May, 2018

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Summer Schedule

Traditionally, the Milwaukee Astronomical Society will not have General Meetings during summer months of June thru August.

However, we will have **Monthly Board Meetings** on the second Monday of each month from 7 PM that is open for everybody who interested in organizational and Observatory related issues. The next Board Meeting is scheduled for June 11th.

The **Annual Summer Picnic** is scheduled for Saturday, August 4th at 4 PM. It will be a potluck so please bring a dish to share. Family and friends are welcome.

As always, the Observatory is open on Saturday nights, and also when it is posted on the Google Group.

Election Results

During the Business meeting on May 18th two new members were elected to the Board of Directors for a three year term. We would like to welcome **Jim Bakic** and **Jim Schroeter.** Jeff Kraehnke was elected to serve a second term. The Board thanks the service of outgoing members: Rob Burgess and Frank Kenney.

The new Board of Directors reelected all incumbent officers:

President: Tamas Kriska (ex officio), Vice President: Sue Timlin, Secretary: Agnes Keszler (ex officio), Treasurer: Sue Timlin.

Paul Borchardt will be serving as Observatory Director till 2019, and Jeff Kraehnke will remain the Assistant Observatory Director.

Public Nights

The Open House season kick off was a cold rainy day. Despite the unwelcoming weather we had about 12 visitors who enjoyed Herman Restrepo's spectacular presentation about constellations and stars. Everybody who attended the talk learned something exciting about mythology, classification, and color of stars.

Herman demonstrates the spectral properties of Ne lamp

The next Public Night event will be on Saturday, June 23rd from 4:00 to 8:00 PM. The topic is the Sun. If you are willing to participate with manning a telescope, giving a tour of the observatory, or helping in the parking lot, please join us. Thank you for your kind contribution that would make the nights successful.

Observatory Report

The 26" Z-Scope mirror has paid for and picked up by its new owner. Along with the mirrors, several mirror cell components were sold, and the buyer purchased four old eyepieces, and the Sky Shed 8-foot dome from the Solar Scope. Purchase prices were: 26" mirror with the secondary- $1700 4 Konig eyepieces- $100 Sky Shed Dome- $200. The 26" scope's OTA has been completely dismantled and ready to go to the recycle center to be sold as scrap.

The annual spring clean-up was held on Saturday, May 5th. About a dozen members came out to clean up the Observatory and Agnes served a very tasty lunch. Thank you to all of the members who took time out to come and spruce up the Observatory, it looked great for our first open house which was held on the following Friday.

There are now dedicated Canon T3i cameras for each of the four-narrow band filters. The cameras are labeled and stored together in fitted case. Some special thanks go out Gene Hanson for his donation of two of the cameras. I donated one of the cameras myself and the fourth camera the club already had. Although these cameras will be used mostly on the F-Scope, they can also be used with Canon telephoto lenses mounted piggy back on another scope.

Respectfully Submitted,

Paul Borchardt, Observatory Director

Treasurer's Report

$5,936.53	***Starting Balance as of 04/25/2018***
	Expenditures
$1.69	PayPal fees
$23.52	Periodic expenses
$49.86	Observatory expenses
$72.25	WE Energies
$147.32	TOTAL Expenditures
	Revenue
$20.45	Private donations
$48.00	Membership dues
$60.00	Public donations
$1,781.00	Other revenue
$2,000.00	Grants
$4,000.00	Protective withdrawal
$7,909.45	TOTAL Revenue
$13,698.66	***Ending Balance as of 05/16/2018***

Respectfully Submitted,

Sue Timlin, Treasurer

Meeting Minutes

The meeting was held on May 18th at the MAS Observatory, New Berlin and was called to order at 7:03PM by Tamas Kriska President.

Minutes, Treasurer's Report, **Observatory Director's Report**, and **Membership Committee Report** were electronically submitted ahead of the meeting. Membership application Jonathan Russell was approved.

Old Business – We are still waiting for *B-scope focuser motor*. *Camera bodies for narrow band filters:* Two Canon Ti3 cameras were bought thanks to Gene Hanson's generous donation. *Maintenance plan*: Anonymous donation of $2000 for maintenance was received. *Long range planning*: Scott Berg sent out and introductory letter, and will be the acting chair of a Long Range Planning committee through next month.

