



Vol. 52, no. 1

# The W.A.S.P.



January 2020

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## The Warren Astronomical Society Paper

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### A New Year's Greeting



Photo: Ken Bertin

### From the 2020 WAS Board

From left to right: Riyad Matti (2nd Vice-president: Stargate operations), Bob Trembley (Outreach Chair), Dale Partin (1st Vice-president: speaker scheduling), Mark Jakubisin (Treasurer), Diane Hall (President), Jonathan Kade (Publications). Not present: Glenn Wilkins (Secretary).

On the right end, Dale Thieme (Editor of the WASP: non-elected position)

# The WASP



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P.O. Box 1505  
Warren, Michigan 48090-1505

Dale Thieme, Editor

## 2019 Officers

President	Diane Hall	<a href="mailto:president@warrenastro.org">president@warrenastro.org</a>
1st VP	Dale Partin	<a href="mailto:firstvp@warrenastro.org">firstvp@warrenastro.org</a>
2ndVP	Riyad Matti	<a href="mailto:secondvp@warrenastro.org">secondvp@warrenastro.org</a>
Secretary	Glenn Wilkins	<a href="mailto:secretary@warrenastro.org">secretary@warrenastro.org</a>
Treasurer	Mark Jakubisin	<a href="mailto:treasurer@warrenastro.org">treasurer@warrenastro.org</a>
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	Entire Board	<a href="mailto:board@warrenastro.org">board@warrenastro.org</a>

The Warren Astronomical Society, Inc., is a local, non-profit organization of amateur astronomers. The Society holds meetings on the first Monday and third Thursday of each month, starting at 7:30 p.m.

First Monday meeting:	Third Thursday meeting:
Cranbrook: Institute of Science	Macomb Community College
1221 North Woodward Ave	South campus, Bldg. J, Room J221
Bloomfield Hills, Michigan	14600 Twelve Mile Rd.
	Warren, Michigan

## Membership and Annual Dues

Student	Individual	Senior Citizen	for families
\$17.00	\$30.00	\$22.00	add \$7.00

## Astronomical League (optional)\$7.50

Send membership applications and dues to the treasurer:  
c/o Warren Astronomical Society, Inc.  
P.O. Box 1505  
Warren, Michigan 48090-1505

Or:  
Pay at the meetings  
Also via PayPal (send funds to [treasurer@warrenastro.org](mailto:treasurer@warrenastro.org))

## Among the many benefits of membership are

- Loaner telescopes (with deposit). See 2nd VP.
- Free copy of each WASP newsletter.
- Free use of Stargate Observatory.
- Special interest subgroups. See chairpersons.

## The Warren Astronomical Society Paper (WASP) is the official monthly publication of the Society.

Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the end of each month. Any format of submission is accepted. Materials can either be transmitted in person, via US Mail, or by email ([publications@warrenastro.org](mailto:publications@warrenastro.org))

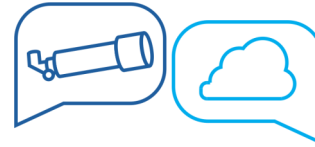
**Disclaimer:** The articles presented herein represent the opinion of their authors and are not necessarily the opinion of the Warren Astronomical Society or this editor. The WASP reserves the right to edit or deny publication of any submission.

**Stargate Observatory** is owned and operated by the Society. Located on the grounds of Camp Rotary on 29 Mile Road, 1.8 miles east of Romeo Plank Road, Stargate features an 8-inch refractor telescope under a steel dome. The observatory is open according to the open house schedule published by the 2nd VP.

# Snack Volunteer Schedule

Jan 6	Cranbrook	Marty Kunz
Jan 16	Macomb	Bob Berta
Feb 3	Cranbrook	Ken Bertin
Feb 22	Macomb	Jerry Voorheis

If you are unable to bring the snacks on your scheduled day, or if you need to reschedule, please email the board at [board@warrenastro.org](mailto:board@warrenastro.org) as soon as you are able so that other arrangements can be made.



## Discussion Group Meeting

Come on over, and talk astronomy, space news, and whatnot!

Gary Ross has put his oar in for one last time at hosting the Discussion Group.

Thursday, January 23, 2020 subject to rescheduling, stayed tuned to the email announcements.  
1828 North Lafayette, Royal Oak.

FINAL DISCUSSION GROUP there for ever. *Caveat:* There will be **no furniture**. Bring chairs, possibly a picnic blanket (provisional).

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# The 2019 WAS Award Banquet

## In Pictures

### Warren Astronomical Society Annual Awards Banquet

This year, we held the banquet in a new location, the Ukrainian Cultural Center. Despite all the officers panicking in the afternoon before the occasion, the whole event was a smashing success in this humble editor's opinion.

During the "meet and greet" time, Bob Trembley set up his virtual reality computer and headset. Among those to try it out was Bill Beers who wrote of his experience in "Letters".



Photo: Ken Bertin

Ken Bertin and fifty of his closest friends



Photo: Dale Thieme

The buffet table was splendidly arrayed with many delightful dishes (I tried the Varenyky for the first time-superb!). Hats off to Laura Wade and Anita Malys for obtaining this venue.



Photo: Ken Bertin

Rapt attention



Photo: Ken Bertin

Prize table in the background



Photo: Ken Bertin

Getting ready to take us on a journey through the ancients' eyes.

*(Continued on page 4)*

(Continued from page 3)

The prize table was also festooned with a variety of astronomical prizes, both from our generous members and the commercial sponsors: Astronomy Magazine, Celestron Cranbrook Institute of Science, Meade, Oberwerk, Sirius Astro Products, and Starizona. Thank you to all.



Photo: Ken Bertin

We are enlightened about Ursa Major by Don Klaser.

Don Klaser presented “Stories in the Sky,” for the main talk. The presentation explored the stories we’re familiar with – Greco/Roman, and ventured into how the Sumerian, Babylonian, Egyptian, Aboriginal Australian and Native American cultures tried to understand their place beneath the heavenly sphere. I even learned something new about Ursa Major (and Minor).

If you want to see the original full length treatment of “Sky Lore” here are the links to Astronomy for Everyone Sky Lore videos:

Spring: <https://www.youtube.com/watch?v=MkGggrHVYKg>

Summer:

<https://www.youtube.com/watch?v=VOjgtpJVwIM>

Fall:

<https://www.youtube.com/watch?v=QIKh6vouR4E>

Winter:

<https://www.youtube.com/watch?v=DLps67VvniQ>

Jeff MacLeod recognized the contributions of the presenters for the past year, then-

And the Awards go to:

Blaine McCullough Award: Anita Malys

Larry F. Kalinowski Award: Laura Wade

E. John Searles Award (long overdue): Joe Tocco

Congratulations to these deserving members.

(Continued on page 5)

## The Obligatory “Rogues Gallery”

First, the line up of all the past presidents in attendance.



Photo: Ken Bertin

Past Presidents: L to R– Riyadh Matti, Jon Blum, Marty Kunz, Ken Bertin, Jeff MacLeod, Diane Hall, Jonathan Kade

Then, all the outgoing officers from 2019 (several are returning for encore appearances or in new roles)



Photo: Jonathan Kade

2019 W.A.S. Board (and one editor): Jerry Voorheis (secretary), Dale Thieme (editor), Dale Partin (publications), Bob Trembley (outreach), David Baranski (2nd VP/Stargate), Mark Jakubisin (treasurer), Jeff MacLeod (president), Jonathan Kade (1st VP/scheduling). Note: The 2020 officers group photo is on the front cover of this issue.

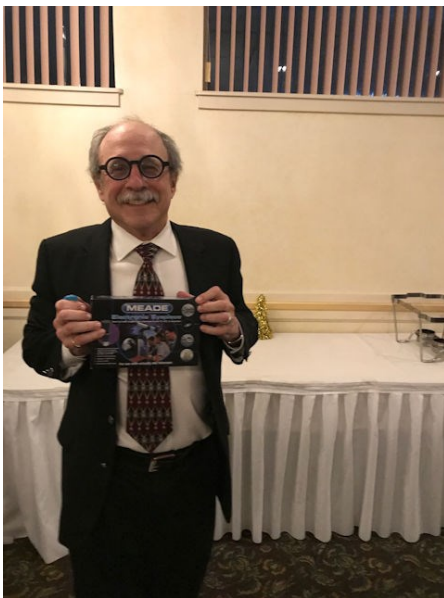
## From the Raffle Table

(Continued from page 4)

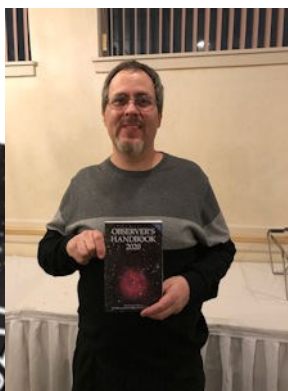
Here are a few photos of some happy attendees with their prizes: Victor Manske with his StarPro AZ from Meade, Ken Bertin and his Meade Electronic Eyepiece, Dale Thieme scored the binoculars from Oberwerk, and Jon Blum has the Astronomy Magazine subscription.

