



The W.A.S.P.

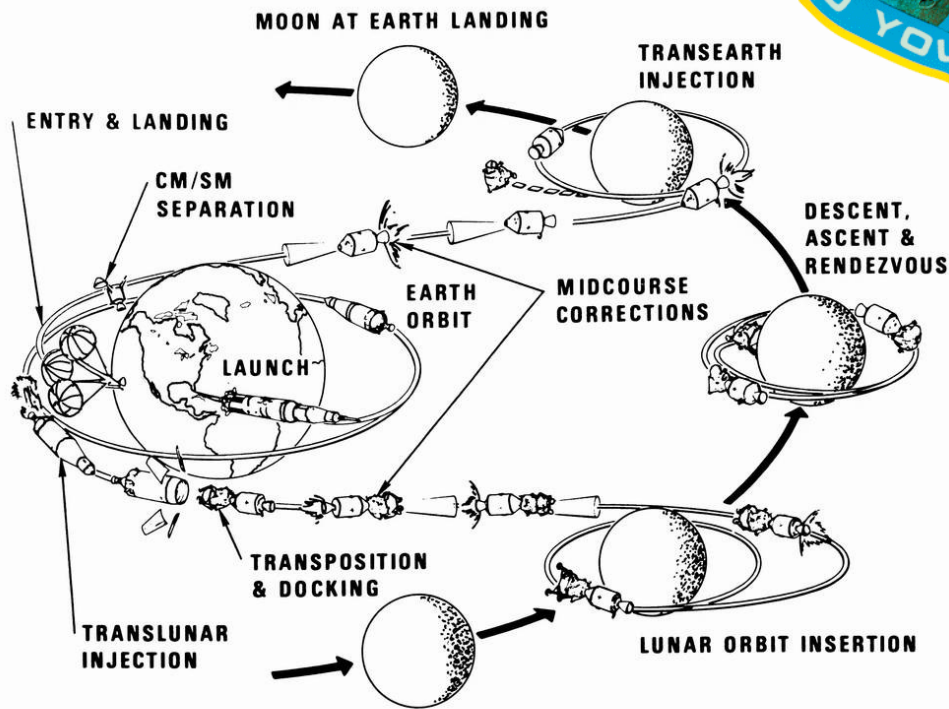
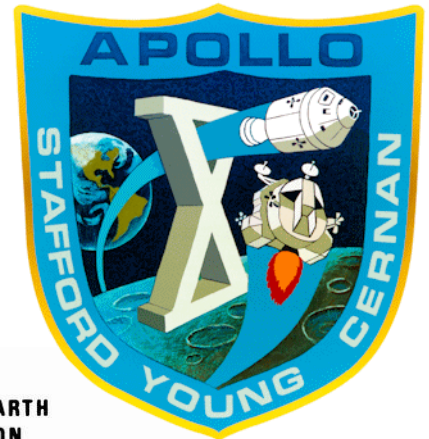


Vol. 50, no. 5

May, 2019

The Warren Astronomical Society Paper

Apollo 10 50th Anniversary 18 May–26 May 1969



MOON AT EARTH LAUNCH

Apollo 10 was a Type F mission, a piloted lunar module demonstration in lunar orbit, the dress rehearsal for the first piloted landing on the Moon. It was also the first time all members of a three-person crew had previously flown in space.

The crew members were Colonel Thomas Patten Stafford (USAF), commander; Commander John Watts Young (USN), command module pilot; and Commander Eugene Andrew "Gene" Cernan (USN), lunar module pilot.

Notice: The Macomb meeting room is now back in the Library, in room J221

The WASP

Published by
Warren Astronomical Society, Inc.
P.O. Box 1505
Warren, Michigan 48090-1505



Dale Thieme, Editor

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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 1221 North Woodward Ave Bloomfield Hills, Michigan	Macomb Community College South campus, Bldg. J, Room J221 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

Pay at the meetings

Also via PayPal (send funds to 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.
- Free use of W.A.S. library. See librarian.

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)

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.

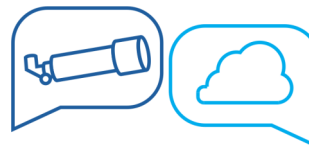
Stargate Observatory is owned and operated by the Society. Located on the grounds of Camp Rotary on 29 Mile Road, 1.8 miles east of Romeo Plank Road, Stargate features an 8-inch refractor telescope under a steel dome. The observatory is open according to the open house schedule published by the 2nd VP.

Library. The Society maintains a library of astronomy-related books and periodicals at the Cranbrook meeting location. See the librarian, Jonathan Kade, to check out a book.

Snack Volunteer Schedule

May 6	Cranbrook	the Kaplans
May 16	Macomb	Angelo DiDonato
Jun 3	Cranbrook	Bob Berta
Jun 20	Macomb	Riyad Matti

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.



Discussion Group Meeting

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

When: Wednesday, May 22, at 7pm.

Where: 3219 Woodside Ct. Bloomfield Hills, MI

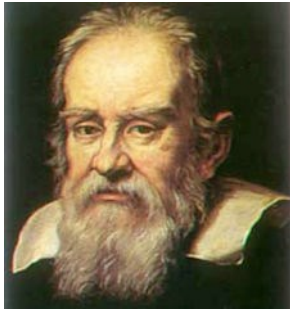
Amenities and Refreshments:

Laura Wade will provide sloppy joes, cake and wine. People attending can bring drinks or other snacks of their choice.

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The Life and Times of Galileo



Local astronomer Ken Bertin explores the life and times of Galileo Galilei, who is widely considered the father of modern science. Three quotes say it all:

"Propositions arrived at by purely logical means are completely empty as regards reality. Because Galileo realized this, and particularly because he drummed it into the scientific world, he is the father of modern physics—indeed, of modern science altogether." - Albert Einstein, 1954

"Galileo, perhaps more than any other single person, was responsible for the birth of modern science." – Stephen Hawking, 2009

"If I have seen further than others, it is by standing upon the shoulders of giants." Isaac Newton, 1675. One of the giants that he referenced was Galileo.

Please register at bit.ly/dpl_Galileo



Ken Bertin

**Sunday, May 5, 2:00 –
4:00 p.m.**

Friends Conference Room



President's Field of View

Well my semester is finally done! To quote Richard Feynman "If you think you understand quantum mechanics, you don't understand quantum mechanics". I can firmly say, I don't understand quantum mechanics. Now, what do I really mean by this? Well, I don't think it too difficult to internalize QM conceptually, if you take what is told and come to terms with it. What is maybe impossible is why it works the way it does, quantized energy for instance. Well the answer is the math, and that is what I don't understand much at all. Not to say I can't do the math, but truly understanding what the math is saying and why this particular math is the universe is significantly different. For me, this is what Feynman was taking about. This has definitely been my hardest semester to date, but hey, its Spanish and C++ this summer so ya never know.

In club news we had a great final discussion group at Gary Ross' house this past week, the discussion group will continue just not at Gary's. The open house which coincided with my birthday got cancelled, so that was a bummer. I really want to say it was a really great birthday but with finals hanging over me and not making it to Stargate I only managed a great birthday. The weather is going to turn at some point here and it will finally be T-shirt astronomy time. Aside from all that, the club is running well, the new board has found its groove and now it's time to start thinking about the Picnic and all the events we are going to have this summer. I want to encourage everyone to volunteer to any capacity you can, because there will be enough to go around this summer.

Finally, I want to start a new segment, that I hope to continue as a regular WAS feature called Homework. I am going to post a math puzzle (I'll try to make them astronomical), and whomever emails me the solution will get a mention in the next segment and at the meeting. I will also post a solution next month. So, you ready?

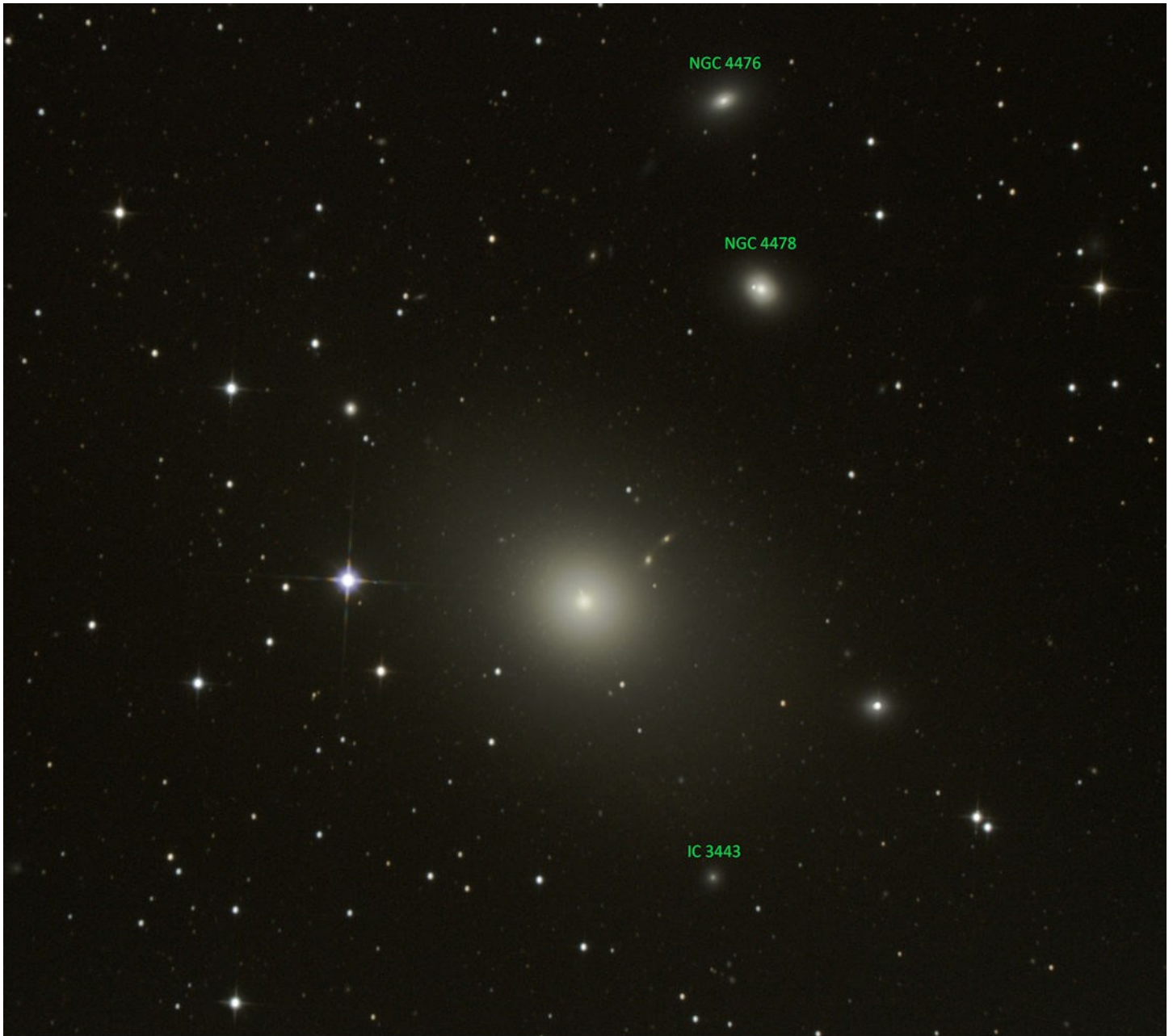
HW-4/19: You were looking up at the stars, not looking where you were going and have fallen into a deep (cylindrical) hole, you notice that the hole is exactly 5 feet in diameter. You also notice that from your vantage point at the bottom of the hole, the opening appears to be the same size as the full moon (30 arc mins). The question is, how deep is the hole?