New Business – *MAS Instagram*: Derek Rickert volunteered setting up an Instagram profile. *Fundraising*: A motion was made and carried to set aside $3,475 from recent equipment selling and also future sales and donations to an equipment improvement fund. Future fundraising strategies will be established. *G-scope*: The Observatory Committee concluded the mount is unrepairable. Gene Hanson generously offered to buy a replacement AP1600GTO mount which can hold a scope up to 20". Future strategy is to purchase a high end telescope to be the Club's a flag ship equipment.

Election - Jim Bakic and Jim Schroeter were elected to the Board. All Officers were reelected.

Program – Amber Bakkum from the Medical College of Wisconsin and Angela Van Sistine from UWM Milwaukee gave a presentation entitled Astrobiology: Life Beyond Earth.

Respectfully Submitted

Agnes Keszler, Secretary

Membership Report

Since the last Report we received three new membership applications and would like to welcome Jonathan Russell, Marilyn Sameh, Scott & Kristi Castello, and Billy Williams & Family. We now have 158 active members.

Respectfully Submitted,

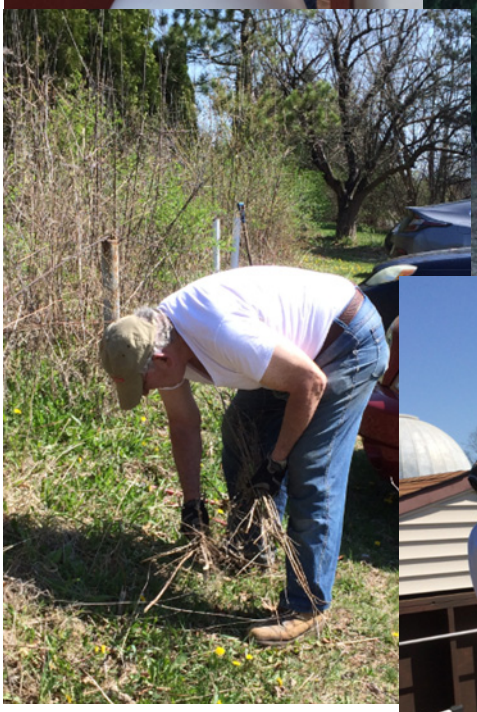
Jeff Kraehnke, Committee Chair

Observatory News

Summer Clean-up

To get prepared for the upcoming Open House season the Club organized the annual spring clean-up work party on a beautiful Saturday of May 5th. All Observatories were vacuumed, equipment wiped, the mirrors of the two 18'' Obsession telescopes were cleaned. Two old poles were removed from the yard and the parking lot area was cleaned.

Now everything is nice and shiny. A big thank you goes to all 16 participants.



Observatory News

Disassembling of the Z-scope

This month we bid our last farewell to the Z-scope, an entirely Club-made 26 inch scope built in the early eighties. The centerpiece of that scope was the 26" test blank for the 200" Palomar telescope made at the time the Club was formed in 1932. It was replaced by a modern imaging telescope three years ago.

After about 100 man-hours of disassembly, the scope was laid to rest at the Waukesha recycling center. There were many bruises, pinches and bloody knuckles over the last month or two. There was a head injury, rain, snow and damaged woodwork. But also exercise, fresh air, cleaner buildings and a lot of member bonding.

The final remains included: 70 lbs of brass, 15 lbs of stainless steel, 70 lbs of lead, and 700 lbs of aluminum totaling $474.






Student Science Projects

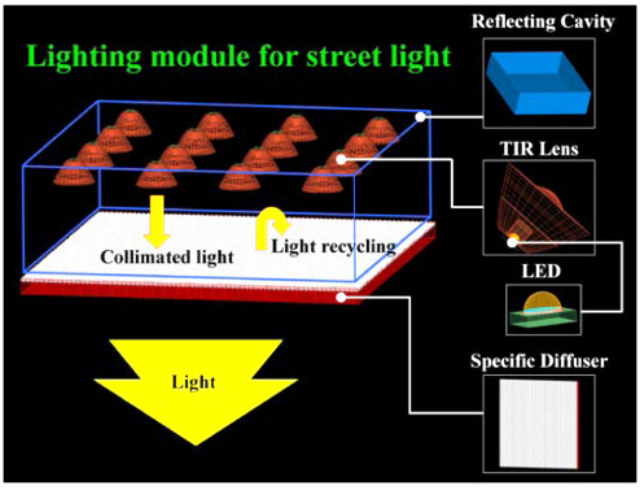
Light Pollution

As part of our series on school projects, this month we share a work of a high school student, **Megan Seiler** who contacted the MAS asking help with her engineering class' project on Light Pollution:

Introduction - Light Pollution disturbs life processes. Light pollution is a problem for everyone. 80% of the world's population lives under light pollution. It disturbs natural processes such as insect breeding, circadian rhythm, and bird and turtle migrations. It also wreaks havoc on energy consumption, crime and safety. Light pollution is such problem for everyone, so what can the average person do to make a difference?

