Dr. Mark Christensen presents “The James Webb Space Telescope”
pg. 6

Society Meeting Times

Astronomy presentations and lectures twice each month at **7:30 PM**:

**First Monday** at Cranbrook Institute of Science.

**Third Thursday** at Macomb Community College - South Campus Building J (Library)

Note: for the summer, we are meeting in room 151, lower level of the library.

March Discussion Group Meeting

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

We will celebrate the Equinox with cheap red!

The Discussion Group for March 22, at 7:30pm Eastern, will be hosted by Gary M. Ross at his home in Royal Oak.

**1828 North Lafayette, Royal Oak**

Four houses north of Twelve Mile Road in the N.W. quadrant formed by 12 Mile and Main St., Royal Oak.

Snack Volunteer Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 5</td>
<td>Cranbrook</td>
<td>Ruth Huellmantel</td>
</tr>
<tr>
<td>Mar 15</td>
<td>Macomb</td>
<td>Jeff MacLeod</td>
</tr>
<tr>
<td>Apr 2</td>
<td>Cranbrook</td>
<td>Ken Bertin</td>
</tr>
</tbody>
</table>

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 as soon as you are able so that other arrangements can be made.

In this issue:

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4 President’s Field of View
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18 NASA Space Place
FAAC Astronomy Conference & Swap Meet
Saturday, April 7, 2018 9:00 am - 3:00 pm

General Astronomy
9:30 am: Deep Sky Wonders – Tony Licata, FAAC
10:45 am: Meteorites – Todd Slisher, Longway Plt.
12N: Eclipses, Geysers and Stars – Axel Mellinger, CMU
1:30 pm: TBD?

Technical Talks
9:30 am: Ideas in Equipment – Clay Kessler, TSS
10:45 am: How it is Really Made - Tim Cambell, FAAC
12N: The Road to Totality – Liam Finn, FAAC
1:30 pm: TBD?

Planetarium Shows
10:00am, 11:30am & 1:00pm FAAC Members

Interactive Solar System Tour
10:45am John McGill – NASA Solar System Ambassador

Swap Meet
All Day...Earn Cash by Selling Those Items Sitting Around Collecting Dust!
Telescopes, Eyepieces, Cameras, Binoculars, Mounts, Software, Books, and Accessories, etc.

Participating Vendors
Telescope Support Systems, Wood Wonders, Sirius Astro Products, LX-200 Electronics Exchange

Admission: $5.00 (children 15 and younger – Free / must be accompanied by an adult)
Sales Table: $15 in advance, or $20 at the door as available, (one admission ticket included).
Advanced Table Registration ends Mar 29, 2018
Doors Open: 8:00am for setup.
Make Checks Payable: to FAAC for advance table registration.
Send payment to: Ford Amateur Astronomy Club, P.O. Box 7527, Dearborn, MI 48121-7527
Location: Henry Ford College, 5101 Evergreen Rd, Dearborn, MI 48128 (Andrew A. Mazzara Admin. & Conference Center… See X on map, Staff Parking Lots 11 & 12 will be open)

For More Contact Jim via email: w8tu@comcast.net or call (734) 751-6280 or
Information: Frank Ancona via email: FrankAncona34@yahoo.com or call (248) 345-0176
Oh, what a month will do, did I say school was exciting? I must have meant brutal. I don’t wish to sound like a typical complaining college kid but I don’t understand what they are trying to accomplish. Many people I have talked with say that the degree is just a piece of paper telling employers that you are willing to work hard to achieve something, that you are committed to your goals. So, the college experience is one that is supposed to harden you the realities of the workplace. For a degree in management I couldn’t agree more, but for the hard sciences I would think a fundamental understanding for the field would take priority. It doesn’t seem to work that way. Anyway, enough of my rantings.

Things with the club have been good, the openhouse was clouded over but still a good time. I finally built an adaptor to mount the Vixen scope I won at last year’s banquet to my Celestron mount (the Frankenscope is alive!) I now have a mount that fits three scopes! We could only see a very hazy moon, so we were left wanting more, but it’s nice to have the new scope up and running. We had a very nice discussion group hosted by Joe Tocco, I brought the scope that night too but was distracted by the conversations and didn’t set it up, maybe this weekend. The next Cranbrook meeting has got me just a bit nervous, both Jonathan and Diane will be out of town for that meeting and I don’t know about you, but I have juggled with one hand tied behind my back, but not TWO! They will be missed but I believe we have all the audio/video stuff covered, as long as I remember to bring the camera! But it’s their loss because we are going to get a great presentation that night. Some in depth info on the James Webb space telescope, count me in.

