Milwaukee Astronomical Society from its very beginnings back in 1932, Gene Hanson, MAS Webmaster, has presented it in various time periods, currently through 1977. There are many pictures and slideshows along with stories about them. We hope that you get a real sense of how special our club really is and how it is all rooted in what has happened in the past. [Click here](#) to read about it.

The James Webb Space Telescope Delights!

MAS members shared their reactions to the [first James Webb Space Telescope images](#):

"The Southern Ring Nebula is breathtaking and more detailed than we ever hoped for. In particular the MIRI image is amazing and full of new information on how planetary nebulae are formed. The binary of a white dwarf and a main sequence star stirring up the gases and dust blows my mind." — Dennis Roscoe, who also led a talk on the James Webb, July 23 at the Pewaukee Library.

"So at the risk of showing just how newbie I am(!) I had a similar reaction to others online. It's was one of 'that's it? Hubble looks pretty good still so what's the real difference?' Then the side by side comparisons, especially the one I mentioned earlier with the slider helped me a lot, started showing up captioned with in-depth explanations. That made all the difference to see the image data differences and how much more is being observed. The new images were wonderful - now they've become mesmerizing." — Peter Lakatos

"I wouldn't expect an in-depth science lecture, but I wish more would be said about how these data get collected over time and processed -- missing a great public learning opportunity into the depth of the science. Unfortunately, the general public may think that if you could just travel far enough out into space, that you could 'visually' see this image like viewing a painting on canvas, and have little conception of the distances between the stars. Similarly, the misconception that stars within constellations are close to one another. Looking forward to Dennis's presentation this Saturday in Pewaukee." — Mitzi Keadle

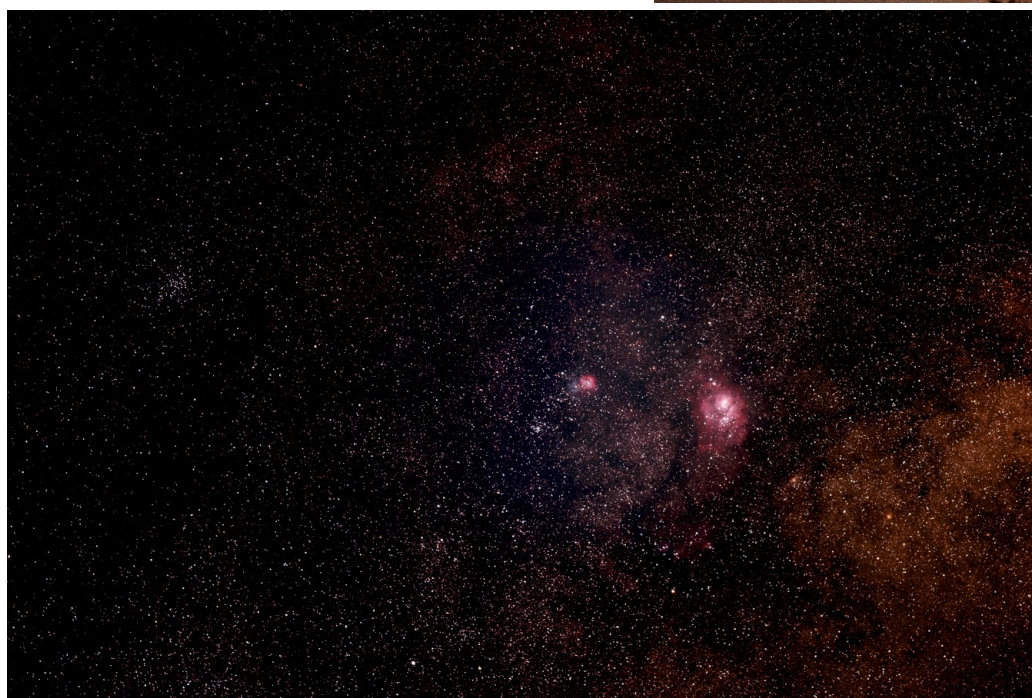
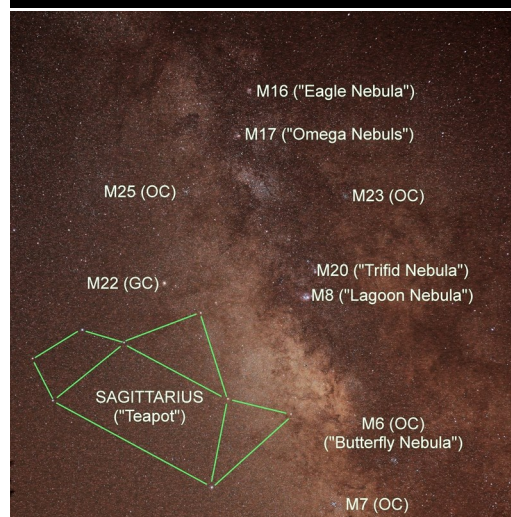
"What struck me was how incredible it is to see light from as far into the past, and then realize that we're talking in **billions** of light years when we take a look at this image of Galaxy Cluster SMACS 0723. So not only that, but due to speaking in such a large scale of time and space - no longer can we roughly equate time and space as we can when measuring approximate distance to a local galaxy like Andromeda. So, we know that due to expansion, these galaxies in the picture of the early universe from James Web, are so much farther away than they were when imaged - [now around 46 billion light years away!](#)" — Matthew Ryno