Research - What seems most compelling is that while light adversely affects plants and animals, it also draws us. The blue Light of LEDs attract insects and is harmful to the circadian rhythm. Light exposure can make it difficult to go to sleep, disrupting the circadian rhythms that keep our bodies healthy. A survey conducted for this project indicated that Light Pollution can be annoying, but lighted areas are still necessary. Research is still needed to gather the fullest causes of our area's light pollution has evolved and how bright is too bright for household lights. The root cause of the problem is human ignorance.

Light pollution causes glare, direct upwards reflect, skyglow, and light trespass. Glare is when light shines in a horizontal way. Direct upwards reflection is caused by lights shining directly up, out, and over the shields that should be blocking the light. Light can also spill out through windows or reflect off of city streets. This light spill is called light trespass. Skyglow is caused by light reflecting off of water droplets or other small particles in the air. It creates a giant halo of light.



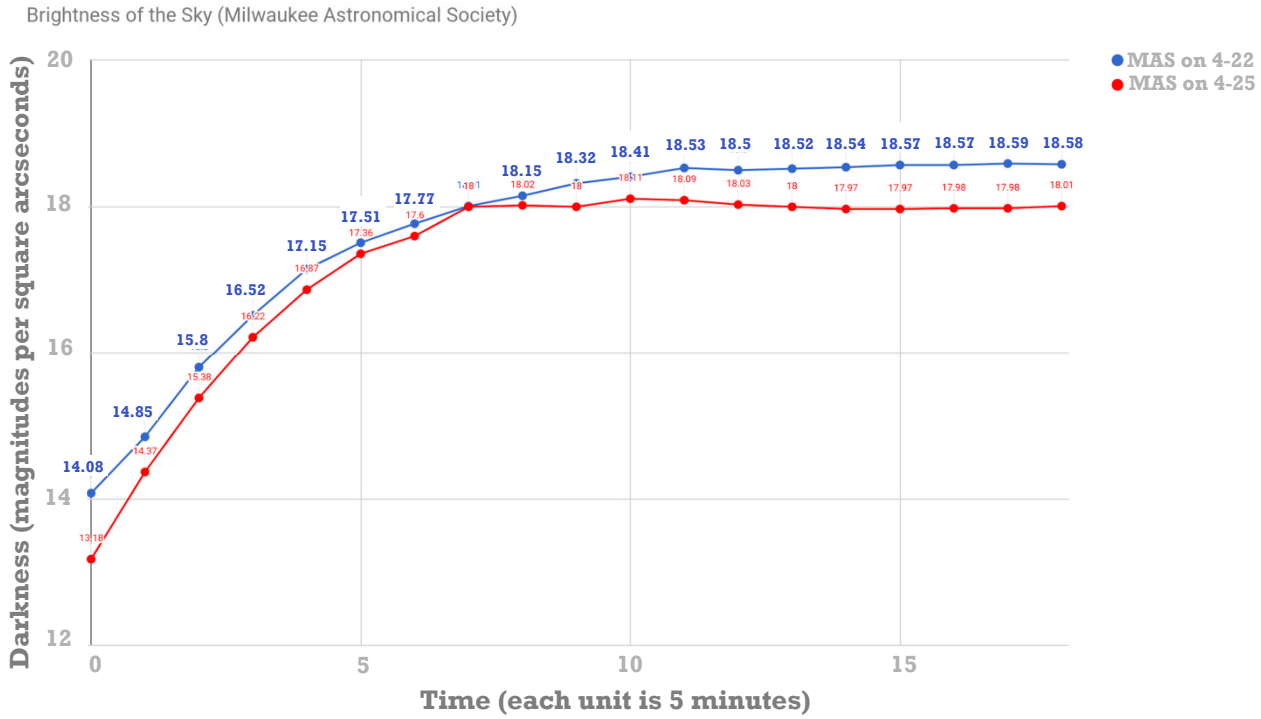
A visual representation of the new streetlamp design