Jeff MacLeod
President

Main Library

5201 Woodward Avenue
Detroit, MI 48202
313.481.1409

www.detroitpubliclibrary.org

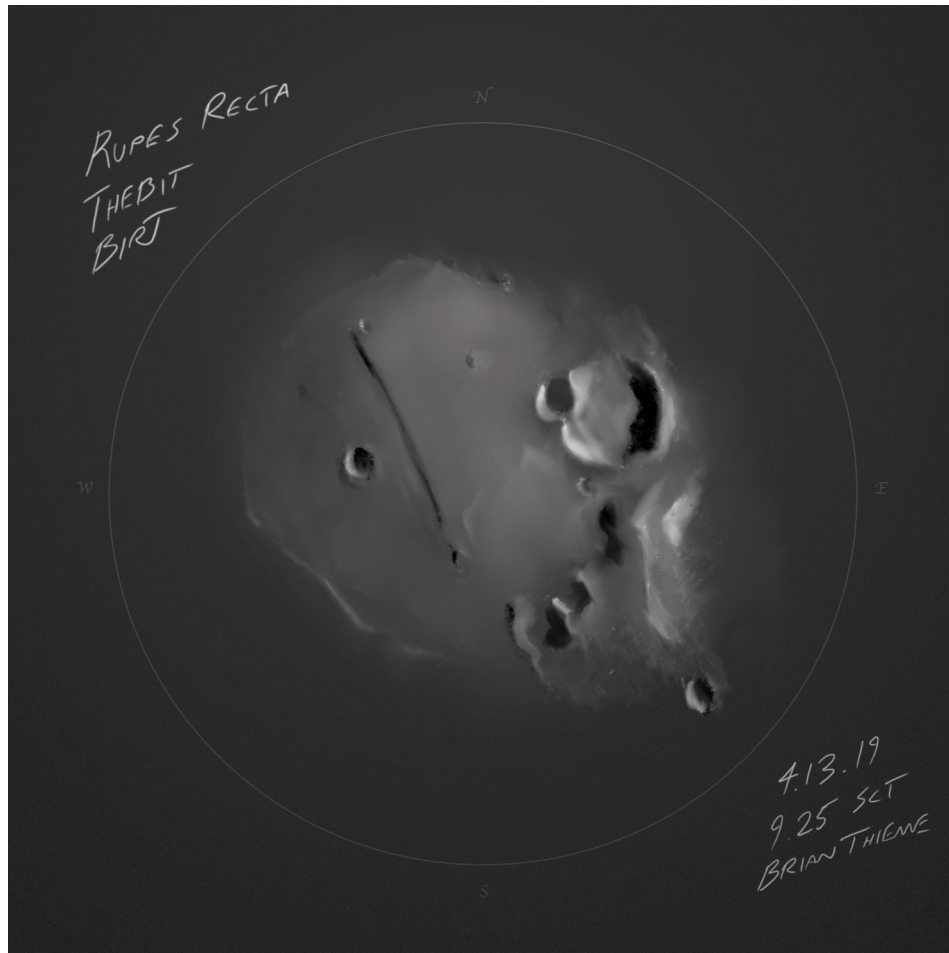


M87 Galaxy

Messier 87 is a supergiant elliptical galaxy located in the constellation Virgo. One of the most massive galaxies in the local Universe, it has a distance of 53 million light-years from earth. It is home to the first ever imaged supermassive black hole, taken by the Event Horizon Telescope and released to the public in April 2019.

Photo taken by Bill Beers 4/27/19

Sketching at the Eyepiece



I've been trying to follow along with the suggested moon targets that Orion Telescopes shares through their Facebook page. The weather in April was not accommodating, but on the 13th I was able to view their recommended target for the evening, Rupes Recta. This is a feature on the lunar surface that I was very familiar with, but never bothered to learn its name. Commonly known as “the straight wall”, it appears to be a sheer cliff face. This is apparently a trick light and shadow, however. It's far less steep than I imagined. The Wiki article describes the 110 km fault as more of a “gentle slope”, rising gradually to a height of 300 m. It's flanked on the eastern side by crater Thebit, and crater Birt to the west.

Brian Thieme

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.

From the desk of the Northern Cross Observatory

Perseus Cluster of galaxies

Centered on NGC 1275 (Perseus A)



36 x 10 minute subs (6 hours of data acquisition)

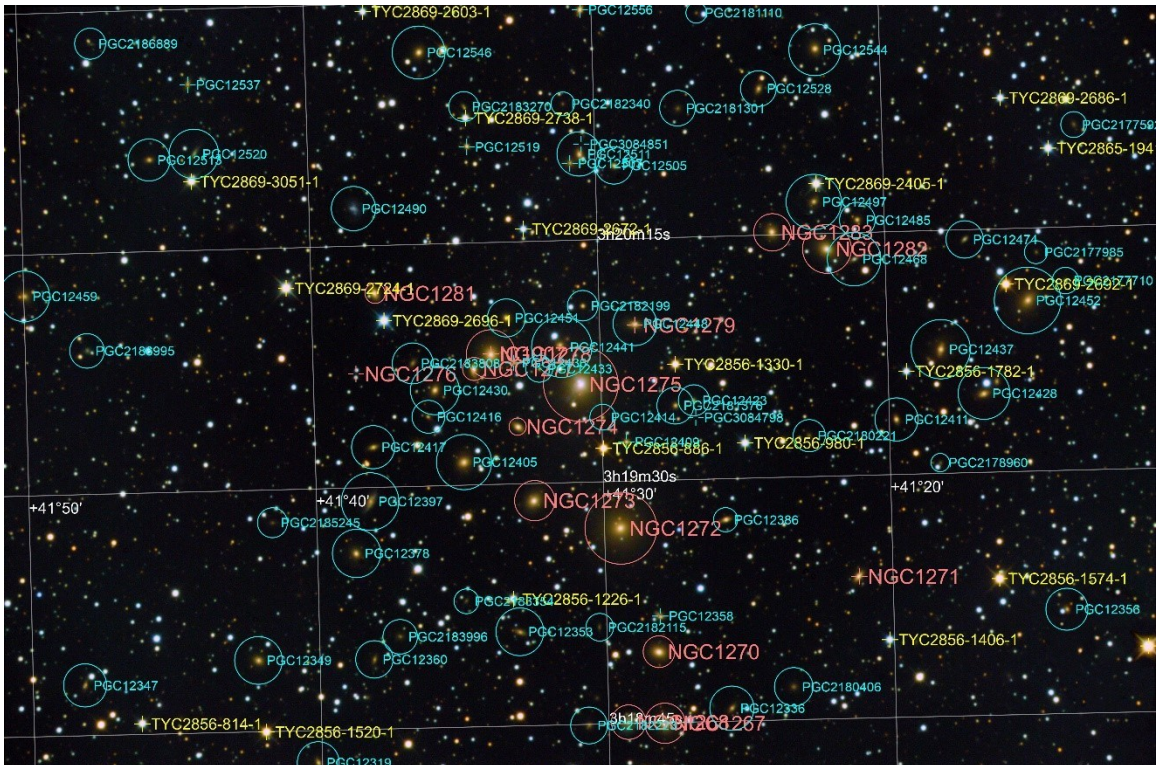


PLATE SOLVED

EVERY RED AND BLUE CIRCLE IS A GALAXY

Doug Bock | Northern Cross Observatory | Processed January 6, 2019

Object Information

NGC 1275 is a type 1.5 Seyfert galaxy located around 237 million light-years away in the direction of the constellation Perseus. NGC 1275 corresponds to the radio galaxy Perseus A and is situated near the center of the large Perseus Cluster of galaxies.

NGC 1275 is a strong radio and X-ray source that produces peculiar emission lines in its nucleus. It's listed as entry 3C 84 in the 3rd Cambridge Catalogue of Radio Sources and Carl Seyfert include it in his original list of active galaxies. NGC 1275 is actually a complex system consisting of a main galaxy and a high velocity system (HVS). Tidal interactions between the two objects result in large amounts of dust disruption, gas stripping and star formation. In addition, tidal forces send existing gas and dust swirling into the [supermassive black hole](#) at center of the main galaxy, resulting in the powerful X-ray and radio wave emissions.

NGC 1275 was discovered by William Herschel on October 17, 1786.

Magnitude: 12.6

Absolute magnitude: -23.75

Constellation: Perseus

Group or cluster: Perseus Cluster

Redshift: 5264 ± 11 km/s; $z=0.017559$

Apparent magnitude (V): 12.6

About the plate solve data

The Principal Galaxy Catalog (PGC) objects are identified in blue.