An interesting development from the member donations: some years ago I started bringing a copy of the RASC Observer's Handbook to the banquet as a raffle prize donation, then a second one joined and now, there was a stack of three! I'm sure Gary would approve of this expansion. The books left the table with these members: Diane Hall, Fred Judd, and Jennifer Dye (Who I believe also got the Cranbrook membership voucher)

Photos: Jonathan Kade



## A new Trend?



See Gary? There is still hope for us

# 2019 Warren Astronomical Society Awards

## E. John Searles Award "A Most Gracious Craftsman"

Seven years ago we dubbed this man "Stargate's Keystone" for the effort he put in bringing our observatory back online in its present glorious state. That's a grand title, but Joe has just kept on doing the simple, unglamorous, and often draining work of keeping the club's gears running smoothly. As secretary, treasurer, and Second VP he's put in the long hours on the Board under several Presidents. As Second VP, his zeal in making sure Stargate was open whenever someone from the public came calling awed and frankly alarmed his fellow board members. His gracious nature and sense of humor helped many a board get through the tight spots that every administration faces, his unflagging attention to detail kept Stargate in good shape, and he's the star of our most popular video on YouTube. Since Joe is ever reluctant to put himself in the spotlight and claim due honors for his duties, we have to do it for him tonight.



Photo: Ken Bertin

## Larry F. Kalinowski Award "Reaching for the Zenith"

In just a few years, Laura's made the transition from newcomer to staple at club events. She opens her doors to WAS members on a regular basis for Discussion Group and has been an enthusiastic outreach volunteer, but what stands out about Laura is her drive to keep peering deeper and deeper into the substance of the W.A.S. to find the ways that it can be improved as an organization. Laura keeps asking how can we be better-- more welcoming, more enthusiastic, more able to carry out the our mission to the community-- and then she offers to step up and shoulder a part of the work in bringing the W.A.S. to that better tomorrow. A fine example is the work she did with Anita in securing this very venue tonight.



Photo: Ken Bertin

## Blaine McCullough Award "Star Hostess"

Anita is among the members who has kindly opened her home to WAS members for Discussion Group. Her enthusiasm to welcome all members as family and her desire to have our functions be top-notch demonstrations of hospitality both shine. Her efforts helped guarantee a good banquet this year and hopefully for years to come!



Photo: Jonathan Kade



## President's Field of View

Well another year gone by, I can't say enough just what a success this year's banquet was. Everything seemed to go smooth, we had a few hiccups like forgetting the door prize tickets, and I forgot to check the P.O. Box one last time. Thank you, Dale Partin, for picking up tickets, Riyad Matti for picking up and bringing door prizes (long story). Once we had those little issues solved, we had a pretty nice evening, the new location had plenty of parking (an issue from last year), we also had a nice quiet room (an issue from years past), but we also got great food, great guests, great speaker, and great prizes. The only other issue I am aware of was some bad ice-cream, but they made us a new batch and discounted our bill as a result. All and all I'd say we have found a new home for the banquet, thanks again to our two award recipients Laura Wade and Anita Malys for finding this venue. Our other award winner was Joe Tocco for all he has done for the club in the past, and I was so glad I got to be the one to give him the Searles award.

Under the category of things I was supposed to do: last field of view. We had a bylaw change at the November meeting, we voted on extending term limits for board officers from two to three years. The amendment passed with no objection, and while the count was hard to be certain of, it was voted on by at least 38 members (based on sign-in sheet, couldn't read all the names and some might not have signed in).

Lastly, I would like one last chance to emote about just how much this club meant to me. It has been an honor to serve as its president during not only historic events like images of black holes and the 50th anniversary of the Apollo 11 Moon landing, but the 50th anniversary of our own observatory, Stargate was pretty special as well. This club has provided me so many opportunities for personal growth I fear to think where I would be without it. I was probably at the lowest point in my life when I found this club. Mathematically, low points tend to be stable equilibrium, meaning once you are in one it takes a lot of energy to get out. The WAS became an enormous part of lifting me out of that place. It is from the encouragement of this group that I have become a better public speaker, decided to go back to school for Physics of all things (if you could see my old math scores) and hopefully one day work for NASA, become a Solar System Ambassador, and become President of the club. It has been a point of huge personal pride for me and I thank each and every one of you for making it happen, from my board (both 2018 and 2019) to the members of this club I feel are now family, I will not name names but you should know who you are.

What is this club for? Bringing together like-minded people, collectively engaging and furthering our passion? Yes, but I would like to make a case for this organization also being a proving ground for the young and ambitious. As I have said, my life has changed for the better in countless ways because of the WAS. I think this club is a fantastic place for younger adults to learn, grow, and create. A safe place to test out upcoming presentation they might have to give (such as a PhD defense, or high school project), create connection with people that can encourage and give perspectives they might not get other places. We have such a diverse membership there really is something for everyone and everyone in the club has something to offer. I am not sure how we get younger people in the door, but it seems we have such a resource I feel it must be shared with as many as possible. The things that I go to do and the things I learned that none of my fellow students have gotten to do, I almost feel guilty, almost. With all that said I have the utmost confidence in the new board to shepherd us into the next decade. I won't be graduating till May 2021 (sigh), so you won't be rid of me for quite some time. Love you all and thanks!

Jeff MacLeod



Here is Jeff, fulfilling his last few duties as president, heaping accolades on Joe Tocco.

## Astronomy at the Beach Needs Your Help



I am reaching out to your club because GLAAC and AatB need your help. GLAAC elections will be held during the January 9, 2020 planning meeting, and the Secretary, V.P. and President have announced their retirement from GLAAC. The January meeting will be held at the Island Lake DNR headquarters, or online using BlueJeans for those who cannot attend in person.

AatB 2020 will be the 24th annual event, but only if willing and responsive members of our clubs take on the multiple responsibilities. While I could provide a list of the AatB roles, the most important one is "Determine what AatB will be this year." If you were in charge of AatB, would you host a keynote speaker? Have two tents? Do fundraising? All of these choices and more need to be discussed and decided by the 2020 GLAAC Planning Board.

For at least the past decade, AatB has been the largest free, public, educational and entertaining astronomical event in North America. Please let us know that you will help to continue this grand tradition.

Planning Meeting:  
January 9, 2020, at 7:30PM  
Island Lake Headquarters Building  
12950 Grand River Ave, Brighton, MI 48116  
- or online -  
[bluejeans.com/864376269](https://bluejeans.com/864376269)  
- or by phone -  
888-240-2560

Even if you can't make it to the January planning meeting, you can join the groups.io site to get emails and updates from the planning committee.

<https://glaac.groups.io/g/main>

Signed,  
Joseph Velez  
Outgoing President  
GLAAC Planning Board



## Letters

### My Trip To Saturn

During the WAS banquet, I had the pleasure of trying out Bob Trembley's virtual reality goggles. I have heard a lot of good things about Bob's VR system, and did not know what to expect. Bob asked which program I wanted to view. Since I had no idea, he suggested Saturn. The goggles fit well over my glasses and it was complete with sound headphones. When he turned the system on, I was floating in space! Everywhere I looked, 360 degrees, it was like I stepped out of the International Space Station, complete with the sound of rushing space. I thought this was great but it only got better. As I drifted closer to Saturn, the planet got bigger and bigger. At one point I was standing on the rings of Saturn. It was such an experience, I was actually afraid to move of fear of falling off the rings! As I drifted over the planet and away from it, it became time to start the banquet, so I had to disembark from my journey. I could have spent hours floating around. Bob asked how I liked it. I said the only thing cooler than this was watching the total solar eclipse! If you ever get a chance to try these out, I highly recommend it! Thanks Bob, for my trip to Saturn.

Bill Beers



## Space Pirate Radio

Tune in to Captains Marty Kunz and  
Diane Hall for live radio  
Wednesday nights at 9:00 pm ET  
on  
Astronomy.fm





Want to keep track of W.A.S. meetings and exciting astronomical events next year?

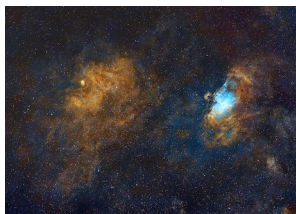
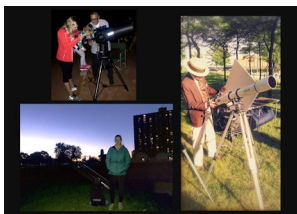
## Order your 2020 Warren Astronomical Society calendar now!