The Wayne state astronomy club is gaining momentum, they had twice as many people (continued)
show up for their second meeting of the year. I really hope we can help them with some observing at Stargate and help each other advertise our events. The Wayne state club, officially called the WSU student astronomical society has had some trouble in the past, but they are reinvigorated and motivated to get the club back up and running. The only problem is their entire board is graduating at the end of this semester! So, someone at Wayne state is going to have to step up and take over when they’re gone.

Other than that, I am looking forward to some great events we have coming up, the North Hill elementary event is shaping up into a big event, I know they are going to be blown away with all the presenters and different topics that we are going to cover. I’m also getting involved with Bob Trembley (AKA Mr. Outreach) for this year’s Penguicon, a Science/fiction convention. I will be on some panel discussions with Bob, presenting on orbital mechanics and even running a juggling workshop. So if you have never been, make this year the year you go!

Jeff MacLeod
President
Main presentation: “The James Webb Space Telescope”
Dr. Mark Christensen of the Fox Valley Astronomical Society will present about the James Webb Space Telescope (JWST). The intended replacement for the Hubble Space Telescope, the Webb is an even larger instrument that will be placed into orbit on the far side of the moon. Instead of looking mostly in the visible range like the Hubble, the JWST will operate in the infrared portion of the spectrum. This will allow it to see deep into dust clouds in which stars are born, as well as into the cores of galaxies. By sensing the IR portion of the spectrum the JWST will also be able to probe deeper into the early history of our universe since it will be able to detect objects with much greater red-shifts.

This talk will discuss the engineering and testing challenges associated with the JWST and its mission, as well as the planned program of observing. Finally, a brief biographical sketch of James Webb, who was the NASA administrator for much of the Apollo program, will be presented.

Mark was born in Detroit in 1947, spent his early childhood in Inkster, and his teens and college years in Livonia. A student of Mathematics and Physics at Wayne State and Purdue Universities, he earned his PhD in 1975 and spent a decade as a professor of Mathematics at the Georgia Institute of Technology. In 1984, he went to work for Northrup Grumman, rising from Technical Advisor to VP of Engineering for the Rolling Meadows site. From 1999 to 2010 he worked as a defense industry consultant.

Mark first became interested in astronomy in high school, completing his first mirror and telescope in 1965. He was a member of the Detroit Observational and Astrophotographic Association from its inception, and while at Georgia Tech was a leader of the Atlanta Astronomy Club. He and his wife Arlene reside in Saint Charles, IL and are currently members of the Fox Valley Astronomical Society, the Northwest Suburban Astronomers, and the Chicago Astronomical Society.

Short presentation: “Starry Nights @ Science Olympiad”
Sandra Macika will give the short presentation, “Starry Starry Night: Astronomy at the Science Olympiad”. She’ll talk about the Science Olympiad, a competition that does for STEM subjects what organized team sports does for gym class. She’s a judge with the Wayne-Oakland Science Olympiad (WOSO), in charge of their Starry Starry Nights astronomy activity. She’ll tell us in detail about that activity, and what you can do to be a part of it!

Sandra has been a supervisor for WOSO’s Astronomy since 2015. She’s the Vice President of GLAAC, and has been on the planning committee since 2014. She’s owned a 14.5” Starmaster telescope since 1999, worked with NASA doing Meteor Studies for 7 years – 1996 to 2002, and did outreach at Lick Observatory for 10 years – 1997 to 2006. She’s also certified to help Boy Scouts earn their Astronomy badge.
Main presentation: At tonight’s meeting, Gary M. Ross will present “Occultations, including the Great North American Fiasco of 2014”.

Occulations of stars and planets by the Moon -- or planets -- are arresting phenomena and intriguing to observe in telescopes great and small. They can be gainfully observed even in poor astro-locations. Such events, however, are of considerable use in astrometry and detailed study of lunar motion. Once they were of value for planetary atmospheres, and very early on dispelled hypotheses/ speculations about a lunar atmosphere.