The New General Catalog (NGC) objects are identified in red.

The Tycho Catalog objects are stars in yellow.

The central NGC 1275 galaxy is 237 million light years away

Picking a few of the brighter PGC's using various online catalogs, this image is at least 400 million lightyears deep. I can't find distance data for the dimmer ones.

Tools

Processing tools

Deep Sky Stacker

PixInsight for image processing and plate solve annotation

Gimp 2 for cosmetic touch up

Control and Auxiliary software

Sequence Generator Pro

Manages all sequences and automation of the cameras and drive systems.

Automatically plate solves for pointing at targets

PHD 2 for autoguiding

Focus Lock for automated focusing in real time

TheSky X – for ad hoc slewing to objects



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

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.



Northern Cross Facility

Current System

- 10" F/8 Riche Chrétien (~2010 mm focal length)
- Losmandy G11 mount with the gemini 2 control system
- PoleMaster camera for polar alignment
- ZWO asi071MC one shot color camera (APS-C sized chip)
 - 4.87 micron pixels
 - 23 x 17 mm frame
 - Cooler
- Starlight Xpress Lodestarx2 guide camera (8 micron pixels)
- On Axis Guide Port (ONAG)
- Optec Focusing system
- Optional - Canon T3i DSLR (secondary camera), usually piggybacked on the 10"
- Optional - 4" f/10 SCT piggybacked on the 10"
- Ethernet router • DS-600 USB to Ethernet Hub (optional)
- Laptop



Astrophotography on Steroids

Imaging a Black Hole

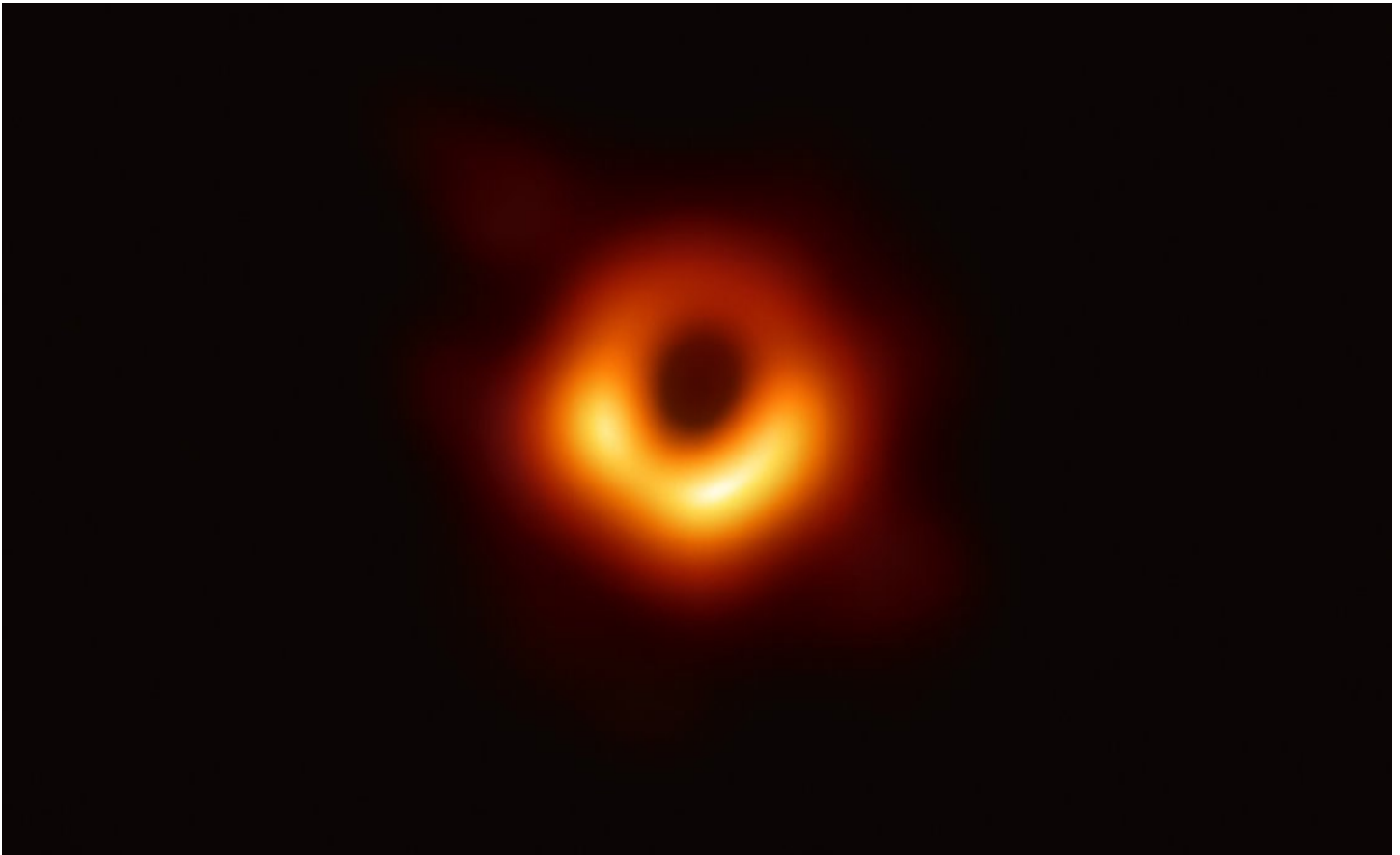
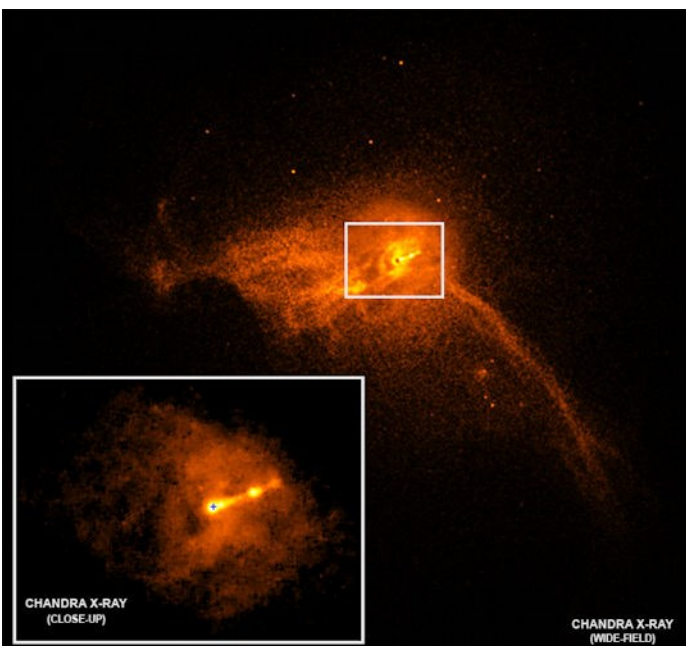


Image: EHT/ESA

“The Event Horizon Telescope (EHT) – a planet-scale array of eight ground-based radio telescopes forged through international collaboration – was designed to capture images of a black hole. In coordinated press conferences across the globe, EHT researchers revealed that they succeeded, unveiling the first direct visual evidence of the supermassive black hole in the centre of Messier 87 and its shadow.” (from [ESA article](#))



Left: Here is an image of M87, an elliptical galaxy in the Virgo galaxy cluster, from the Chandra X-Ray Observatory, showing the jet of high-energy particles launched by the intense gravitational and magnetic fields around the black hole, extending more than 1,000 light years from the center of the galaxy.

“M87 is an elliptical galaxy in the Virgo galaxy cluster, about 60 million light years away from Earth. For years, scientists have known that a supermassive black hole weighing several billion times the mass of the Sun sits at the center of M87. Surrounding the elliptical galaxy is a reservoir of multimillion-degree gas, which glows brightly in X-ray light. Chandra’s studies of this hot gas have given astronomers insight into the behavior and properties of the giant black hole.” ([Chandra Photo Album](#))

Chandra Blog: Story of the [M87 observation](#).

Presentations

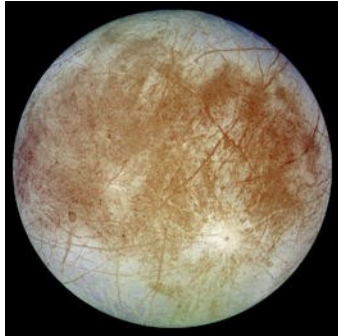
Monday, May 6, 2019 Cranbrook Presentations

Looking for Life in All the Right Places

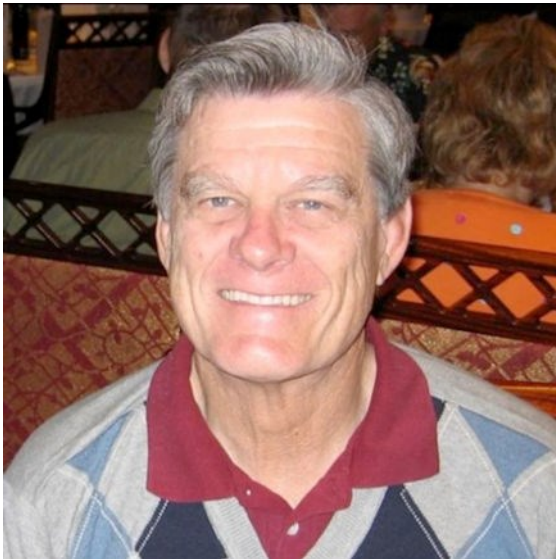
A virtual tour of the putative ecosystems in our Solar System

By Dr. Louis Irwin

None of the planets and moons in our Solar System other than Earth provides an environment conducive to life as we know it. But life is creative; so biomes evolving under different conditions could produce ecosystems distinctly different from our own, yet with characteristics we could recognize and detect with existing technology.



Extrapolating from the known properties of planets and moons in our solar neighborhood, and referencing the evolutionary trajectory of life on Earth, speculative but plausible evolutionary histories for ecosystems on several of our planets and moons can be envisioned.