These beautiful calendars feature W.A.S. member astrophotography and historical photos, including:

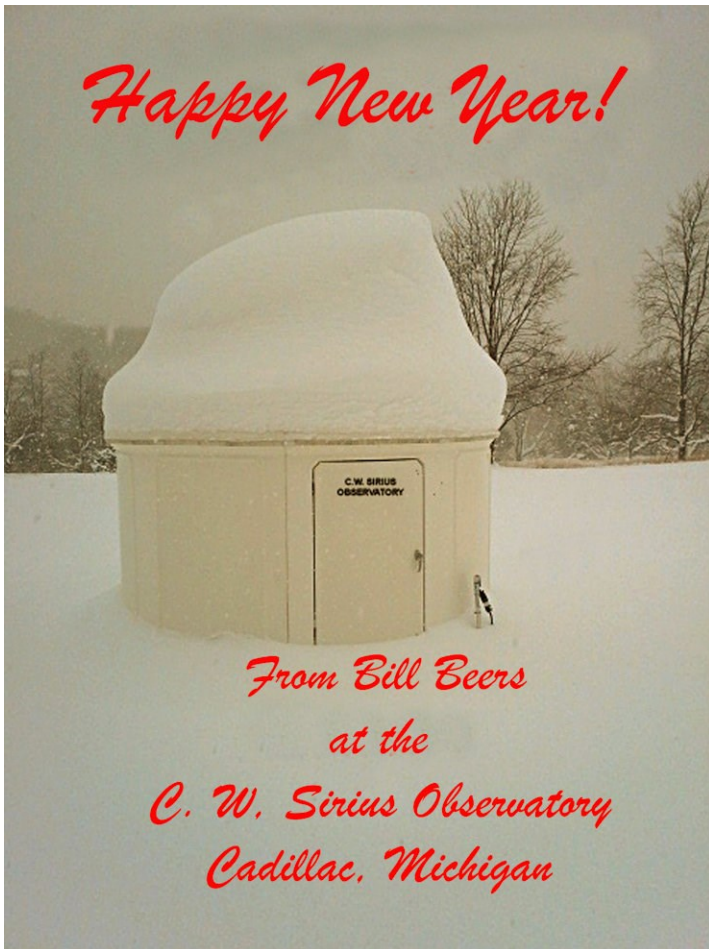
- Cara Reneski - Moon Craters
- Zsolt Nagy - Almost a Quarter Moon
- Bill Beers - Messier 82 Galaxy
- Doug Bock - Messier 51
- Doug Bock - M13
- Astronomy Outreach with Ken Heilig, Amanda Mullins, and Gary Ross
- Bob Berta - Sh 2-54 and M16
- Cheryl Kaplan - Milky Way over Longs Peak
- Joe Tocco - Stargate
- Doug Bock - M 33 Triangulum Galaxy
- Bill Beers - Helix Nebula NGC7293 (aka. The Eye of God)
- Yusef Hakki - Plane in front of moon
- Dale Hollenbaugh - Watching and Imaging the Solar Eclipse

You can buy calendars for \$15 each at the next few meetings. [You can also order them online.](#) (But you still have to pick them up in person or find a kind fellow member to mail it to you.)

**Buy Yours Today**



# Happy 2020 Wishes



# The View From C.W. Sirius Observatory

## NGC 1579



NGC 1579 (also known as the Northern Trifid) is a diffuse nebula located in the constellation of Perseus. It is referred to as the Northern Trifid because of its similar appearance to the Trifid Nebula (Messier 20), which is located in the southern celestial hemisphere of the sky. It is a H II region, a region of star formation. About 2,100 light-years away and 3 light-years across, NGC 1579 is like the southern Trifid, a study in contrasting blue and red colors, with dark dust lanes prominent in the nebula's central regions. In both, dust reflects starlight to produce beautiful blue reflection nebulae. But unlike the Trifid, in NGC 1579, the reddish glow is

not emission from clouds of glowing hydrogen gas excited by ultraviolet light from a nearby hot star. Instead, the dust in NGC 1579 drastically diminishes, reddens, and scatters the light from an embedded, extremely young, massive star. Itself a strong emitter of the red hydrogen alpha light. This Northern Trifid is a very faint object when observing through a smaller telescope. I recommend using a 16" or larger scope in relatively dark skies. Although you won't see the bright colors through your telescope, it does make a nice colorful target for your DSLR, or CCD camera.



### About CW Sirius Observatory:

C.W. (Cadillac West) Sirius Observatory is located 15 west of Cadillac Michigan. Owned and operated by WAS member Bill Beers. The dome is an 8' Clear Skies Inc dome which houses an 11" f/10 SCT telescope, a 102mm f/7 refractor telescope, Celestron CGEM DX mount, and uses an ASI ZWO 071 color CMOS camera, as well as a QHY8L color CCD camera. The telescope can be remotely operated from inside Bills house.



### NGC 660



NGC 660 is a [peculiar](#) and unique [polar-ring galaxy](#) located approximately 45 million light years from Earth in the [Pisces constellation](#). It is the only such galaxy having, as its host, a "late-type lenticular galaxy". It was probably formed when two galaxies collided a billion years ago. However, it may have first started as a disk galaxy that captured matter from a passing galaxy. This material could have, over time, become "strung out" to form a rotating ring.

The ring is not actually polar, but rather has an inclination from the plane of the host disk of approximately 45 degrees. The extreme number of pinkish star-forming areas that occurs along the galaxy's ring could be the result of the gravitation interaction caused by this collision. The ring is 50,000 light-years across - much broader than the disk itself - and has a greater amount of gas and star formation than the host ring. This likely indicates a very violent formation. The polar ring contains objects numbering in the hundreds. Many of these are red and blue supergiant stars. The most recently created stars in the ring were just formed approximately 7 million years ago. This indicates that the

formation of these stars has been a long process and is still occurring.

Data about the dark matter halo of NGC 660 can be extracted by observing the gravitational effects of the dark matter on the disk and ring's rotation. [\[2\]](#) From the core of the disk, radio waves are being emitted. The source of these waves is an area only 21 light years across. This may indicate the presence of a super-cluster of stars located within an area of cloud of gas. The region in the center has a vast amount of star formation, so luminous that it is considered to be a [starburst galaxy](#).

Late in 2012, this polar-ring galaxy produced an enormous outburst having a magnitude of approximately ten times brighter than a supernova explosion. The cause is not certain, but this event may have resulted from a tremendous jet being emanating from galaxy's central black hole.

From Wikipedia

Asi071mc pro camera, 78 x 300 second subs, 24 darks, 50 flats, 10" f/8 RC, Losmandy G11 mount  
Photo by Doug Bock

# Presentations

## Monday, January 6, 2020 Cranbrook Presentations



Main Talk:

### “In Search of... The Shining Mountain,” and Other Discourse on Moon Astronomy

By Gary M. Ross

In which it will be shown that observing the Moon with simple telescopes in unfavourable locations, but diligence and the lynx eye of a dedicated field observer -- to wit, my own self -- leads to spiritual improvement, of which many Society members are in demonstrable need. Per Tennessee Williams: *Suddenly, Last Summer*.

Again the theme is the utility of small or very small instruments, often in wretched observing locations. That wonderful little world. What fascination on a morning last summer when observing sunset on the southern terminator with all of 45X. The eye wandered to the far right limb, and set in motion an observing programme by two blokes with primitive telescopes a continent apart . . . ("Apollo", "astronaut", and "N.A.S.A." will not be mentioned.)

About the speaker:



- First lunar observations in 1958 with Dad's French binoculars @ 8X, dropped in a row-boat a few years later, but not repaired for over fifty years by the Wizard of Mount Hukee.
- Fired for incompetence from Wayne-Oakland Science Olympiad.
- Not worn gym shoes since the Kennedy administration, owned any "camo" since the first Bush administration, have never sent nor received a text message, do not and never have owned a black pick-up truck -- with no intention of starting.
- Can not find *Camelopardalis* nor *Lynx*, but should get cracking.

Short Talk:

### Visiting the John Glenn Astronomy Park

By Jeff MacLeod

Last summer Jeff & Janelle took a trip to the Hocking Hills region of southern Ohio, during their stay

*(Continued on page 14)*

## WAS PRESENTATIONS

If you would like to present either a short talk (10-15 minutes) or a full-length talk (45-60 minutes) at a future meeting, please email Jonathan Kade at:  
[firstvp@warrenastro.org](mailto:firstvp@warrenastro.org).

(Continued from page 13)



they found the John Glenn Astronomy Park. Better than that, there was an observing night while they were there, better than that, it was clear! Jeff will share the experience and fun of the John Glenn Astronomy Park with the WAS in this short presentation.

Jeff MacLeod is a physics and astronomy major at Wayne State University, where he also works at the Wayne State Planetarium. He is the former President of the Warren Astronomical Society and has been obsessed with space his entire life, with a special place in his heart for NASA, cosmology, and this club.



Foerch. The questions range from easy – “On which planet were you born?” - to challenging – “What is the resolution of the 120 orders of magnitude discrepancy between general relativity and quantum field theory?”

You will receive a contestant number when you enter if you wish to participate. Contestants and questions will then be chosen randomly. Prizes for correct answers include kudos from the audience, the satisfaction of being 'firstus with the mostus', and a swell certificate. This promises to be a fun, raucous evening of science, wisecracks, wry comments, and deep insights. Fire up your science mojo and join us!