Light pollution is often caused when people use too much light. People often believe that light will keep their community safer. However, this is not always the case. Inaccurate lighting can create shadows for people to hide in. Brighter lights do not mean safer communities. Street lamps can be a major problem for those trying to reduce light pollution. They are necessary to keep some areas lit, but they oftentimes end up wasting energy. Certain lamps have found a way to combat this. Researchers in Taiwan and Mexico designed a highly efficient streetlamp that aims to shine a uniform rectangle of light on a given area. The researchers used industry standard light emitting diodes (LEDs), a diffuser (to reduce glare), and a reflective cavity. During the 10 meter simulation, the result was an optical utilization factor (OUF) of 51-81 percent, whereas the standard for an 'excellent' streetlamp is about 45 percent. Optical utilization refers to how much light hits its target, compared to how much comes out of the lamp itself. In other words, how much light does what it is supposed to. These street lights are not yet on the market. However, an organization called the International Dark-Sky Association has labeled certain approved lights are available for home use. They have a blue seal of approval on the box. LEDs use less energy, but be careful as they are often too bright. Yellow colored low pressure sodium lights are recommended by the International Dark-Sky Association because of their energy efficiency and sensitivity to human vision. However, there is very little color recognition with these types of lights. For that reason, they are not always recommended for security.

Our Area's Light Pollution - As a form of research, I took measurement of the brightness of the sky in the area. These measurements were taken using a Sky Quality Meter (SQM) at the Milwaukee Astronomical Society (MAS). The ratings (in magnitudes per square arcseconds) were plotted on a graph to show the amount of darkness on two given days at MAS. The higher the rating, the darker the sky. I collected data on Sunday the 22nd of April and Wednesday the 25th of April. I took

to be continued on next page

measurements using the SQM every five minutes starting at 8:17pm. You can see the darkness increase as the night goes on. You can also see that there is some space between the two lines of data. This is most likely the cause of varying moon phases and cloud cover.



I also investigated ratings in other areas using an online database called "Globe at Night." On the database other measurements were taken using the same tool. One such measurement was taken earlier this year near San Juan National Forest in Colorado, a SQM rated that sky at 21.62. On the two days measurements were taken the highest rating in our area was 18.59. The difference between the Colorado value and the highest MAS value was 3.03. The sky in Colorado compared to our darkest sky is roughly the same as our darkest sky (on 4-22 this was at 9:42pm) compared to our sky at about 8:30pm. It is astonishing to think how much more dark and clear our sky could be if we were to decrease light pollution in our area.

Recommendations: If you want to decrease the light pollution where you live, try out these tips:

Set lights on a motion sensor. That way they will only turn on when someone or something passes by. Just make sure they are not too sensitive.

Set lights on a timer, so they are only on during the times they are needed.

Do not buy high power lights for residential use. Most of the time they are just not needed.

Use lights that illuminate what they are supposed to. This may be accomplished by using physical objects to block access light such as curtains, hills between lots, or shields on street lamps.

One can also use warm or yellow light bulbs to avoid attracting insects and disrupting their mating and migration patterns. Although insects are annoying, they are a major food source for many animals higher up in the food chain such as bats and frogs. If the bats and frogs have nothing to eat, the animals that eat bats and frogs will have nothing to eat, leading to a major decline in an ecosystem's population of many species.

Conclusion - These recommendations might work well for many individuals because they are inexpensive and easy to practice. The research process to determine more specific ways to decrease light pollution across the nation is still ongoing.

A special thanks to everyone at the Milwaukee Astronomical Society, I couldn't have done it without you!