This presentation will focus on the possibility of sulfur-based microbes in the clouds of Venus, subterranean microbiomes and cave-dwelling macroorganisms on Mars, several trophic levels of organisms in the subsurface oceans of Europa and Enceladus, and diverse forms living in the dual hydrophilic and hydrophobic habitats thought to exist on Titan.

Dr. Louis Irwin, a native West Texan, received a B.A. degree in chemistry from Texas Tech University and a Ph.D. in biochemistry and physiology from the University of Kansas. He has served on the staffs at the Shriver Center for Mental Retardation in Waltham, MA and the Neurosciences Research Program of M.I.T., and on faculties at the College of Pharmaceutical Sciences, Columbia University, and the Wayne State University School of Medicine. He has been chair of biology at Simmons College in Boston and the University of Texas at El Paso.

Trained as a physiologist, his early and continuing interest in neuroscience and evolutionary biology has led to over 60 publications in those fields, including two books: *Scotophobia* and *The Evolutionary Imperative*. In the last two decades, he has added astrobiology as a natural extension of his earlier interests, leading to 20 publications including two books, *Life in the Universe* and *Cosmic Biology*. Currently he is a Solar System Ambassador for the Jet Propulsion Lab at Caltech, and a Professor Emeritus of Biological Sciences at the University of Texas at El Paso.

Barnard's Star

By Professor Jerry Dunifer

Barnard's Star is one of our nearest stellar neighbors, a fascinating red dwarf that is practically flying across our sky. Jerry will consider some of the identifying characteristics of this star, as well as its interesting history. You'll also be introduced to the man that it's named after, E. E. Barnard.

Jerry Dunifer is a Professor Emeritus at Wayne State University. He was a member of the faculty in the Department
(Continued on page 11)

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

(Continued from page 10)

of Physics & Astronomy for 35 years before retirement. While active in the Department he served as a Professor and Associate Chair of the Department for several years. His research program there involved the study of the electrical and magnetic properties of high-purity metals at a temperature of 1 Kelvin. He also played an active role in the astronomy programs of the Department, including the WSU Planetarium and telescopic observing facilities.



Since retirement, one of Jerry's hobbies has been visiting a number of the major and historic astronomy observatories around the World. He has visited dozens of different sites and has traveled as far as the geographic South Pole and the geographic North Pole. And many places in-between.

Thursday, May 16, 2019 Macomb Presentation

We're back at our old room! The Warren Astronomical Society meets monthly on the third Thursday in classroom J221 in the J (Library) building at Macomb Community College's South Campus.

Higher Priority Than Mars

A Case for Visiting Near-Earth Objects

By Dave Bailey

A lot of time, effort, and money is going into getting humans to Mars. However, getting to Mars is not a life-or-death mandate for humanity.



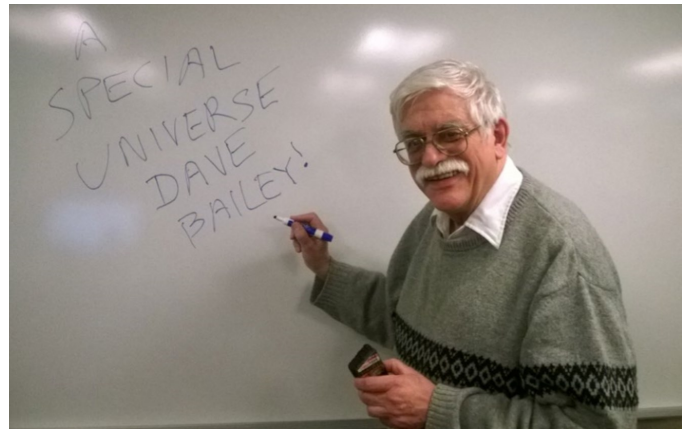
Just getting people there isn't much use - it would take an impractically long time to establish a self-sufficient colony, much less to terraform the planet to make it as welcoming

as the least hospitable places on Earth. (Of course, terraforming Mars may not even be physically possible.)

On the other hand, learning about near-earth asteroids could save the entire human race from destruction. So obviously it's a much higher priority! Going to near-earth objects, learning about them, and learning to nudge them out of collision courses is hugely important to the future of our species. In terms of cost and difficulty, it's cheaper than a serious effort to get humans to Mars, though a little more expensive than a return to the moon.

We'll talk about feasible missions to Mars and to NEOs, compare the challenges and rewards of each, and see if we can set humanity on a better space exploration path than we're currently on.

In the process, Dave will discuss the concept of Solar System Ships, nuclear- or solar-powered ships with electric engines, built in low earth orbit that make getting around our solar system easier without all of the pesky requirements of having to land or take off from deep gravity wells (i.e. planets and moons).



Astronomy has always been a major part of Dave Bailey's life - his parents met at Yerkes Observatory! Dave is in the minority in the club; he is more of a theoretician than an observationalist. He doesn't own a major telescope.

As an optical engineer, he has worked on several different kinds of spy equipment (details classified). He has done laser isotope separation (NOT on uranium). He has worked with laser weapons, both offensive and defensive, and nerve gas detectors (details not classified).

Living up to his reputation as the club's resident Einstein, Dave's presentations to the club regularly expand our minds and challenge our preconceptions. They also generally use whiteboards instead of computers, and come with multi-page handouts. If you're looking for some mental exercise, don't miss his presentations!



Movie Review

By Diane Hall

To celebrate the 50th Anniversary of Apollo 11's Moon landing, former President Diane Hall will be contributing a series of space-themed movie reviews to the WASP in upcoming months.

Apollo XI (2019)

You've seen Neil Armstrong descending the LM's ladder. You've heard the first words spoken by a human on another world. But you, and I, have not seen the journey of Apollo XI quite like this before. Whether you lived through the first manned Moon landing on July 20, 1969 or you've been catching up after the fact like I've been all my life, certain moments and images and dialogue fragments form the basic fabric of the Apollo XI mythos, and most of them center upon the drama of the landing itself... or on Walter Cronkite's reaction shots.

What *Apollo XI* the film does is to place those oft-replayed moments into the larger context of the mission entire, thereby breathing fresh life into a tale five decades old. The footage, edited and directed by co-producer Todd Douglas Miller, is deployed to tell the story of Apollo XI (men and mission) without any explicit narration to color the viewer's reaction. From the Saturn V's journey to the launchpad via NASA's unique Crawler-Transporter to the clips of the crew being readied for launch, *Apollo XI* takes the necessary time to establish the setting. This is not a whirlwind blast upon a giant rocket; it is methodical in set-up and stately in execution, with each figurative milestone in the journey given its due—and through this, it delivers an emotional wallop of greater substance than a hectic montage would've. The moment of Trans-Lunar Injection here receives the same gravity as the decision to proceed with the lunar landing itself and that footage was for me one of the singular joys of this film. Much of *Apollo XI* is touted as “never-before-seen” and as many times as I've immersed

myself in images of *Columbia* and her crew, I can't recall ever seeing that shot of the mighty rocket firing to send them off to the Moon.

Then, too, the comprehensive approach taken by Miller allows for the less-sung heroes of the mission to shine. While Capcom Charlie Duke was on deck for the adrenaline rush of the lunar landing itself, here we see the other invaluable members of the team in Houston—like Owen Garriott and Bruce McCandless, both of whom passed away in recent months. From the establishing shots of technicians on the hallowed Pad 39A to the crew of *USS Hornet* who pluck *Columbia* from the sea, *Apollo XI* makes it clear how many, many hands contributed to this triumph. As for the crew onboard *Columbia* and *Eagle*, I felt Command Module Pilot Michael Collins proved the scene stealer. Collins is my favorite of the Space Race-era astronauts, self-deprecating and humane in a way that makes him a pleasure to hear today. His *joie de vivre* works here as contrast to the famously reticent Armstrong and the notoriously intense Aldrin, who provide those history-book quotes like “The Eagle has landed” and “Magnificent desolation.” One gets the sense Collins knows he's going to be the forgotten man of the mission and he's up there on *Columbia* having the time of his life regardless.



If *Apollo XI* has one flaw, I'd say it's that Matt Morton's electronic score underwhelms. Morton put forth a valiant effort, using only instruments that existed in 1969, but one of my viewing companions voiced the belief that no score at all would have been more appropriate, permitting the natural noise and silence to tell the story. I personally admit to letting my favorite portions of the score of the decades-old TV series *From the Earth to the Moon* play in my head at key moments. However, consider any faults in the score to be a mere slip of the tongue, like Charlie Duke's “Twanquility Base,” in the course of a splendid, perfect mission.

Rating: 5 out of 5 Moons



Next month we'll take a trip in the Wayback Machine to the heady days of Project Mercury and see whether or not The Right Stuff still has the, er, right stuff.





Over the Moon

With Rik Hill

A pox on the moon!