**Format:**

Numbers are passed out as people arrive to those who wish to participate. The moderator will choose the numbered contestants using a random number generator app. The questions are in random order in a PowerPoint presentation.

The contestant numbers will be printed on their certificates of participation.

Correct answers receive applause and the certificate. Contestants may 'call a friend', but any 'friend' may only be called once. Wrong answers are passed on to the next contestant drawn. Contested answers and unanswered questions are discussed at large.

Jim Foerch instantly became an astronomy enthusiast when his sister showed him Jupiter on Thanksgiving, 1988. He has been a member of the Grand Rapids Amateur Astronomical Association ever since and currently serves as treasurer and one of their outreach group leaders. For the last 10 years he has also been a presenter and program developer at the Roger B. Chaffee Planetarium in the Grand Rapids Public Museum. On public nights at the James C. Veen Observatory he takes pleasure in showing guests Albireo and telling them it is the 'U of M star'. When not doing astronomy he picks a mean banjo in the Blue Water Ramblers.



## Thursday, January 16, 2020 Macomb Presentation



### Astronomy Slam!

Hosted by **Jim Foerch** of the Grand Rapids Amateur Astronomical Association

Attention science geeks and astronomy nerds: we're going to have an astronomy slam! Members of the Warren Astronomical Association and the general public are invited/challenged to answer 1101011 (base 2) questions on astronomy, cosmology, and astrophysics created by science educator and astronomy popularizer James “Mr. Jim”



**Club Member  
Name Tags**

Email [publications@warrenastro.org](mailto:publications@warrenastro.org) for your personalized name tag



# Over the Moon

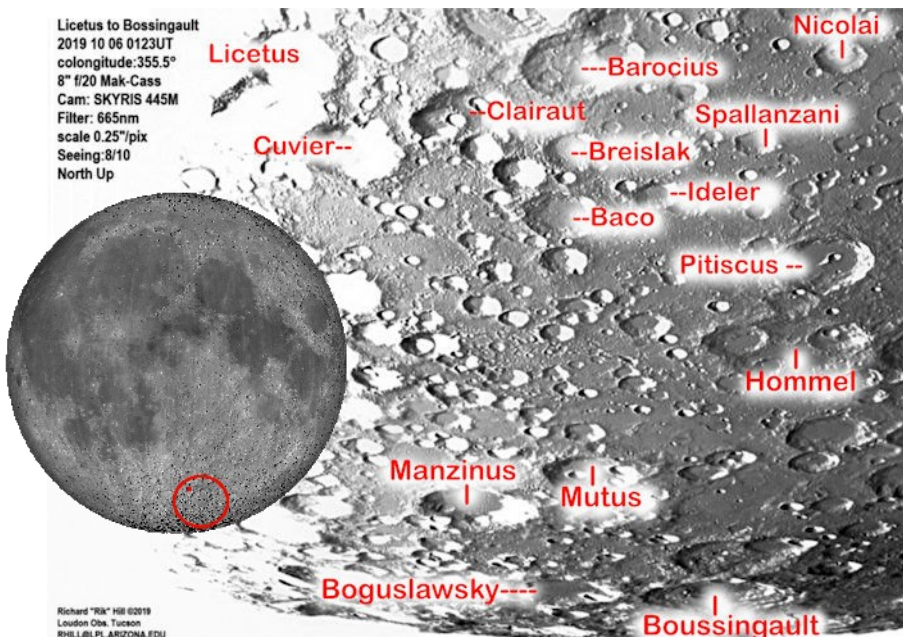
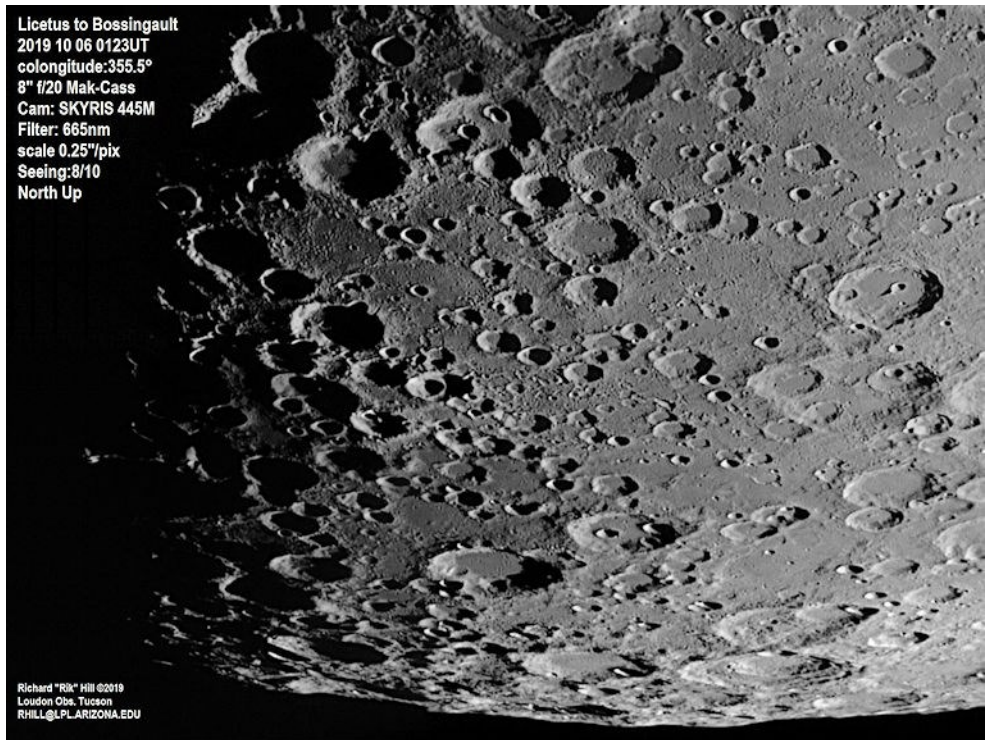
With Rik Hill

## Down Under

It was not a particularly favorable view of the south end of the moon in terms of libration or distance but still it was dramatic down under. Starting with the shadow filled crater in the upper left we see Licetus (77km dia) that looks to be wearing a necktie. This necktie is the western or left wall of the odd crater Heraclitus (94km) catching the morning light before the lower eastern portions. Below and right (east) of Licetus is the same sized Cuvier (77km) and further east is Clairaut (also 77km) with the trio of smaller craters on the floor. Northeast of this is Barocius (85km) with the "D" satellite crater taking a bite out of the eastern wall. Two craters to the south Breislak (51km) and finally Baco (71km) form an equilateral triangle with Barocius and Clairaut. Three smaller craters lead from Barocius to the upper right corner of this image. They are Ideler (41km) overlapping another older crater of the same size, then further northeast is the almost polygonal Spallanzani (32km) and another one of the same general morphology in the corner of the image, Nicolai (43km).



The big crater due south of Nicolai is Pitiscus (85km) with the odd central crater that appears to be casting a shadow in the wrong direction. This is because the shadow is being cast by the remnant of the former central peak that was impacted on the east side when Pitiscus A (10km) was formed. South of this is a large, very old crater Hommel (129km) overlain by half a dozen smaller craters. This one may be over 4 billion years old! That's approximately 16 rotations of our galaxy!! Down at the



bottom near the limb is an eye catching double crater. This is Bossingault (134km) with the large inner satellite "A" crater (72km) nearly perfectly concentric inside. West of this is the crater Buguslawsky (100km) with the flat bottomed Manzinus (also 100km) north of it with a floor littered with 2-4km secondary craters. To the east (right) is the crater, Mutus (80), with three smaller craters (16-24km) within it's walls. There are a few other shadow filled craters along the terminator but details are lost in the shadows. Take a moment before moving on to enjoy the limb with the mountains near the south pole. I have always enjoyed seeing limb profiles like this.

This is a two image montage each from stacks of 1800 AVIs using AVIStack (IDL) and further processed with GIMP and IrfanView.

## January 1993

While not a member written article, kudos to Mike O'Dowd for obtaining permission to reprint this article:



"Observing Stars During the Daytime: The Chimney Myth", by Richard Sanderson (Reprinted by permission from the Skeptical Inquirer (Fall 1992).) Kathleen G. Charla summarizes a very busy year in "Warren Astronomical Society 1992 Summary of Activities."

"Computer Chatter" by Larry F. Kalinowski covers a lot of ground from the banquet to a new desktop publishing program (wonder if it was better than MS Publisher?) to Comet Swift-Tuttle (no danger there) to Best Buy is coming to town, and more.

In the obligatory NASA Space Links: "Hubble Uses Nature's Lens to Explore the Cosmos."

This issue includes an index to the Warren Astronomical Society Paper Volume 24, 1992

## A Blast from the Past

Doug Bock is posting images in the Warren Astronomical Society page on Facebook that he scanned from a collection of slides that he uncovered. One that got my attention is this "early years" one of Frank McCullough working on the WASP. Not sure if I would be a willing editor, working that way.