The very simplest of occultation equipment will be demonstrated. The International Occultation Timing Association will receive brief explanation.

March of 2014 saw a minor disaster for asteroid-stellar observing in which the speaker narrowly avoided involvement. He will explain the lost cause, and how it has lead him to reconsider the Life of the Mind, yet again.

Gary says of himself: “The speaker observed his first lunar occultation during the 2nd Eisenhower administration. In the old country he would be deemed a Man of No Importance. He first addressed the Warren Astronomical Society in 1962. In later years he maintained he would never join, heavily involved in the Grand Rapids Association, but resolve weakened during a “snack break” from invitation by Brian “the Candyman”. He has been recently recognised as the least popular host of the roving Discussion Group.”

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. We have open dates at both Cranbrook and Macomb meetings. Also, if you may have any contacts of possible presenters, please send them along - that would be greatly appreciated. See you at the next WAS meeting!
Cassini to Eudoxus

What a wonderful region on the moon with rilles, mountains fantastic craters with great ejecta blankets and at this colongitude, some great shadows thrown in to boot! The large crater just above the name plate is Cassini (60km dia.) with the distinctive sub-craters A and B on its floor, the nice rima to the right of A and the obvious tight ejecta blanket. Notice how the blanket tapers off to the upper left with what looks to be flow marks and how the peaks to the north cast such long shadows. Above and to the left (west) is Promontorium Agassiz and above it is Promontorium DeVille though still largely in shadow here.

To the left of Cassini is the majestic Mons Piton standing like a sentinel in eastern Imbrium. To the east (right) of Cassini is the spectacular downward pointing triangle of Montes Caucasus, my favorite isolated range on the Moon with peaks jutting up out of the surrounding mare, Imbrium to the left and Serenitatis to the right. The pear shaped crater in the center of this range is Calippus (34km). Notice the mountains to the west of Calippus that cast shadows towards Cassini. Between these and Cassini are some nice rilles and south of them the crater Thaetetus (26km). I also like the peak in the lower tip of this mountain range also casting dramatic shadows westward and to the left of these shadows is Rima Thaetetus.

At the north end of the mountain range is a plain known as Alexander listed with an 85km “diameter” though it is not very round and above this, in the corner of this image is the grand crater Eudoxus with nicely terraced walls surrounded by the hummocky terrain of its ejecta. This two image montage was made with the new Autostitch program and two images made from 500 frame stacks from 1500 frame AVIs. Stacking was done with AviStack2 and final processing with GIMP and IrfanView.

Rik Hill

Guide map and Moon location by Ralph DeCew
Object of the Month: NGC 3184

NGC 3184 is a face-on spiral galaxy in the constellation Ursa Major. It is sometimes referred to as the Little Pinwheel Galaxy, a diminutive form of a name shared with several other galaxies possessing distinct spiral arms tracing out semi-circular arcs. Other “Pinwheels” include M101, M33 and M83, although NGC 3184 is fainter and less known to most amateur astronomers. The galaxy has an integrated apparent magnitude of 9.8, angular dimensions of approximately 7.8' x 7.2', and has a classification of SAB(rs)cd using the Hubble-Vaucouleur System. This class designates it as a spiral galaxy with an early stage bar and fairly widely wound s-shaped arms that form a ring close to the core. The galaxy is about 40 million light years distant and is known for having produced at least four supernovae within the last century, the most recent of which was a 14th magnitude Type II event observed in December 1999.

NGC 3184 is simple to locate for anyone with a passing familiarity with Ursa Major, but like most face-on galaxies, it is a challenge to observe in smaller apertures (<8") if light pollution is present. This is due to the fact that much of the emitted light is spread over the area of the spiral arms, rather than concentrated in a narrow band, as is the case with edge-on galaxies. NGC 3184 is positioned within the toes of the hind leg of Ursa Major, only about 0.8° west of μ Ursae Majoris (mag. 3.06), which should allow the observer to land directly on the object’s position by centering on this star with a wide angle, low power eyepiece. At low to medium power, a faint 5’ wide halo should be discernible surrounding a brighter star-like core region. Under favorable conditions and higher magnification, some structure indicative of the spiral arms can be detected. With pristine skies and large aperture (>12"), however, the sweeping curves become more apparent and fine details, including knots and mottling, may be revealed.