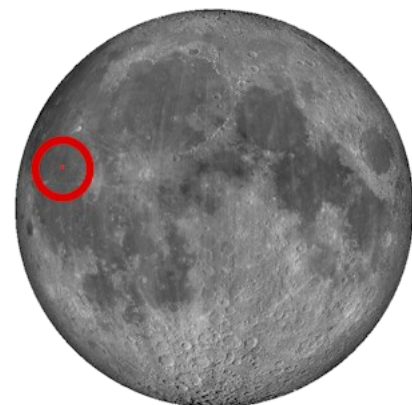
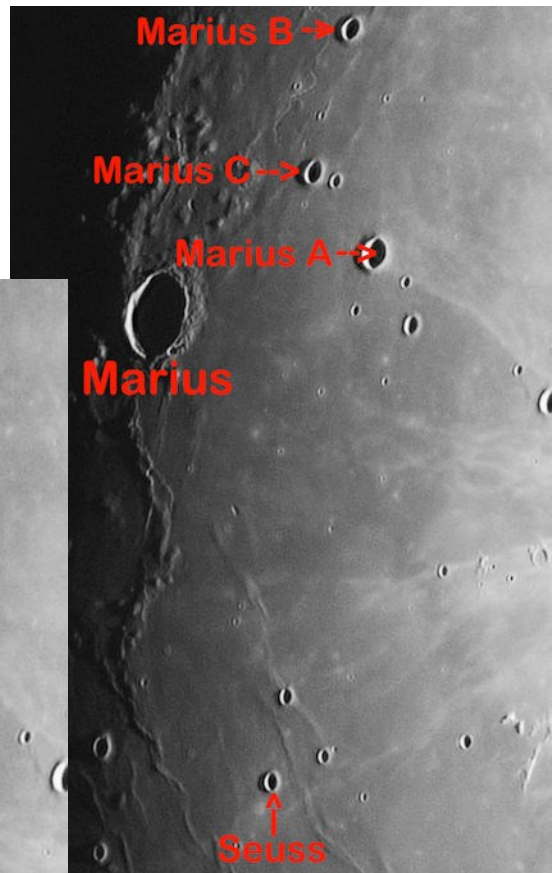
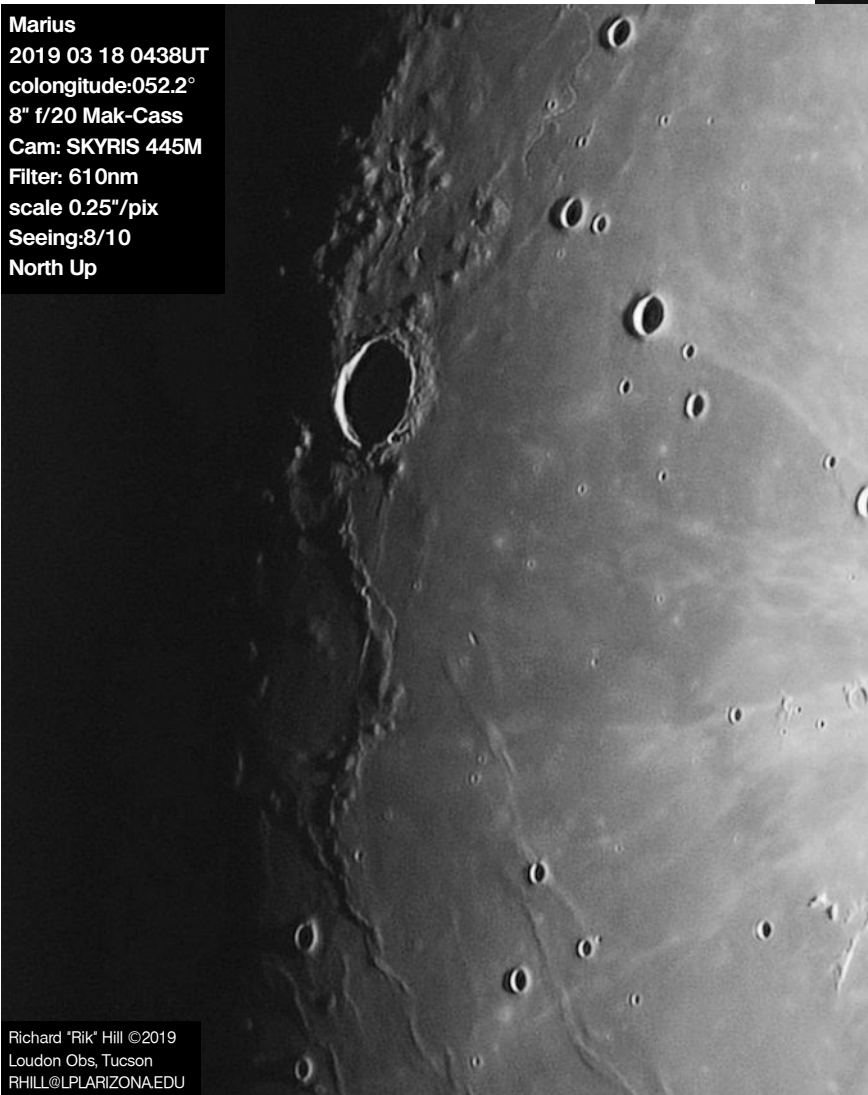
A day after Kepler comes into view you'll see another crater about the same latitude on the terminator surrounded by quite rugged terrain. This is 43km diameter Marius with its herringbone ejecta blanket well displayed. Seen here it has a large unnamed dorsum tail to the south ending just west of a right triangle of craters the southernmost of which is Seuss (10km). The western rays from Kepler can be seen coming in from the right side of the image. Northeast of Marius (upper right) are three fairly good sized craters from bottom to top are Marius A (15km), Marius C (11km) and Marius B (12km) all bigger than Seuss! Between Marius C and B you can see the sinuous Rima Marius running off the north edge of this image. To the north of Marius you can see the eastern end of the



field of domes Marius also called the "Marius Hills". These are a real treat to see as the moon gets more and more gibbous.

This montage was made from two images each stacked from 1800 frame AVIs using AVIStack2 merged with AutoStitch and then further processed with GIMP and IrfanView.

Marius
2019 03 18 0438UT
colongitude:052.2°
8" f/20 Mak-Cass
Cam: SKYRIS 445M
Filter: 610nm
scale 0.25"/pix
Seeing:8/10
North Up



Richard "Rik" Hill ©2019
Loudon Obs, Tucson
RHILL@LPLARIZONA.EDU



Object of the Month

By Chuck Dezelah

NGC 4038 and 4039



NGC 4038 and 4039 are a pair of interacting peculiar spiral galaxies in the constellation Corvus. They are often together referred to by their common nicknames, the “Rattail Galaxy” or the “Antennae Galaxies”, given to them due to the stretched-out spiral arm remnants that extend from each galactic center. The galaxies are in the process of undergoing a collision and both are experiencing a starburst phase caused by the clash of material and subsequent rapid star formation. NGC 4038 and 4039 have integrated apparent magnitudes of 10.3 and 10.6, and the angular dimensions of their core regions are approximately $5' \times 3'$ and $3' \times 1'$, respectively. Their classification in the Hubble-Vaucouleur System is SB(s)pec and SA(s)pec, indicating that both are peculiar-type spirals, the larger of which contains a bar-shaped feature at its center. It is estimated that in 400 million years they will merge completely to form a large elliptical galaxy with single combined core.

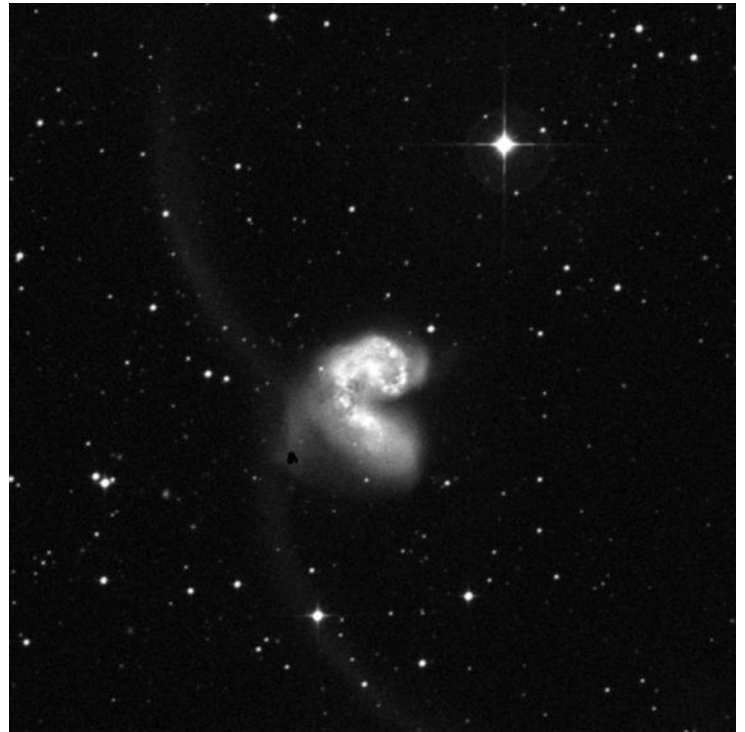


Image from Digitized Deep Sky

Finding the Antennae Galaxies is fairly straightforward, since there are a number of well-positioned naked-eye stars in the vicinity that can aid in star-hopping. The galaxies can be found about 3.5° west-southwest of the star Gienah (γ Corvi, mag. 2.6), lying at the northwestern corner of Corvus. In fact, a line drawn from Algorab (η Corvi, mag. 2.9) to Gienah and extended that same distance again will land the viewer very near the target location. In telescopes of $6''$ or larger aperture under moderately light polluted skies and low power, NGC 4038/9 should appear as a conspicuous concentrated glow. Higher magnification or the use of larger apertures should reveal at least some aspects of the unusual structure of the merging galaxies. For example, the presence of two separate regions of the “bi-lobal” merging cores should be apparent, as well as some finer details such as bright knots and darker sections within the objects. The tails or antennae for which the objects are named, however, will likely only be visible in the largest amateur instruments or with astrophotography.

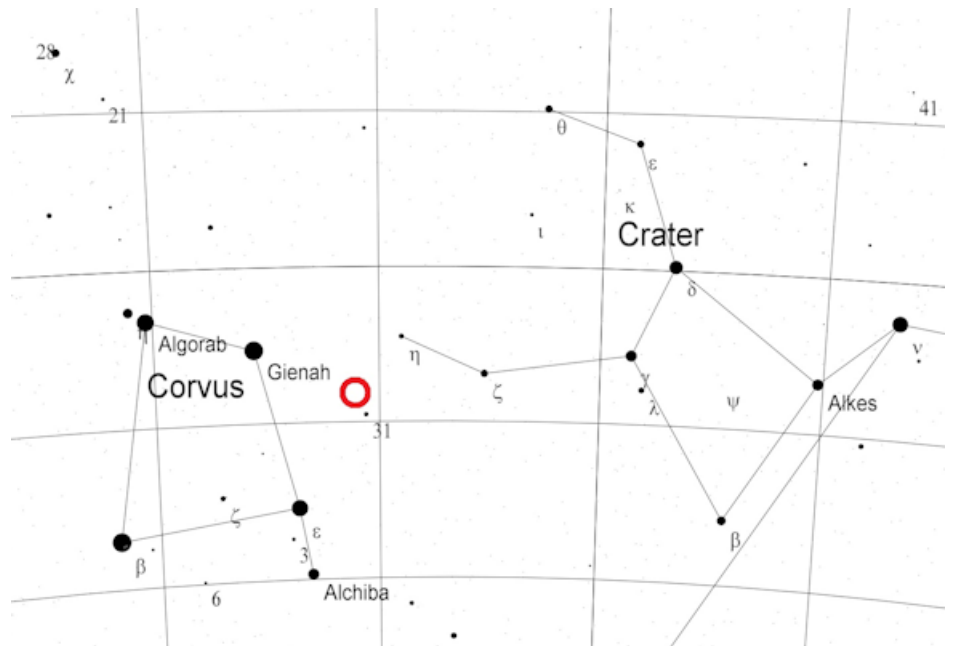


Chart created from Cartes du Ciel

History S.I.G.