Dale Thieme,  
Chief scanner

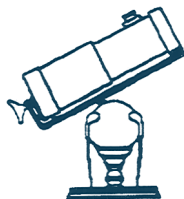


Photo: Dale Thieme

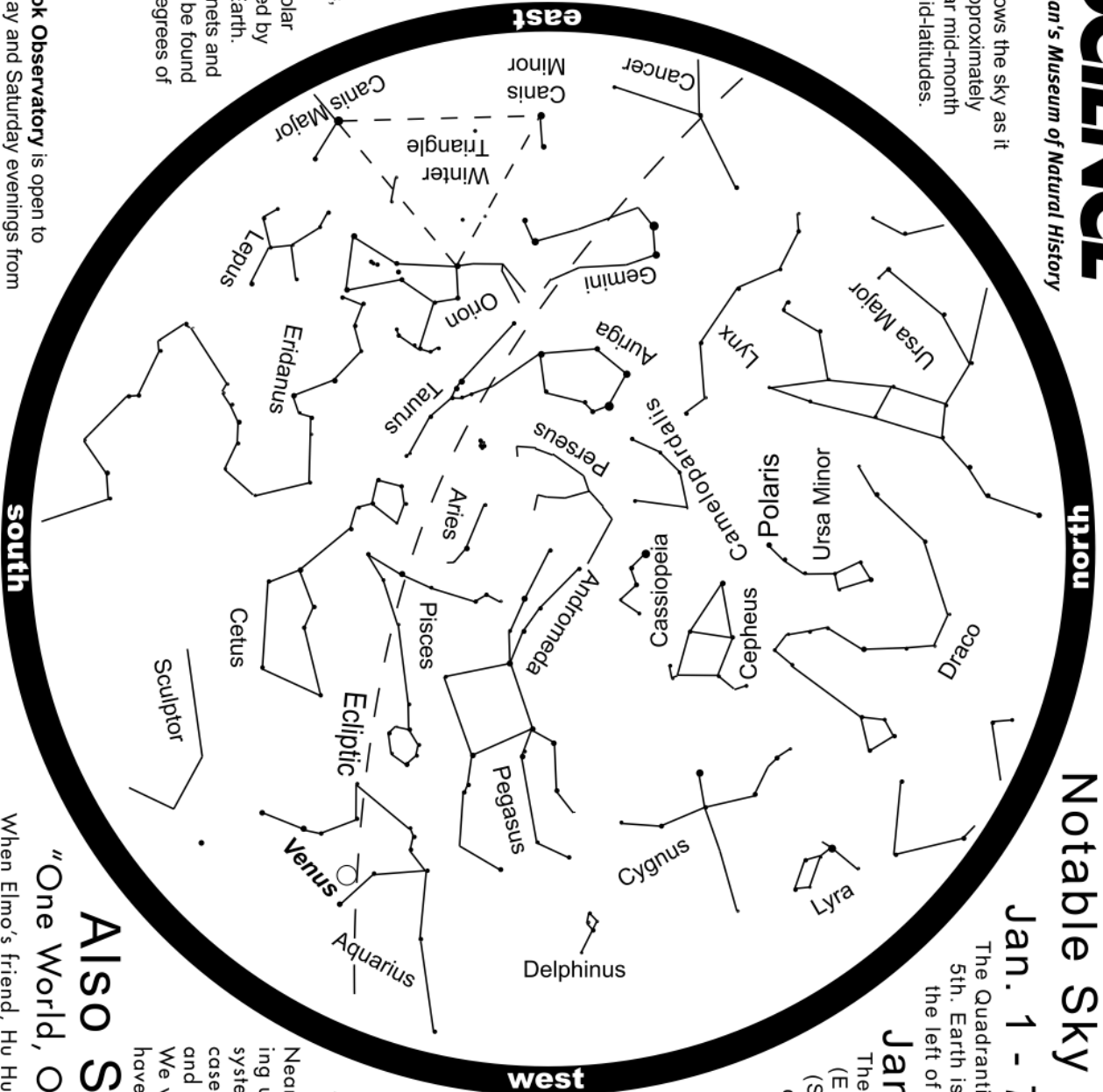
The History S.I.G. and publication staff in one happy bundle: Jonathan is happy that he doesn't have to deal with Microsoft Publisher and Dale is happy he gets to edit for another year.



# JANUARY 2020



This chart shows the sky as it appears at approximately 7pm EST near mid-month at northern mid-latitudes.



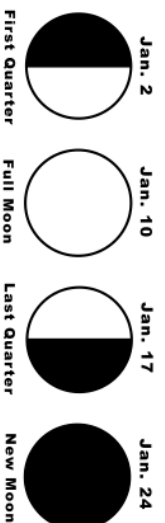
## Notable Sky Happenings

**Jan. 1 - 7**  
The Quadrantid Meteor Shower peaks on the night of the 3rd-5th. Earth is closest to the Sun on the 5th. The Moon is to the left of Aldebaran on the 7th (E evening).

**Jan. 8 - 14**  
The Moon is at the lower right of Pollux on the 10th (E evening). Mars is above Antares on the 12th (SE predawn). The Moon is upper right of Regulus on the 13th (W predawn).

**Jan. 15 - 21**  
Moon is upper left of Spica on the 17th (S morn) and upper right of Mars on the 20th (SSE).

**Jan. 22 - 31**  
The bright star above the Moon on the 27th is Venus (SW evening). The Moon is upper left of Venus on the 28th.



## Now Showing

### "Robot Explorers"

Near the end of the twentieth century, we began launching unmanned probes into the far reaches of the solar system. What they discovered was amazing and in some cases unexpected. New space missions are underway, and many of these robust spacecraft are still operational. We will pay tribute to these robots and learn what they have taught us about our solar system.

## Also Showing

### "One World, One Sky: Big Bird's Adventure"

When Elmo's friend, Hu Hu Zhu, visits from China. Big Bird, Elmo and Hu Hu Zhu take viewers on an exciting discovery of the Sun, Moon, and stars. They learn about the Big Dipper and the North Star and take an imaginary trip to the Moon where they learn that the Moon is a very different place.

For astronomy information visit <http://science.cranbrook.edu>

What is that dashed line? It's the ecliptic, the reference plane of the solar system, defined by the Sun and Earth. The major planets and the Moon can be found within a few degrees of this plane.

The Cranbrook Observatory is open to the public Friday and Saturday evenings from 7:30 - 10:00pm EST, and the first Sunday of the month from 1:00 - 4:00pm for solar viewing. Come have a look through our 6" telescope! For observatory information visit <http://science.cranbrook.edu/explore/observatory>



# Stargate Observatory

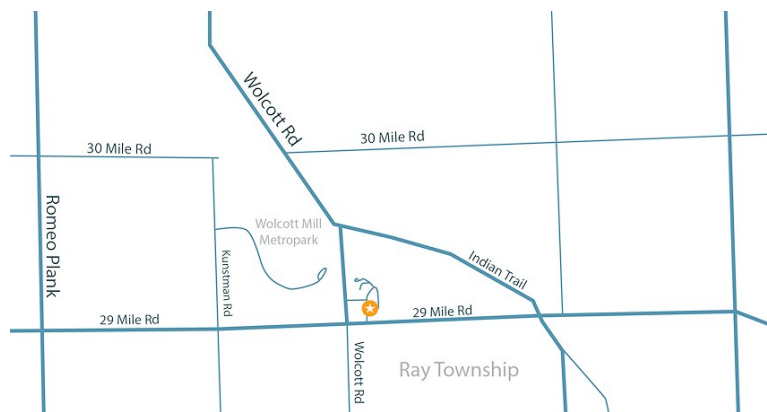
## Monthly Free Astronomy Open House and Star Party

4th Saturday of the month!  
Wolcott Mill Metropark - Camp Rotary entrance

- Sky tours.
- Look through several different telescopes.
- Get help with your telescope.
- We can schedule special presentations and outings for scouts, student or community groups

Contact: [outreach@warrenastro.org](mailto:outreach@warrenastro.org)

Find us on [MeetUp.com](https://www.meetup.com) 



20505 29 Mile Rd (1.8 miles east of Romeo Plank Rd) Ray, MI 48096  
82° 55'04" West Longitude, 42° 45'29" North Latitude

### Observatory Rules:

1. Closing time depends on weather, etc.
2. May be closed one hour after opening time if no members arrive within the first hour.
3. Contact the 2nd VP for other arrangements, such as late arrival time. Call (586) 634-6240 .
4. An alternate person may be appointed to open.
5. Members may arrive before or stay after the scheduled open house time.
6. Dates are subject to change or cancellation depending on weather or staff availability.
7. Postings to the Yahoo Group and/or email no later than 2 hours before starting time in case of date change or cancellation.
8. It is best to call or email the 2nd VP at least 2 hours before the posted opening with any questions. Later emails may not be receivable.
9. Generally, only strong rain or snow will prevent the open house... the plan is to be there even if it is clouded over. Often, the weather is cloudy, but it clears up as the evening progresses.