Chuck Dezelah
Notable Sky Happenings

MARCH 2018

Mar. 1 - 7
- The Moon will help us spot the five planets this month. It’s above Jupiter in the southern sky on the 7th.

Mar. 8 - 14
- The Moon is to the upper right of Mars in the S pre-dawn sky on the 7th.

Mar. 15 - 21
- No moon occurs at 12:15am EDT on the 20th.

Mar. 22 - 31
- The Moon is above Jupiter in the S pre-dawn sky on the 7th.
- The Moon will help us spot the five planets this month. It’s above Jupiter in the S pre-dawn sky on the 7th.
- The Moon is to the upper right of Mars in the S pre-dawn sky on the 7th.
- 30th New Moon

Mar. 1, 9, 17, 24
- Full Moon
- Last Quarter
- First Quarter
- New Moon

Mar. 1 & 31
- Mar. 9
- Mar. 17
- Mar. 24

The Cranbrook Observatory is open to the public Friday and Saturday evenings from 8:30 - 10:00pm EDT, and the first Sunday of the month from 1:00 - 4:00pm for astronomers of all ages. Visit our planetarium, explore the night sky through our 6-inch telescope, and much more! For observatory information visit http://science.cranbrook.edu/explore/observatory

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Cranbrook Institute of Science
OBSERVATORY A

From Dream to Discovery

Now Showing

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

Also Showing

"From Dream to Discovery"

Journey from NASA's test facilities all the way to Pluto and experience the excitement of today's space missions. Immerse yourself in the adventure and excitement of space exploration. The Sure and certain: the journey from NASA's test facilities all the way to Pluto and experience the excitement of today's space missions.

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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
Find us on MeetUp.com

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.
February Open-House
The February open-house was a wash with Riyad Matti, Pat Brown and Jeff MacLeod engaging in conversations under cloudy skies and 40 degree temperatures. No visitors. The observatory was opened at 5:30 PM and closed at 8:30 PM.

March Open-House
The regular Open-house for March is scheduled for Saturday the 24th. A first quarter moon will rise at 12:26 pm and set at 3:37 PM. Because of the start of daylight savings sunset will be an hour later than recently, around 7:50 pm with astronomical twilight ending right around 9:30 pm. 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.

Observatory update
Pending a warm weekend in late March or April a small fascia board will be installed under the soffit of the observatory roof, caulked and painted to match the block wall exterior. This will be preventive measure to eradicate the problem with bees nesting in the observatory building.

Joe Tocco
Second Vice President

W.A.S.P. Photo and Article Submissions
We’d like to see your photos and articles in the W.A.S.P. Your contribution is ESSENTIAL! — This is YOUR publication!

Send items to: publications@warrenastro.org

Documents can be submitted in Microsoft Word (.doc or .docx), Open Office (.ods), or Text (.txt) formats, or put into the body of an email. Photos can be embedded in the document or attached to the email and should be under 2MB in size. Please include a caption for your photos, along with dates taken, and the way you ’d like your name to appear.
We had quite the busy month in February!

2/9/2018: CANCELLED FOR WEATHER (Friday) 6-8 pm - Tiger Cub Scouts “The Sky is the Limit” at Cranbrook. Thanks to Parker Huellmantel and Ken Bertin for signing up.

2/10/2018: Troop 1489 at Stargate. Angelo DiDonato and Bob Berta handled a Boy Scout troop consisting of ten Scouts and four Scout leaders; Angelo reports everyone was happy despite the weather and the troop leader sent us a nice note of appreciation.

2/26/18: Gary Ross did a telescope workshop at the Wilder Branch of the Detroit Library system. He reports it is an ideal place for sidewalk astronomy in the tradition of John Dobson though Wilder could use a moon map and other observing resources to aid in future events. He also engaged in “vigourous exchange of scientific ideas” with one of these Flat-Earth types that have been coming out of the woodwork of late.

2/28/2018: Cub Scouting event at Sequoyah Elementary in Macomb Twp. Bob Berta and Angelo DiDonato met with Scouts, parents and their scout leader at Sequoyah Elementary school. Bob Berta gave an excellent talk on size, distance, gravity, and possibility of extra terrestrial life. They concluded with a Q&A and an overview of the W.A.S. and our Stargate Observatory.