May 1982



As luck would have it, the Stargate drawing becomes the featured cover...again. My issue selection for these reports is done "blind", picking from a spreadsheet of issues not yet featured in this column. I have no idea what the cover looks like until I fetch the image.

Before diving into the articles, a look at the minutes of the March 18, 1982 meeting may prove interesting. Mention of "all our problems are settled at Macomb and we can meet there again" is made. Now I'm wondering what those problems were...

"Some Astronomical Reflections" - PART IV by John J Wetzel reflects on the question of going to Mars. Chuck Fausel covers RY Leonis, R Leonis and X Leonis in "Variable Star Observing". This last article will please Gary Ross as it concerns getting up very early for astronomy: "Some Comments Regarding the Most Critical Period in Observing an Astronomical Event" by David L. Harrington.

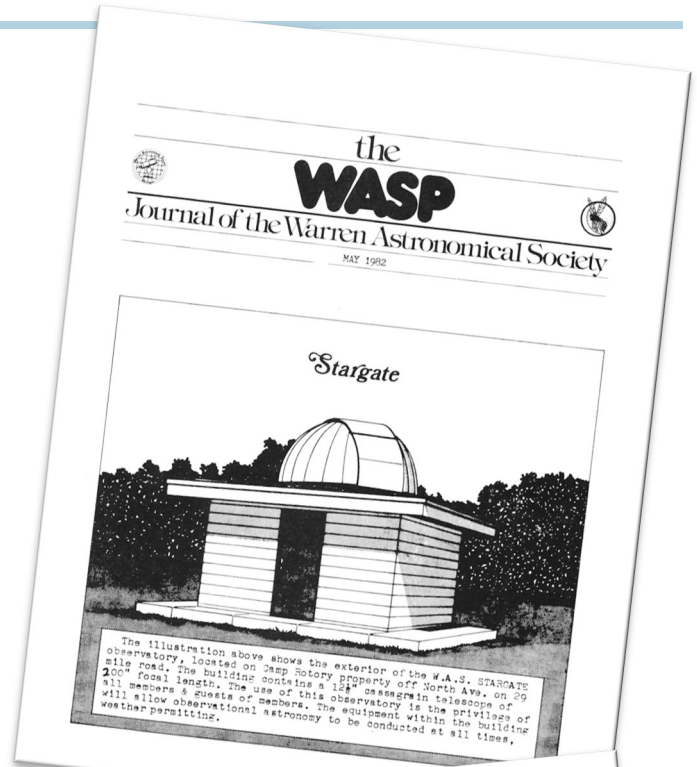
May 1992

This issue is a prime example of the publishing formula for the WASP in the 90s. Prior to the January 1992 issue, we had gone through a period of thin issues, only 6 pages long. Then, we rediscovered NASA. Now the issues for nearly half of the decade are eight pages consisting of a feature article, Larry Kalinowski's column, news bits from NASA and club announcements.

In this issue, "Stars of Interest" by Steve Franks is the featured article, followed by the "Computer Chatter" column of Larry Kalinowski. NASA's "Spacelink" fills up two pages and finally, there is the "At the Telescope" feature. The subjects seem to go on a rotation through the months and no clue as to where the material comes from. This month's topic: "Limiting Magnitudes"

From the Scanning Room

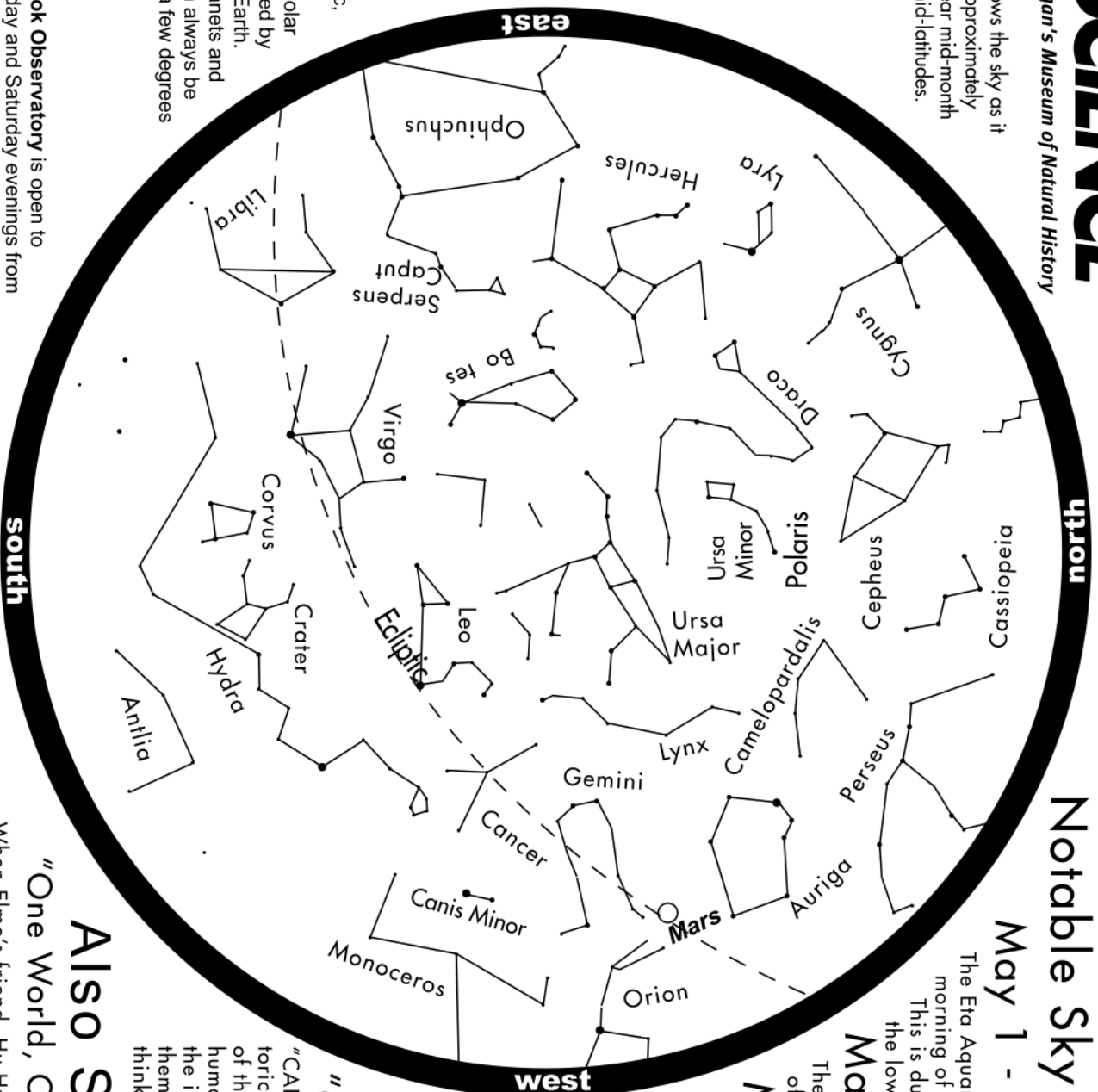
While researching for the March Macomb meeting, the question of the whereabouts of Chris Edsall came up. We recalled that he'd gone off to England at some point but couldn't say when. Now I've come across this bit from the May 1973 issue: "The W.A.S. sends its best wishes to Chris Edsall who has just recently left us for England. [Should set Anglo-American relations back a bit] The W.A.S.P. won't



be the same without his unique cover artistry." Now I'm left wondering how many of those covers Chris was responsible for. The beat goes on.

Dale Thieme,
Chief scanner

This chart shows the sky as it appears at approximately 10pm EDT near mid-month at northern mid-latitudes.



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 always be found within a few degrees of this plane.

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 solar viewing. Come have a look through our 6" telescope! For observatory information visit <http://science.cranbrook.edu/explore/observatory>

MAY 2019

Notable Sky Happenings

May 1 - 7

The Eta Aquarid meteor shower peaks the night of May 6 and morning of the 7th. It may produce up to 30 meteors/hour. This is dust left over from Halley's Comet. The Moon is at the lower left of Mars the evening of the 7th (WNW).

May 8 - 14

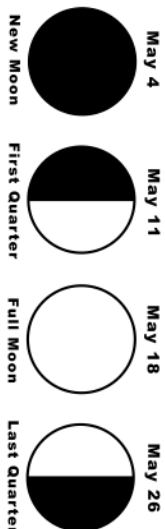
The Moon is at the upper left of Regulus, the "heart" of Leo, on the 12th (SSW evening).

May 15 - 21

The star below the Moon the evening of the 15th is Spica (SSE). The Moon is to the right of Jupiter the morning of the 20th (SW).

May 22 - 31

The Moon is to the right of Saturn on the 22nd and to the left on the 23rd (S predawn).



Now Showing

"CAPCOM GO! The Apollo Story"
 "CAPCOM GO! The Apollo Story" is an immersive, historical documentary that showcases the achievements of the Apollo program and what it took to put the first humans on the Moon. It introduces a new generation to the immense challenges they overcame and will inspire them to become the explorers, designers, engineers, thinkers and dreamers of the future.