"I will tell you all. I forced my boss to let me go on break when the first images were released, and I must admit that I was in tears when I saw the line spectra of WASP 96-B. The MIRI view of the Southern Ring was also spectacular." — William Gottemoller

A View from the Observatory

What a remarkable stretch of clear skies we're having. I took the opportunity on Thursday to visit the MAS, use G scope for a bit, and take planetary images early into the morning. What a treat! Especially fun to share, was my shot of the Comet C/2017 K2 (PANSTARRS), which was clearly visible from the pads for my eVscope 4inch reflector telescope, and will be from the telescopes as well at the MAS. This comet should be especially good to view tonight under new moon conditions from the MAS, look to the South. This image is a combination of 4sec. shots, over the span of 8 minutes, so if you're looking visually, it will be a little more nuanced to spot but there! [Here are the coordinates](#) for the comet. For the most part the comet is currently in the Ophiuchus constellation. — Matthew Ryno

Not only is the weather warmer for viewing, but the good stuff is out in the south during the summer. Sagittarius and company are right in the Milky Way and in fact the center of our galaxy is seen there. Due south right now are tons of stars and nebulae, many visible through the club's scopes. Just point the 18inch scope south and be wowed. I was last night. Here's a 15minute exposure through a 135mm lens that many members probably have as part of a regular land camera. That's Lagoon and Trifid and M21 with M23 cluster off to the left. Center of our galaxy is just to the right of the picture. And zooming in a little shows the Trifid and Lagoon nebulae. Also seen is the so-called starfish cluster and some dark nebulae. — Russ Blankenburg



Adopt a Telescope Program - Signup Sheet

	Adopter	Scope	Location
1	Sue Timlin/John Hammetter	18" F/4.5 Obsession	Wiesen Observatory
2	Steve Volp	12.5" F/7.4 Buckstaff	B Dome
3	Robert Burgess	12.5" F/9 Halbach	A Dome (Armfield)
4	Russ Blankenburg	9-1/4" F/10 Celestron	Albrecht Observatory
5	Jeff Kraehnke	14" F/7.4 G-scope	Z Dome
6	Lee Keith/Tom Kraus	12" F/10 LX200 EMC	Tangney Observatory
7	Colin Boynton	10" F/6.3 LX200	Ray Zit Observatory
8	Tamas Kriska	Stellarvue SVQ 100 F/5.8	Jim Toeller Observatory
9	Paul Borchardt	Solar scope	SkyShed POD

At Your Service

Officers / Staff

President	Jill Roberts	262-765-7092
Vice President	Sue Timlin	414-460-4886
Treasurer	Sue Timlin	414-460-4886
Secretary	Matthew Ryno	414-248-1455
Observatory Director	Paul Borchardt	262-993-8870
Asst. Observatory Director	Russ Blankenburg	262-938-0752
Asst. Observatory Director	Lee Keith	262-875-9103
Newsletter Editor	Matthew Ryno	414-248-1455
Webmaster	Gene Hanson	262-269-9576
Membership Chair	Matthew Ryno	414-248-1455

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Jim Bakic	414-303-7765
Matthew Ryno	414-248-1455
Jill Roberts	262-765-7092
Sue Timlin	414-460-4886
Jason Doyle	414-678-9110
Dennis Roscoe	608-206-0909
Lee Keith	262-875-9103
Jim Schroeter	414-333-3679
Mike Bauer	262-894-1253
Mike Wagner	262-547-3321
William	262-442-3686
Gottmoller	

July Keyholders

08/06	William Gottmoller	262-442-3686
08/13	Jim Bakic	414-303-7765
08/20	Steve Volp	414-751-8334
08/27	Jeff Kraehnke	414-333-4656



MAS Observatory

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