Upcoming Events (March):

3/8/2018: NEED VOLUNTEERS! An event at North Hill Elementary in Rochester featuring presentations, telescope viewing, and crafts from 6PM to 8 PM. Moon viewing around 7:30 PM would be appreciated. We have five volunteers for the evening but more are welcome.

3/9/2018: NEED VOLUNTEERS! Family Nite with Nick DiCresce at Maire Elementary in Grosse Pointe from 6:30 to 8PM. Mark Kedzior will have scopes out for folks to look through after the event and he could use some assistance.

3/24/2018: NEED VOLUNTEERS! Boy Scout Astronomy at Cranbrook. One provisional volunteer (thanks, Ken!) and we definitely need more.

3/24/2018: NEED VOLUNTEERS! DbarA Scouting event at the camp in Dryden, 4PM-whenever. Bob Berta and Mike O'Dowd have signed up for telescope viewing; expect mostly cub Scouts. Talk to Bob B if interested.

Upcoming Events (April):


4/21/2018: The City of Warren is hosting an Earth Day event at the Warren Civic Center on VanDyke for Saturday April 21 from noon to 5PM. We’ve signed up for a table and could use two or three volunteers to staff it. Recommended subjects for outreach that day include preserving dark skies. No telescope necessary.

4/21/2018: Astronomy Day! Cranbrook Institute of Science welcomes the W.A.S. solar telescopes and all-around general astronomical goodness. They will most likely also have a make-n-take planisphere set up and other activities, so if you don’t have a telescope but know your way around a planisphere your assistance would be appreciated. The event runs from 1-4 PM, so volunteers should set up prior to 1 PM. The observatory and planetarium will be open as well.

Diane Hall
Outreach
TREASURER’S REPORT FOR 2/28/2018

MEMBERSHIP
We currently have 70 members, of which 23 are family memberships.

INCOME AND EXPENDITURES (SUMMARY)
We took in $455.33 and spent $66.98. We have $20,425.84 in the bank and $179.72 in cash, totaling $20,605.56 as of 2/28/2018.

INCOME
223.00 Membership/renewals
15.00 Astronomical League
37.75 Snacks
177.58 General Fund
2.00 Merchandise

EXPENSES
50.00 Snack reimbursement
16.98 Supplies

GLAAC REPORT 2/28/2018
Beginning Balance: $4,301.67

INCOME
No Activity

EXPENSES
No Activity

Ending Balance:
$4,301.67

Ruth Huellmantel
Treasurer

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.

The W.A.S. Library

Come visit the breathtaking WAS library, located in the scenic rendering-server room at Cranbrook Institute of Science! In our library, you’ll find six shelves of books about:

- Observing every celestial object imaginable;
- Using and making telescopes;
- Popular and unpopular science;
- Science biography, science history, science fiction;
- Archives of our fifty-year history;
...and other stuff we can’t classify.

To check out a book, you simply have to be a member in good standing. At Cranbrook, see our librarian, Jonathan Kade, at the break. To have a book delivered to Macomb, simply request a book from the library list from Jonathan. Where do you see the list? It doesn’t exist yet! Hassle Jonathan to post it.
**History S.I.G.**

**March 1985**

In this issue, we find an article on Venus by Steve Franks, followed by the W.A.S. Library listing. Looking though the list, I saw a rather complete collection of WASP issues, a shame that it disappeared over the years: some of the missing ones in the scanning endeavor were listed there. On a positive note, we now possess many that weren’t listed.

Bob Lennox presented plans for a star map table and we get “Adventures in Astronomy” by Doug Bock to round out the issue.

**March 1996**

A perusal of the WASP online archives listing shows an entry for “October 1995 through May 1996” consisting of an HTML document titled “Masterpieces Messier Missed” that Jeff Bondono posted—which I took to mean no individual WASP issues for that span of months. Now this printed issue pops up from the Kim Dyer collection. Stay tuned, there may be others. This issue features “Computer Chatter” by Larry Kalinowski, an announcement for the “SOLAR ECLIPSE CRUISE 1998 -7 Day Cruise to Aruba”, and, of course, “Masterpieces Messier Missed” by Jeff Bondono.