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>





Stargate Observatory

Monthly Free Astronomy Open House and Star Party

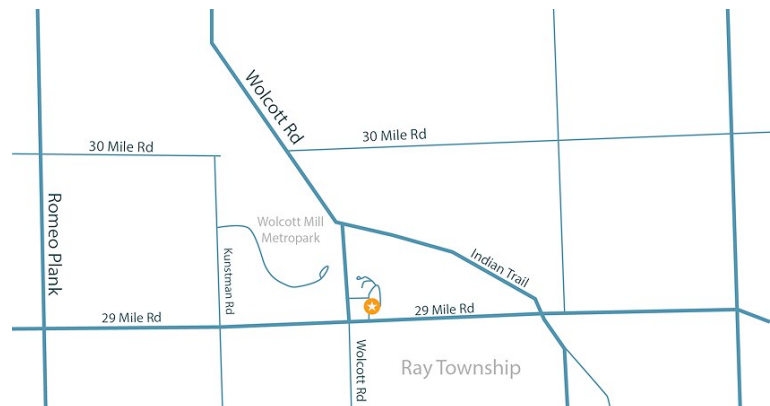
4th Saturday of the month!

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

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 Events

The Stargate Observatory was scheduled to host two events for April 2019, State Wide Astronomy Night (SWAN) and the monthly Open House.

The State Wide Astronomy Night (SWAN), April 12th, had low attendance due to partly cloudy skies.

The Open House was cancelled due to poor weather conditions forecasted for the evening.

The WAS board is currently soliciting bids for replacing the dome at Stargate.

May Open House

Next Open House is scheduled for Saturday, May 25th, 2019.

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.

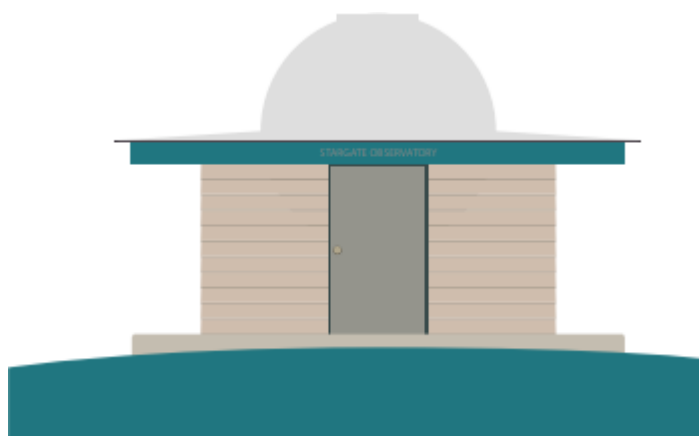
Remember to dress warm and in layers!

Sunset : 7:57pm

Astronomical Twilight Ending : 10:03pm

Moonrise : 1:56am

David Baranski
2nd VP (Observatory Chairperson 2019)



Astronomical Events for May 2019

Add one hour for Daylight Savings Time

Source:

<http://www.astropixels.com/ephemeris/astrocal/astrocal2019est.html>

Day	EST (h:m)	Event
02	06:39	Venus 3.6°N of Moon
03	01:26	Mercury 2.9°N of Moon
04	17:45	NEW MOON
05	08:00	Eta-Aquarid Meteor Shower
06	16:52	Aldebaran 2.3°S of Moon
07	18:36	Mars 3.2°N of Moon
09	13:50	Moon at Ascending Node
09	22:30	Pollux 6.3°N of Moon
10	20:35	Beehive 0.0°S of Moon
11	20:12	FIRST QUARTER MOON
12	09:19	Regulus 3.0°S of Moon
13	16:53	Moon at Perigee: 369017 km
18	16:11	FULL MOON
20	11:54	Jupiter 1.7°S of Moon
21	08:00	Mercury at Superior Conjunction
22	14:12	Moon at Descending Node
22	17:25	Saturn 0.5°N of Moon: Occn.
24	02:00	Mercury at Perihelion
26	08:27	Moon at Apogee: 404134 km
26	11:33	LAST QUARTER MOON

Saw a Fireball?

Report it to the American Meteor Society!



[www.amsmeteors.org/
members/fireball/
report-a-fireball](http://www.amsmeteors.org/members/fireball/report-a-fireball)

Outreach Report

We have a *boatload* of outreach requests, and more continue to come in! If you are interested in presenting at any of these events, *please* contact: Outreach@warrenastro.org. I've also highlighted some member outreach activities over the last month.
-Bob T.



Outreach Requests

Warren Public Library Civic Center Branch - wants a presentation on astronomy this summer. 6:00 or 6:30 PM. Leave by 7:45 PM.

Contact: Paul Konkolesky pkonkolesky@cityofwarren.org
(586) 751-0770 ext. 5007

Warren Public Library System - wants a presentation on astronomy this summer

Contact: William Konkolesky beyondcosmic@gmail.com
(248) 515-9568

Cub Scout Pack 90 at Stargate Observatory

Sat. June 1, Time 7:00 PM (TBD)

Contact : Laura Hayden lhayden@comcast.net
[[Google Calendar](#)]

Astronomy Presentation for Vacation Bible School

Thur. June 20, 2019 7:00 PM

St Paul Lutheran Church, St Clair Shores

Their space-themed event is "Miraculous Missions." Anything astronomy / space is good.

Expecting 75-100 preschool-6th graders

Contact: Donna Megge 586-612-7777, auntnonnie555@yahoo.com

[[Google Calendar](#)]

Note: this is unfortunately at the same time as our Macomb meeting.

Campbell Public Library

Tuesday July 16 3:00-4:00 PM [[Google Calendar](#)]

Tuesday July 23, 3:00-4:00 PM [[Google Calendar](#)]

Would like an Intro to Astronomy for Kids (4-16yrs)

Contact: Abigail Rubin aru-bin@detroitpubliclibrary.org 313-481-1552

Address: 8733 W Vernor Highway, Detroit, Michigan, 48209

Warren Public Library - Busch Branch

Wednesday evenings, June 15 - July 31, 6:30 PM

Contact: Andrea Mucha amucha@cityofwarren.org (586) 353-0580

Volunteers: Bob Berta: June 19, Jonathan Kade: June 26.

Open: July 3, 10, 17, 24, 31

Detroit Public Library Main Branch - would like Presentations:

Thursday mornings camp: 10:30 AM

Saturdays open 10AM-6PM

Contact: Jennifer Dye jdye@detroitpubliclibrary.org. (734) 846-6266.

Volunteers: Jonathan Kade and Dave Bailey

Auburn Hills Public Library - wants presenters or panelists for some astronomical adult programs during Astronomy Week. They also would like the same in June or July

Would also like an Astrophotography lecture/panel: any Tuesday evening mid-June to July OR Saturday, July 6 afternoon OR Monday July 15 afternoon

Contact: Victoria Phelps reference@auburn-hills.lib.mi.us

MacDonald Public Library, New Baltimore - wants an individual or small group to lead an astronomy program geared toward teens and adults.

July 1 - evening, July 3, 5, 6 - all day / evening

Mon / Wed / Fri / Sat in July; July 20 open.

Contact: Maria Gardella gardellm@libcoop.net. (586) 725-0273

Volunteers: Jonathan Kade, Dave Bailey, Bob Berta, Angelo DiDonato

After-hours stargazing at Southfield Public Library

Thursday, August 1, 2019, 9:30 - 11:30pm

Contact: Katie Rothley krothley@southfieldlibrary.org
(248)796-4380

Volunteers: Jonathan Kade

Detroit Public Library - Hubbard Branch

Thur. Aug. 1, 9:30 PM

Wants an astronomy program for 8-13 year olds

Contact: Mary Masasabi mmasasabi@detroitpubliclibrary.org (313) 481-1752

Hobby Day at Crosswinds Marsh

Saturday, August 10th, 9:00 am-1:00 pm

Sumpter Township
Brenna Van Schoick Bvanschoick@waynecounty.com
(734) 654-1223
Volunteers: Diane Hall [[Google Calendar](#)]

Camp-out at Chesterfield Pollard Park

Friday Aug. 23 6:30 PM - Sat. Morning
The evening will include storytelling, sports games, s'mores stations, a flashlight night hike, and more.
Contact: Michele Vannerson mvannerson@chesterfieldtwp.org (586) 949-0400, ext. 6450 [[Google Calendar](#)]

Member Spotlight

Angelo DiDonato & Bob Berta did STEM program for entire high school and teachers on April 18th to an audience of about 90 people.

Mark Kedzior gave a 67 minute presentation, "Getting Started in Astronomy" to approximately 21 patrons at the **Harrison Township Library** on April 10th. The presentation was well received. I had 96 slides in my presentation, covering types of telescopes, images of objects through scopes, iPhone Astronomy/photography with astronomy apps and smartphone adapters (that was a hit!), and night skies of April and Spring/Summer celestial objects of interest.

Mark is continuing to work with the **Chesterfield Township Library** about their **Telescope Loaner Program**. The Library has been awarded a grant to initiate the **Library Telescope Program**. They will be purchasing two (2) Orion StarBlast 4.5" Dob reflectors and the associated modification items to ready them for their patrons to check out. Once items are received, the modification process will take place. On **Tuesday, June 18th at 6 PM**, the Chesterfield Township Library will have a launch of their Library Telescope Loaner Program, where the program, operation of the telescope and the process the patrons will follow on how to check out a telescope from the library will be presented.

Mark will be doing my **Grosse Pointe Woods Library** Telescope Class/ Night Skies of May presentation tonight, May 1st, at 6:30 PM.

Also at the Chesterfield Township Library, there will also be two "Night Skies of the Month" presentations beginning at **6 PM** on **Wednesday, July 17th**, and **Tuesday, August 20th**.

Diane Hall and Jonathan Kade have been doing a lot of outreach with the **Henry Ford Centennial Library** on recent Wednesday nights, and are looking at scheduling some future dates there.

Diane Hall and Jonathan Kade attended the **2019 FIRST® Championship** event at Beacon Park in Detroit, Friday April 26th at 7pm. Diane reports: It was a fun event; the park turned off its signature lights until 10:30 and we were able to show people Mars, colored stars, double stars, and star clusters. The position of the sun relative to buildings prevented solar observing but we were able to show people elements of Detroit architecture until sundown, which they enjoyed. The thousands of people predicted didn't materialize but we had many dozens of people come through.

Bob & Connie Trembley - For their last after-school club session of the year, their students got to experience a virtual reality fly-through of the Milky Way galaxy in [OVERVIEW VR](#); all the students were amazed!