# Stargate Report

## Stargate Observatory Open House December 2019

Mother Nature treated us with a cloudy forecast for the evening.

We did have clear skies in the south west to view a slice of the moon and Venus.

We also had clear skies in the east in the area of the Winter Circle.

At about 9:00pm the entire sky clouded over and we closed Stargate Observatory for the night.

## Next Month Events

**Saturday, January 25th**

Stargate Observatory Open House

Sunset : 5:37pm

Astronomical Twilight Ending : 7:15pm

Moonrise : 8:38am

Please arrive just after sunset (or sooner if you plan to set up a scope or do solar observing). A friendly reminder to be courteous if you arrive after dark, dim your headlights upon entry to the park, and no white light flashlights please. If you are setting up a large scope or have a lot of equipment to set up then you are permitted to park on the observing field, with your vehicle lights pointed away from the observatory and other telescopes.

Remember to dress warm and in layers!

Dave Baranski  
2019 2nd VP, Observatory



## Astronomical Events for January 2020

Add one hour for Daylight Savings Time

Source:

<http://www.astropixels.com/ephemeris/astrocal/astrocal2020est.html>

Day	EST (h:m)	Event
01	20:30	Moon at Apogee: 404580 km
02	23:45	FIRST QUARTER MOON
04	04:00	Quadrantid Meteor Shower
05	03:00	Earth at Perihelion: 0.98324 AU
07	16:09	Aldebaran 3.0°S of Moon
09	18:29	Moon at Ascending Node
10	10:00	Mercury at Superior Conjunction
10	14:10	Pen. Lunar Eclipse; mag=0.896
10	14:21	FULL MOON
10	21:26	Pollux 5.3°N of Moon
11	18:54	Beehive 1.0°S of Moon
13	06:37	Regulus 3.8°S of Moon
13	09:00	Saturn in Conjunction with Sun
13	15:20	Moon at Perigee: 365964 km
17	07:58	LAST QUARTER MOON
17	18:03	Mars 4.7°N of Antares
20	14:13	Mars 2.3°S of Moon
22	15:31	Moon at Descending Node
22	21:42	Jupiter 0.4°N of Moon: Occn.
24	16:42	NEW MOON
28	02:29	Venus 4.1°N of Moon
29	16:28	Moon at Apogee: 405390 km

# Outreach Report

## Outreach Report - January 2020

In my [recent post](#) on the [Vatican Observatory Foundation's Sacred Space Astronomy site](#), I wrote about how by mid-February 2020 I will be a grandparent, and my thoughts about what the world might be like when my granddaughter is an adult. With the current pace of astronomical research, I'm sure that many new things will be discovered by astronomers. But I also have concerns about my granddaughter's quality of life - and most of that has to do with pollution in its various forms.

Several forms of pollution have a direct effect on the field of astronomy: air pollution, light pollution, space junk and satellite constellations to name a few. I wrote that I would like to see a shift in mindset where the very rich and multi-national organizations all compete for a prestigious annual award recognizing those who helped to restore/repair Earth's environment! Hey, I can dream... In an odd bit of synchronicity, the Dark Sky Update from Dr. Sally Oey (below) includes some meetings on sustainability and healthy environment.

In 2019 the W.A.S. outreach team has performed dozens of volunteer outreach events, and we got some great feedback from the public; there's a reason I keep saying at meetings that my outreach team is the best! I was thrilled to be able to hand out the NASA Night Sky Network pins to our volunteers at the banquet! I'm looking forward to 2020, and would *really like* to resurrect Larry Kalinowski's Messier observing marathons, with an eye toward getting some of our members Astronomical League observing awards.

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## Astronomy at the Beach NEEDS Your Help!

GLAAC elections will be held during the January 9, 2020 planning meeting, and the current Secretary, V.P. and President have announced their retirement from GLAAC. The January meeting will be held at the Island Lake DNR headquarters, or online using BlueJeans for those who cannot attend in person.

*(Continued on page 21)*

DETROIT  
PUBLIC  
LIBRARY

Business, Science & Technology  
PRESENTS

## COLONIZING MARS

Sunday, January 19, 2020  
2:00-3:00 p.m.



Sending people to Mars has been the stuff of science fiction. We are on the threshold of this becoming reality. Elon Musk founded SpaceX to get people to Mars. We may need to colonize the Moon first to gain experience. There are many challenges to be dealt with to live on Mars, such as long term living in reduced gravity, cosmic radiation, energy sources, etc. Long term, terraforming Mars is on the table, but challenging.

Dr. Dale Partin teaches astronomy at Macomb Community College and is a member of the Warren Astronomical Society. Prior to that he had a career doing advanced research in the automotive industry. He has a B.S. and M.S. in physics and a Ph.D. in electrical engineering from Carnegie-Mellon University.

Register: <https://dpl-colonizing-mars.eventbrite.com>

Call 313-481-1409 for more information during branch hours.

Limited parking is available in the staff parking lot off Putnam Street, a one-way street accessible from Cass Ave.

**Main Library  
Old Fine Arts**  
5201 Woodward Avenue  
Detroit, MI 48202

313/481-1391

[www.detroitpubliclibrary.org](http://www.detroitpubliclibrary.org)

*(Continued from page 20)*

AatB 2020 will be the 24th annual event, but only if willing and responsive members of our clubs take on the multiple responsibilities. There are a LOT of decisions need to be made this year - the most important one is "Determine what AatB will be this year." If you were in charge of AatB, would you host a keynote speaker? Have two tents? Do fundraising? All of these choices and more need to be discussed and decided by the 2020 GLAAC Planning Board.

For at least the past decade, AatB has been the largest free, public, educational and entertaining astronomical event in North America. Please let us know that you will help to continue this grand tradition.

### **Planning Meeting:**

January 9, 2020, at 7:30PM

Island Lake Headquarters Building

12950 Grand River Ave, Brighton, MI 48116

- *or online* -

[bluejeans.com/864376269](http://bluejeans.com/864376269)

- *or by phone* -

888-240-2560

### **W.A.S. Calendar Entry: [LINK](#)**

Even if you can't make it to the January planning meeting, you can join the [groups.io](http://groups.io) site to get emails and updates from the planning committee. <https://glaac.groups.io/g/main>.

*Here are the jobs to be done on the GLAAC planning committee:*

**PRESIDENT** - presides over meetings, helps establish direction, coordinate and oversees activities, etc.

**VICE PRESIDENT** - assists the president with governance of GLAAC and fills in when necessary. Maintains connection to host DNR and institutions that support GLAAC (Michigan Science Center, Cranbrook, universities and others).

**SECRETARY** - keeps records/minutes, sets up and notifies of meetings.

**TREASURER** - keeps records of income and expenditures, including donations, and gives reports

**COMMUNICATIONS DIRECTOR** - responsible for getting the word out of the event (Facebook, websites, press releases, emails to teachers, public relations of all types).

*Not up to being on the committee? Here are some of the key tasks that require help:*

**PLANNING the PROGRAM** - speakers, club tables, printed programs, science demon-

strations, scavenger hunt, communicating, confirming with people.

**PLANNING the TENT LOGISTICS** - dealing with tent vendor, coordinating location with DNR, payment, who goes where, arranging A/V and electricity.

**PLANNING OTHER LOGISTICS** - signs, parking, volunteers, Ham radio helpers, telescope field ambassadors, Girl Scout volunteers, getting the many supplies beforehand, getting help with setup and takedown.

**SOCIAL MEDIA** - updating GLAAC website, creating Facebook event, doing Facebook promotions of all types, using other social media to increase awareness.

**PUBLIC RELATIONS** - sending emails to STEM teachers, getting articles written, mentions on event calendars, mentions on radio/TV.

**GETTING MONEY** - sending invoices to clubs and sponsors, chasing down checks.

**WORKING WITH DNR** - setting date, planning the event, planning logistics, getting volunteer forms completed by everyone on committee, food vendor, last-minute questions and issues.

**TELESCOPE FIELD PLANNING** - communicating with clubs, recruiting as many telescopes as possible, working with DNR on unloading/loading/parking plans, creating maps, improving guest experience, telescope volunteer satisfaction, on-site managers, keeping things safe.

**ACTUAL SETUP and TAKEDOWN** - the tents, chairs, tables, stage, electrical cords, speakers, projectors, amps, mixers, screens, many street signs, other signs, balloons, blow-up aliens, etc.