**From the Scanning Room:**

Once desk top publishing became the standard for producing the WASP, Volume and issue numbers were engaged. I thought I might be on to something in determining what issues were never published (to date I have only one “in print” mention of a non-publication month- Oct. 1972), but soon found out that was overly optimistic. Our editors have used two different volume and number systems over the years.

The first occurrence of volume and issue numbering found was October 1986 (Volume 18, #8). This system then made the March issue #1 in designation since the WASP was founded with a March issue. The combined months of December ‘86/January ‘87 then became Volume 18, #10, with February ‘87 as volume 18, #11. This continues until December ‘90/January ‘91 with an abrupt switch to Volume 23, #1, dropping any issue numbering based on December. All issues since displaying volume and number show January as issue #1. Much less confusing – except those occasions when editors copied one issue to create next and forgot to adjust the numbering (March ’96 is a case in point: banner says vol. 27, #12 December 1995- but everything inside indicates March 1996).

This research prompted another realization: Next March marks the 50th anniversary of the WASP.

Dale Thieme
Chief scanner
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

<table>
<thead>
<tr>
<th>Club Name &amp; Website</th>
<th>City</th>
<th>Meeting Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astronomy Club at Eastern Michigan University</td>
<td>Ypsilanti/EMU</td>
<td>Every Thursday at 7:30PM in 402 Sherzer</td>
</tr>
<tr>
<td>Capital Area Astronomy Club</td>
<td>MSU/Abrams Planetarium</td>
<td>First Wednesday of each month 7:30 PM</td>
</tr>
<tr>
<td>Farmington Community Stargazers</td>
<td>Farmington Hills</td>
<td>Members: Last Tuesday of the month Public observing: 2nd Tuesday of the month</td>
</tr>
<tr>
<td>Ford Amateur Astronomy Club</td>
<td>Dearborn</td>
<td>Fourth Thursday of every month (except November and December) at 5:30 PM</td>
</tr>
<tr>
<td>Oakland Astronomy Club</td>
<td>Rochester</td>
<td>Second Sunday of every month (except May)</td>
</tr>
<tr>
<td>Seven Ponds Astronomy Club</td>
<td>Dryden, Michigan</td>
<td>Monthly: generally the Saturday closest to new Moon</td>
</tr>
<tr>
<td>Sunset Astronomical Society</td>
<td>Midland</td>
<td>Second Friday of every month</td>
</tr>
<tr>
<td>University Lowbrow Astronomers</td>
<td>Ann Arbor</td>
<td>Third Friday of every month</td>
</tr>
<tr>
<td>Warren Astronomical Society</td>
<td>Bloomfield Hills/ Cranbrook &amp; Warren/ MCC</td>
<td>First Monday &amp; third Thursday of every month 7:30 PM</td>
</tr>
</tbody>
</table>

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/SASNewsletters.htm  
http://www.umich.edu/~lowbrows/reflections/

WAS Member Websites

Jon Blum: MauiHawaii.org  
Bob Trembley: Balrog's Lair  
Bill Beers: Sirius Astro Products  
Jon Blum: Astronomy at JonRosie  
Bob Trembley: Vatican Observatory Foundation Blog  
Jeff MacLeod: A Life Of Entropy
Meeting Minutes

Board Meeting - February 5th

Present: Jeff MacLeod, Jonathan Kade, Joseph Tocco, Diane Hall

Meeting convened at 6:29 PM

Officer’s Reports

President - Jeff requested 25-35 copies of the New Member Handout which Joe Tocco offered to print up and supply. Jeff also reported that he was turning over to the Treasurer a $25 donation from the Shelby Township Girl Scout trip who donated at the end of their recent visit to Stargate and also for a new member who paid his dues to Jeff.

1st Vice President - Jonathan announced multiple presentations over the next few months and noted that the May short talk at Cranbrook, and the June talk at Macomb are still open and available. He added that we are still waiting to hear of our exact location for the Macomb meetings while the library is under construction from May until January of 2019. Further details are in his report published in the WASP.

2nd Vice President - Joe provided the details of a successful open-house on the 27th of January and provided the specifics for the upcoming February open-house on the 24th. At Jeff’s request, Joe will followup on the outstanding issues at Stargate with the Metropark. Primary concern is the wooden ramp and the stone skirting around the observatory. Joe had no other updates at this time. Further open-house information can be found in his report in the WASP.