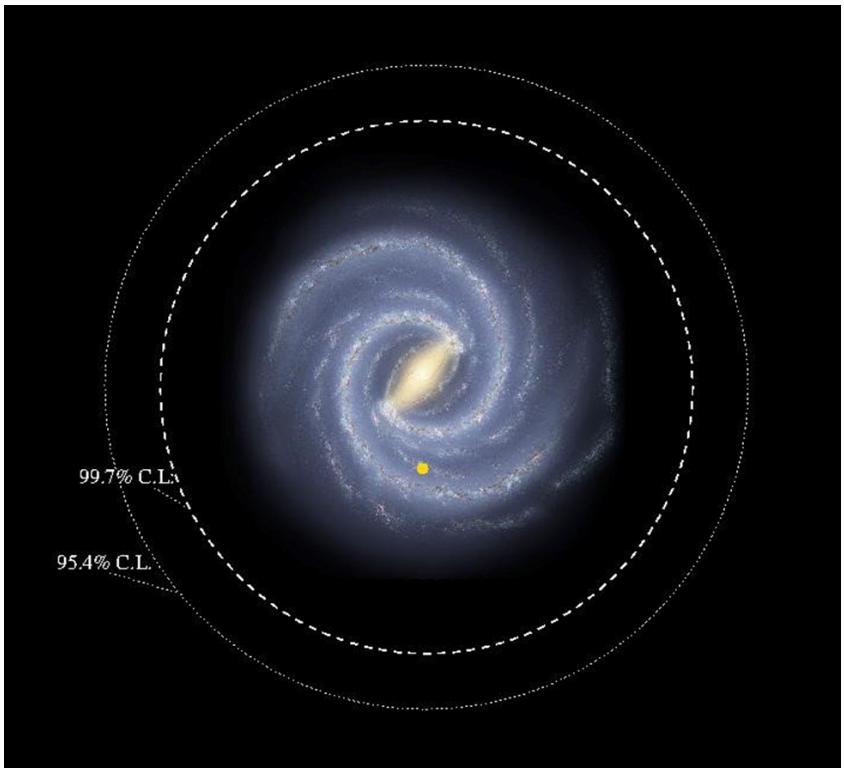
by Megan Seiler

In the Astronomical News

The Disc of the Milky Way is Bigger Than We Thought

A team of researchers at the Instituto de Astrofísica de Canarias (IAC) and at the National Astronomical Observatories of Beijing (NAOC) have published a paper which suggests that if we could travel at the speed of light it would take us 200,000 years to cross the disc of our galaxy.

Spiral galaxies such as the Milky Way have discs which are really thin, in which the major fraction of their stars are found. These discs are limited in size, so that beyond certain radius there are very few stars left.



Credit: Instituto de Astrofisica de Canarias (IAC)

In our galaxy we were not aware that there are stars in the disc at distances from the centre more than twice that of the Sun. This means that our own star was apparently orbiting at about half the galactic radius. However now we know that there are stars quite a bit further out, at more than three times this distance, and it is probable that some stars are at more than four times the distance of the Sun from the galactic centre.

"The disc of our galaxy is huge, around 200 thousand light-years in diameter," says Martín López-Corredoira, a researcher at the IAC and the first author of the article recently published in the journal *Astronomy & Astrophysics*, and whose authors come from both the IAC and the NAOC.

In broad terms, we can think of galaxies like the Milky Way as being composed of a rotating disc, which includes spiral arms, and a halo, spherical in shape, which surrounds it. This piece of research has compared the abundances of metals (heavy elements) in the stars of the galactic plane with those of the halo, to find that there is a mixture of disc and halo stars out to the large distances indicated.

The researchers came to these conclusions after make a statistical analysis of survey date from APOGEE and LAMOST, two projects which obtain spectra of stars to extract information about their velocities and their chemical compositions. "Using the metallicities of the stars in the catalogues from the high quality spectral atlases of APOGEE and LAMOST, and with the distances at which the objects are situated, we have shown that there is an appreciable fraction of stars with higher metallicity, characteristic of disc stars, further out than the previously assumed limit on the radius of the galaxy disc" explains Carlos Allende, a researcher at the IAC and a co-author of this publication.

Francisco Garzón, an IAC researcher who is another of the authors of the article explains, "We have not used models, which sometimes give us only the answers for which they were designed, but we have employed only the statistics of a large number of objects. The results are therefore free from a priori assumptions, apart from a few basic and well established ones."

from phys.org

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	18" F/4.5 Obsession	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	Herman Restrepo/Matt Mattioli	8" F/11 Celestron EdgeHD	Ray Zit Observatory
8	Tamas Kriska	14" F/1.9 F-scope	Jim Toeller Observatory
9	Paul Borchardt	Solar scope	SkyShed POD

At Your Service

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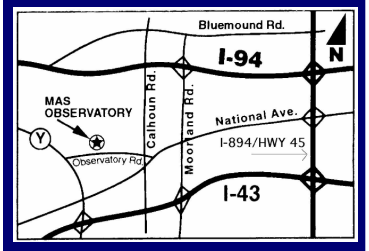
June Keyholders

06/02	Tamas Kriska	414-581-3623
06/09	Herman Restrepo	414-702-2842
06/16	Gene Hanson	262-269-9576
06/23	Tom Schmidtkunz	414-352-1674
06/30	Sue Timlin	414-460-4886



MAS Observatory

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