**CUSTOMER EXPERIENCE SURVEY** - designing, distributing, collecting, analyzing, reporting.

*(Continued on page 22)*

(Continued from page 21)

## Volunteers Needed

### Sunday Outreach at the Detroit Public Library

The Library would like to have speakers on Sundays - open dates are: [2/16](#), [3/15](#), [4/19](#), and [5/17](#)  
Contact: Jennifer Dye  
<[jdye@detroitpubliclibrary.org](mailto:jdye@detroitpubliclibrary.org)>

### Girl Scout Mall Frenzy, Mission: Space at Lakeside Mall (Sterling Heights) Saturday, March 21-22, 2020 10pm-3am.

The Girl Scouts have released new Space badges and will be working on them throughout the night. They would like the W.A.S. to help us out again. I've emailed the organizer asking that our table be located in or around a storefront with power. I also asked if they wished me to contact other astronomy clubs via the Great Lakes Association of Astronomy Clubs, and see if they can set up too.  
Contact: Caroline Feathers <[Cfeathers@gsem.org](mailto:Cfeathers@gsem.org)> (313) 870-2511

WAS Outreach Calendar Entry: [\[Link\]](#)

### Astronomy Day at Stargate Observatory Saturday, May 2, 2020

Planning Stage: I've emailed our Metropark contacts about organizing this event.  
Event on the W.A.S. Outreach Calendar: [\[Link\]](#)

### Astronomy Day at Cranbrook Institute of Science

**Saturday, May 2, 2020 1 - 4pm**  
Planning stage: Cranbrook has asked what we have an unspecified number of volunteers available for Astronomy Day.  
Event on the W.A.S. Outreach Calendar: [\[Link\]](#)

### City of Frazer

We recently had a successful event with them ; they would like to do quarterly events with us.  
Contact: Christina Woods  
<[christinaw@micityoffrazer.com](mailto:christinaw@micityoffrazer.com)> 586.296.8483

### Lake St. Clair Metropark Nature Center (Metrobeach)

They would like to plan something with us in 2020 - possibly Astronomy Day, and a couple of days when the Moon will be viewable.  
Contact: Samantha Volz [Samantha.Volz@metroparks.com](mailto:Samantha.Volz@metroparks.com) 586-463-4581  
If you are interested in presenting at any of these locations, please let me know at: [outreach@warrenastro.org](mailto:outreach@warrenastro.org).

The W.A.S. Outreach calendar is available online here: [\[Link\]](#)

## Dark Sky Update

Edited from an email from Dr. Sally Oey  
([MiDarkSkies@umich.edu](mailto:MiDarkSkies@umich.edu))

There is an initiative to have **Belle Isle in Detroit** designated an IDA [Urban Night Sky Place](#); there may be interest on the Windsor side to have their counterpart, Peche Island, similarly designated. If anyone is interested in helping out with this exciting project, please contact Jerry Hasspacher (Sierra Club SE MI Group) at [jhasspac@gmail.com](mailto:jhasspac@gmail.com). I've emailed Jerry, asking what the W.A.S. can do, and to put me on a mailing list.

The **A2 Planning Commission meeting** on Dec 17 was attended by Jeff Rechten, Karen Wight, John Mirsky, and Sally Oey to support the dark sky specs in the draft Ann Arbor Sign Ordinance (A2SO). The ordinance was tabled due to changes unrelated to lighting. However, this gives an opportunity to review a couple minor inconsistencies between A2SO and draft Lighting Ordinance. A2SO is expected to return to the Planning Commission in the next couple months.

**New, fully shielded streetlights** are going up on Huron Ave. in Ann Arbor. Please check them out and see what you think.

There is a new **draft LEED building credit** for [Bird Collision Deterrence](#) that includes dark sky specifications. This is separate from the existing [LEED SS8 Light Pollution Reduction](#) credit. Unfortunately the wording on the new draft credit is confusing and also very lenient on bird-unfriendly uplighting and glare. We've enlisted IDA to help reword it in hopes of getting the draft amended.

An organization in Traverse City called [Groundwork](#), a business-oriented group promoting sustainability and healthy environment, will be hosting the **2020 Michigan Clean Energy Conference May 17-19**. Perhaps a good group to get on board with dark skies for those up north.

-Bob Trembley

# Meeting Minutes

## BOARD MEETING – December 2, 2019

Members present: David Baranski, Jeff MacLeod, Ken Bertin, Jonathan Kade, Mark Jakubisin, Bob Trembley, Dr. Dale Partin, Jose, David Bailey, and Jerry Voorheis.

The meeting was called to order by Jeff MacLeod at: 6:44 PM.

### Officer's reports

President Jeff MacLeod gave the President's report. He reported that he was looking forward to the WAS banquet.

Jonathan Kade gave the 1st Vice President's report. He reported that he was ready for the WAS banquet.

David Baranski gave the 2nd Vice President's report. The Open House was closed after 1 hour due to weather.

Jerry Voorheis gave the Secretary's report. The minutes are in the WASP.

Bob Trembley gave the Outreach report. WAS banquet details were discussed. WAS officers should arrive for banquet by 5 pm.

Dr. Dale Partin gave the Publications report. The WASP is up.

### Old Business

A check for the Paul Strong Scholarship was sent out to Macomb Community College. There was a discussion about which candidate should be recommended for the scholarship.

A motion was made by Jeff MacLeod that we recommend Student 3 for the Paul Strong Scholarship. 2nd by Dr. Dale Partin. The motion passed.

There was a motion by Jonathan Kade seconded by Dr. Dale Partin to pay the Ukrainian Cultural Center the balance owed for the WAS banquet up to \$1500.00. The motion passed

### New Business

There was a motion by Dale Partin seconded by Jeff MacLeod to pay the WAS banquet servers \$50.00 each up to a maximum of \$200.00. Motion passed.

There was a motion by Dale Partin seconded by Jerry Voorheis to pay \$705.75 for the WAS calendars. Motion passed.

The meeting adjourned at: 7:23 PM.

## CRANBROOK MEETING December 2, 2019

Meeting called to order at 7:30 PM by Jeff MacLeod, President.

Roll call: 44 persons were present.

The WAS banquet was announced.

Brian Klaus's sister Gretchen thanked the WAS for its part in the event that honored the late WAS member Brian Klaus on November 16th at Camp Rotary. There was a round of applause.

Ken Bertin presented In the News and In the Sky. Marty Kuntz gave the Solar report. There were no sunspots.

### Officer Reports

Jeff MacLeod gave the President's report. A bad joke was told by Jeff MacLeod.

Jonathan Kade gave the 1st Vice President's report. He presented highlights of the evening's events and a preview of the WAS banquet

David Baranski gave the 2nd Vice Presidents report. He reported there was no Open House due to weather. The next Open House will be December 28th.

Mark Jakubisin gave the Treasurer's report. Details are in the WASP.

Secretary Jerry Voorheis reported that the minutes are in the WASP.

Bob Trembley gave the Outreach report.

Dr. Dale Partin reported that the WASP is up. He asked for and received a round of applause for Dale Theme whose work made the WASP a success.

Sales of the WAS calendar was promoted by Jonathan Kade.

The Short Presentation was given by Professor Jerry Dunifer - "The Launch of Lightsail 2".

Snack/Break Time.

WAS members toured the Cranbrook Observatory and Planetarium for the remainder of the evening.

## W.A.S. Awards Banquet December 5, 2019

Don Klaser presented "Stories in the Sky".

Anita Malys was presented the Blaine McCullough Award.

Laura Wade was presented the Larry Kalinowski Award.

Joe Tocco was awarded the E. John Searles Award.

Jerry Voorheis  
Secretary

# Treasurer's Report

# The Last Word

## Treasurer's Report for 12/31/2019 MEMBERSHIP

We have 126 current members

### INCOME AND EXPENDITURES (SUMMARY)

We took in \$6,288 and spent/transferred \$6,259

We have \$18,278 in the bank \$641 in checks and \$1,817 in cash, totaling \$20,736 as of 12/31/2019.

### INCOME

\$1879	Banquet 2019
\$2,368	Memberships/renewals
\$167	Astronomical League
\$619	Snacks
\$585	Calendars
\$67	Paul Strong Scholarship

### EXPENSES

\$1,831	Banquet Fees and all expenses
\$120	Service Award Plaques 2019
\$326	Snacks / Supplies
\$90	Meetup Fees 2019
\$30	Library Storage Boxes
\$274	Library Telescope
\$500	Paul Strong Scholarship Donation
\$500	Ha Solar Telescope
\$300	Donation to AATB 2019
\$1,146	Club Insurance 2019
\$706	Calendars 2020

## GLAAC REPORT 12/31/2019

Beginning Balance: \$2,399

### INCOME

\$1,999	Donations for AATB 2019
---------	-------------------------

### EXPENSES

\$514	Reimbursement for printing 2018 Flyers
\$2627	AATB 2019 Tent Rental
\$1074	Miscellaneous expenses for AATB
\$485	Sound System for AATB
\$150	Reimbursement for Facebook ads for 2019 AATB

Ending Balance \$2,299

Mark Jakubisin  
Treasurer

Jonathan Kade  
Publications



If you're shopping on Amazon, make sure to use Amazon Smile. It costs you nothing, and if you select us as your charity, Amazon will donate 0.5% of every purchase you make to the Warren Astronomical Society.