Treasurer - Ruth was not present but Jonathan read her report which can also be found in the WASP.

Secretary - Parker was not present and meeting minutes were not immediately available.

Outreach - Diane detailed the many outreach events including Mark Kedzior’s prolific endeavors with the local libraries. Diane also touched on the upcoming Ford Club Astronomy Event and Swap Meet. Diane’s extensive report is also published in the WASP.

Publications - Brian was not present and reported that the WASP is currently on-line and available to all.

Old Business

Discussion Group - February’s discussion group is being hosted by Joe Tocco at the MCMI office in Sterling Heights.

Banquet - Jonathan drafted a letter to DeCarlos expressing our overall disappointment with the arrangement of the past banquet and our immediate proximity to another group who’s lively celebration ruined our speaker’s presentation. Jonathan’s draft was accepted by the Board and Jonathan will forward it formally to the DeCarlo’s management. The letter’s intent is to explain the situation and to request some assurances that this type of situation does not get repeated in the future.

Stargate - Jeff brought up continued efforts to advertise Stargate’s open-houses and events. Several suggestions were made and discussed including other forms of social media and the idea that event’s are creatively promoted to encourage attendance.

New Business

Jonathan brought up suggested changes to the club’s by-laws but Jeff recommended that it be tabled until the next Board meeting when more Board members will be present. That was an idea accepted the quorum.

Motion was made by Jeff to adjourn and that motion was 2nd by Jonathan, then approved by Diane and Joe.

Meeting adjourned at 7:27 PM

Joe Tocco
2nd Vice President
What Is the Ionosphere?
By Linda Hermans-Killiam

High above Earth is a very active part of our upper atmosphere called the ionosphere. The ionosphere gets its name from ions—tiny charged particles that blow around in this layer of the atmosphere.

How did all those ions get there? They were made by energy from the Sun!

Everything in the universe that takes up space is made up of matter, and matter is made of tiny particles called atoms. At the ionosphere, atoms from the Earth’s atmosphere meet up with energy from the Sun. This energy, called radiation, strips away parts of the atom. What’s left is a positively or negatively charged atom, called an ion.

The ionosphere is filled with ions. These particles move about in a giant wind. However, conditions in the ionosphere change all the time. Earth’s seasons and weather can cause changes in the ionosphere, as well as radiation and particles from the Sun—called space weather.

These changes in the ionosphere can cause problems for humans. For example, they can interfere with radio signals between Earth and satellites. This could make it difficult to use many of the tools we take for granted here on Earth, such as GPS. Radio signals also allow us to communicate with astronauts on board the International Space Station, which orbits Earth within the ionosphere. Learning more about this region of our atmosphere may help us improve forecasts about when these radio signals could be distorted and help keep humans safe.

In 2018, NASA has plans to launch two missions that will work together to study the ionosphere. NASA’s GOLD (Global-scale Observations of the Limb and Disk) mission launched in January 2018. GOLD will orbit 22,000 miles above Earth. From way up there, it will be able to create a map of the ionosphere over the Americas every half hour. It will measure the temperature and makeup of gases in the ionosphere. GOLD will also study bubbles of charged gas that are known to cause communication problems.

A second NASA mission, called ICON, short for Ionospheric Connection Explorer, will launch later in 2018. It will be placed in an orbit just 350 miles above Earth—through the ionosphere. This means it will have a close-up view of the upper atmosphere to pair with GOLD’s wider view. ICON will study the forces that shape this part of the upper
atmosphere.

Both missions will study how the ionosphere is affected by Earth and space weather. Together, they will give us better observations of this part of our atmosphere than we have ever had before.

To learn more about the ionosphere, check out NASA Space Place: https://spaceplace.nasa.gov/ionosphere

This illustration shows the layers of Earth’s atmosphere. NASA’s GOLD and ICON missions will work together to study the ionosphere, a region of charged particles in Earth’s upper atmosphere. Changes in the ionosphere can interfere with the radio waves used to communicate with satellites and astronauts in the International Space Station (ISS). Credit: NASA’s Goddard Space Flight Center/Duberstein (modified)