## (from the Publications Director)

Greetings W.A.S.P. readers,

I hope you've enjoyed another fantastic issue of the W.A.S.P. thanks to the hard work of our contributors and of editor Dale Thieme. We always appreciate member submissions, so keep those cards and letters coming!

I've heard from a lot of members lately that they are not receiving W.A.S. emails. The W.A.S. email list is the main way we get important information to you, so it's really important if you would like to take full advantage of the club to sign up and make sure you see our emails. Here are some tips:

- To protect your inbox, we don't automatically subscribe you to the mailing list, so make sure you sign up for email here: <http://eepurl.com/bjDW2j>
- If you have subscribed, but aren't seeing emails, make sure to check your spam filter. If you see emails from us there, mark them as "Not Spam", and then you should start seeing them again.
- If you use Gmail, our emails might go into the "Promotions" tab, where marketing email usually goes. To make sure future emails don't go there, just click on an email from us in the "Promotions" tab (using a computer) and drag it into the "Primary" tab. When it asks you if you want to move future emails into your Primary tab, say yes.
- If you can't get this to work, talk to me at a meeting or a discussion group (preferably bring your computer!) and we'll figure it out.

Finally, 2020 is going to be the year that the W.A.S. website finally gets a makeover. Please let us know if there are things you want to see on our website!



## The Warren Astronomical Society is a Proud Member of the Great Lakes Association of Astronomy Clubs (GLAAC)

GLAAC is an association of amateur astronomy clubs in Southeastern Michigan who have banded together to provide enjoyable, family-oriented activities that focus on astronomy and space sciences.

### GLAAC Club and Society Meeting Times

Club Name & Website	City	Meeting Times
<a href="#">Astronomy Club at Eastern Michigan University</a>	Ypsilanti/EMU	Every Thursday at 7:30PM in 402 Sherzer
Capital Area Astronomy Club	MSU/Abrams Planetarium	First Wednesday of each month 7:30 PM
<a href="#">Farmington Community Stargazers</a>	Farmington Hills	Members: Last Tuesday of the month Public observing: 2nd Tuesday of the month
<a href="#">Ford Amateur Astronomy Club</a>	Dearborn	Fourth Thursday of every month (except November and December) at 7:00 PM
<a href="#">Oakland Astronomy Club</a>	Rochester	Second Sunday of every month (except May)
<a href="#">Seven Ponds Astronomy Club</a>	Dryden	Monthly: generally the Saturday closest to new Moon
<a href="#">Sunset Astronomical Society</a>	Bay City/Delta College Planetarium	Second Friday of every month
<a href="#">University Lowbrow Astronomers</a>	Ann Arbor	Third Friday of every month
<a href="#">Warren Astronomical Society</a>	Bloomfield Hills/ Cranbrook & Warren/ MCC	First Monday & third Thursday of every month 7:30 PM

### GLAAC Club and Society Newsletters

Warren Astronomical Society:  
Oakland Astronomy Club:  
Ford Amateur Astronomy Club:  
Sunset Astronomical Society:  
University Lowbrow Astronomers:

<http://www.warrenastro.org/was/newsletter/>  
<http://oaklandastronomy.net/newsletters/oacnews.html>  
<http://www.fordastronomyclub.com/starstuff/index.html>  
<http://www.sunsetastronomicalsociety.com/>  
<http://www.umich.edu/~lowbrows/reflections/>

### WAS Member Websites

Jon Blum: [MauiHawaii.org](http://MauiHawaii.org)  
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## Spot the Young Stars of the Hyades and Pleiades

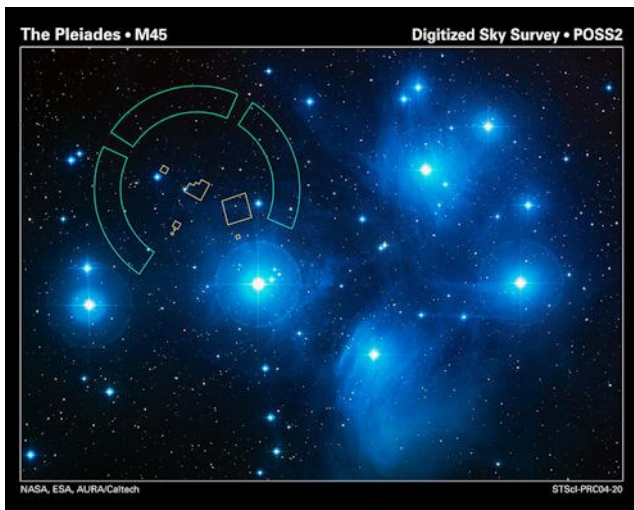
David Prosper

Orion is the last of a trio of striking star patterns to rise during the late fall and early winter months, preceded by the diminutive Pleiades and larger Hyades in Taurus. All three are easily spotted rising in the east in early January evenings, and are textbook examples of stars in different stages of development.

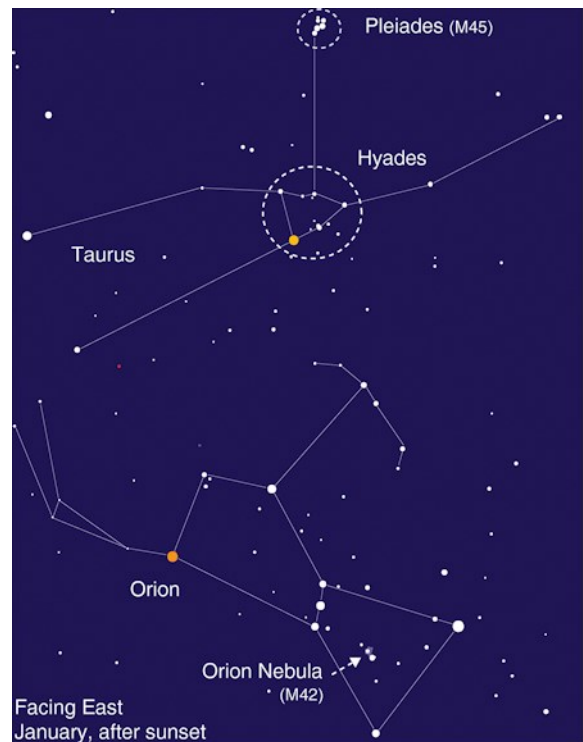
As discussed in last month's Notes, the famous Orion Nebula (M42), found in Orion's "Sword," is a celestial nursery full of newly-born "baby stars" and still-incubating "protostars," surrounded by the gas from which they were born. Next to Orion we find the Hyades, in Taurus, with their distinctive "V" shape. The Hyades are young but mature stars, hundreds of millions of years old and widely dispersed. Imagine them as "young adult" stars venturing out from their hometown into their new galactic apartments. Bright orange Aldebaran stands out in this group, but is not actually a member; it just happens to be in between us and the Hyades. Traveling from Orion to the Hyades we then find the small, almost dipper-shaped Pleiades star cluster (M45). These are "teenage stars," younger than the Hyades, but older than the newborn stars of the Orion Nebula. These bright young stars are still relatively close together, but have dispersed their birth cocoon of stellar gas, like teenagers venturing around the neighborhood with friends and wearing their own clothes, but still remaining close to home - for now. Astronomers have studied this trio in great detail in order to learn more about stellar evolution.

Figuring the exact distance of the Pleiades from Earth is an interesting problem in astrometry, the study of the exact positions of stars in space. Knowing their exact distance away is a necessary step in determining many other facts about the Pleiades. The European Space Agency's Hipparcos satellite determined their distance to about 392 light years away, around 43 light years closer than previous estimates. However, subsequent measurements by NASA's Hubble Space Telescope indicated a distance of 440 light years, much closer to pre-Hipparcos estimates. Then, using a powerful technique called Very Long Baseline Interferometry (VLBI), which combines the power of radio telescopes from around the world, the distance of the Pleiades was calculated to 443 light years. The ESA's Gaia satellite, a successor to Hipparcos, recently released its first two sets of data, which among other findings show the distance close to the values found by Hubble and VLBI, possibly settling the long-running "Pleiades Controversy" and helping firm up the foundation for follow-up studies about the nature of the stars of the Pleiades.

You can learn more about the Pleiades in the Universe Discovery Guide at [bit.ly/UDGMarch](http://bit.ly/UDGMarch), and find out about missions helping to measure our universe at [nasa.gov](http://nasa.gov).



Close-up of the Pleiades, with the field of view of Hubble's Fine Guidance Sensors overlaid in the top left, which helped refine the distance to the cluster. The circumference of the field of view of these sensors is roughly the size of the full Moon. (Credit: NASA, ESA and AURA/Caltech)



Locate Orion rising in the east after sunset to find the Orion Nebula in the "Sword," below the famous "Belt" of three bright stars. Then, look above Orion to find both the Hyades and the Pleiades. Binoculars will bring out lots of extra stars and details in all three objects, but you can even spot them with your unaided eye!