Connie Trembley was awarded **2019 Teacher of the Year** for her school district! Connie teaches middle-school science in New Haven, Michigan - she is a [volunteer NASA/JPL Solar System Ambassador](#), and has an [asteroid](#) named after her.

Gary Ross wins the award for fastest turn-around on an [outreach email I sent out](#). Gary will be presenting at the [Royal Oak Elk's Club](#), Thur. May 16, 2019 at 11:30 AM.

Providing a List of our Outreach Presenters & Presentations to Libraries

Ken Bertin asked that I sent info on his latest lecture to libraries; I can do this for ALL our outreach team and their presentations! Get me a presentation name, description and audience age of your presentation, and I'll keep a Google Doc we can share with libraries, or anyone...

Adding Your Name to the list of WAS Outreach Volunteers

W.A.S. outreach volunteers receive periodic mailings about event requests; if you would like your name added to our list of volunteers, please contact Bob Trembley at outreach@warrenastro.org

- Bob Trembley

[Blogger and Technology Support for the Vatican Observatory Foundation](#)

[2019 Outreach Officer for the Warren Astronomical Society](#)
[Volunteer NASA/JPL Solar System Ambassador](#)
[Volunteer OSIRIS-REx Mission Ambassador](#)



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.

Meeting Minutes

BOARD MEETING – April 1st

Members present; Jeff MacLeod, Jonathan Kade, Bob Trembley, David Baranski, Dale Partin, Joe Tocco and Jerry Voorheis.

The meeting was called to order by Jeff MacLeod at: 6:41 PM

Officer's reports

Jeff MacLeod gave the President's report. The discussion group at Wayne State Planetarium was good with 7 people.

Jonathan Kade gave the 1st Vice President's report. The speaker schedule is full to August.

David Baranski gave the 2nd Vice President's report. He talked about a new Stargate dome and progress on the inventory. The open house was good with about 50 people.

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

Outreach – Bob Trembley needs help with many opportunities, He reported many library requests and on State Wide Astronomy Night.

Publications – Dale Partin reported that the WASP is out.

Old Business

Discussion about the WAS Cranbrook Library move. The WAS survey was discussed

New Business.

There was a discussion of buying a solar telescope and a projector for outreach.

A motion was made by Bob Trembley with 2nd by Dale Partin to buy second projector for \$330.00 or less. The motion passed

The meeting adjourned at: 7:27 PM

CRANBROOK MEETING – April 1st

Meeting called to order at 7:31 PM by Jeff MacLeod, President.

Roll call.

30 persons were present.

Jeff MacLeod gave the President's report. He reported on the Ford Club's swap, on the discussion group at the Wayne State Planetarium and on an upcoming lecture about gravity waves at Wayne State University.

Ken Bertin presented In the News and In the Sky.

Jonathan Kade gave the 1st Vice President's report. The presentation schedule is full for the first half of the year.

David Baranski gave the 2nd Vice President's report: The Open House had excellent skies, 10-15 telescopes, and

50 plus people. Stargate will be open for State Wide Astronomy Night April 12th. The next regular Open House will be April 27th. 60 items were inventoried in the observatory.

The Treasurer's report is in the WASP.

The Secretary's report: The minutes are in the WASP.

Bob Trembley gave the Outreach report. He reported on many events this summer.

Dr. Dale Partin reported that the WASP is up. He reported that the MCC campus would be closed for spring break for the next Macomb WAS meeting and that we would return to Building E instead of the Library.

The next discussion group will be hosted by Gary Ross on April 23.

Bob Trembley spoke about GLAAC.

Jonathan Kade reported that Astro League memberships were open, and that merchandise was available for sale.

Observing reports: the moon and Venus. Cranbrook Observatory will be open Friday and Saturday nights

The Short Presentation was given by Jeff MacLeod - "Things Flat Earthers Have Told Me".

Snack/Break Time.

The Long Presentation was given by Ken Bertin - "The Astronomical Cartoons of Fleischer Studios".

Meeting was adjourned at 10:01 PM.

MACOMB MEETING – April 18th

Meeting called to order at 7:32 PM by Jeff MacLeod, President.

Roll call.

26 persons were present.

Jeff MacLeod gave the President's Report He spoke about rock climbing.

Jeff MacLeod gave the 1st Vice President's report. Upcoming presentations

Jeff MacLeod gave the 2nd Vice President's report. The next Open House will be April 22nd.

Jeff MacLeod gave the Treasurer's report

(Continued on page 22)



**Club Member
Name Tags**

Email publications@warrenastro.org for your personalized name tag

(Continued from page 21)

The Secretary's report is in the WASP.
Jeff MacLeod gave the Outreach report. Bob Trembley needs help for many requests.
Jeff MacLeod gave the publications report: the WASP is online.
Ken Bertin presented In the News and In the Sky.
Snack/Break Time.
A video was shown about the first images of the accretion disk around a black hole.
The Main Presentation was by Bob Trembley - "The Apollo Program and Its Legacy"
Meeting was adjourned at 9:30 PM.

Jerry Voorheis
Secretary



Apollo 10 Liftoff (NASA)

Treasurer's Report

Treasurer's Report for 4/30/2019

MEMBERSHIP

We have 87 current members

INCOME AND EXPENDITURES (SUMMARY)

We took in \$1878 and spent/transferred \$111 We have \$21858 in the bank \$74 in checks and \$665 in cash, totaling \$22,597 as of 4/30/2019.

INCOME

\$1,397	Memberships/renewals
\$30	Astronomical League
\$111	Snacks
\$165	Calendars
\$21	Paul Strong Scholarship

EXPENSES

\$111 Snacks / Supplies

Note: \$80 PO Box Fee 2019 & \$90 Meetup Fees 2019 were removed from the ledger until I am able to reimburse the officers that made those payments.

GLAAC REPORT 4/30/2019

Beginning Balance: \$5,581.52

INCOME

\$600	donation from UofM
\$50	payment from SLAARC for table rental

EXPENSES

No activity

Ending Balance: \$5,581.52

Note: The balance was revised to reflect payment of \$480 on a stop order / reissued check for A2TB 2017.

Mark Jakubisin
Treasurer 2019

Join the Astronomical League!



The mission of the Astronomical League is to promote the science of Astronomy. The major benefit of belonging to this organization is receiving the quarterly newsletter, The Reflector, which keeps you in touch with amateur activities all over the country.

Also:

- Participate in the Observing Program
- Avail yourself of the League Store
- Astronomy Books at a discount
- Attend Astronomical League Conventions

Only \$7.50 annually,
(beginning July 1)

alcor@warrenastro.org

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
Astronomy Club at Eastern Michigan University	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
Farmington Community Stargazers	Farmington Hills	Members: Last Tuesday of the month Public observing: 2nd Tuesday of the month
Ford Amateur Astronomy Club	Dearborn	Fourth Thursday of every month (except November and December) at 7:00 PM
Oakland Astronomy Club	Rochester	Second Sunday of every month (except May)
Seven Ponds Astronomy Club	Dryden	Monthly: generally the Saturday closest to new Moon
Sunset Astronomical Society	Bay City/Delta College Planetarium	Second Friday of every month
University Lowbrow Astronomers	Ann Arbor	Third Friday of every month
Warren Astronomical Society	Bloomfield Hills/ Cranbrook & Warren/ MCC	First Monday & third Thursday of every month 7:30 PM

GLAAC Club and Society Newsletters

Warren Astronomical Society: <http://www.warrenastro.org/was/newsletter/>
 Oakland Astronomy Club: <http://oaklandastronomy.net/newsletters/oacnews.html>
 Ford Amateur Astronomy Club: <http://www.fordastronomyclub.com/starstuff/index.html>
 Sunset Astronomical Society: <http://www.sunsetastronomicalsociety.com/>
 University Lowbrow Astronomers: <http://www.umich.edu/~lowbrows/reflections/>

WAS Member Websites

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

Doug Bock: <https://boonhill.org>
 Facebook: Northern Cross Observatory <https://www.facebook.com/NorthernCrossObservatory>
 Boon Hill and NCO Discussion <https://www.facebook.com/groups/369811479741758>
 YouTube channel: <https://www.youtube.com/channel/UC-gG8v41t39oc-bL0TgPS6w>



This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

Watching the Late Spring Skies

By David Prosper

Late spring brings warmer nights, making it more comfortable to observe a good showing of the **Eta Aquarids** meteor shower. Skywatchers can also look for the delicate **Coma Star Cluster**, and spot the **Moon** on the anniversary of **Apollo 10's** "test run" prior to the Moon landing in 1969.

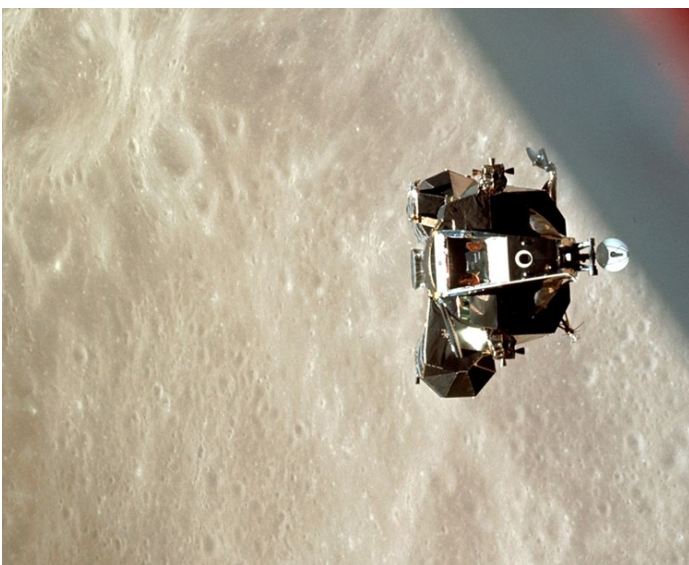
The **Eta Aquarids** meteor shower should make a good showing this year, peaking the morning of May 6. This meteor shower has an unusual "soft peak," meaning that many meteors can be spotted several days before and after the 6th; many may find it convenient to schedule meteor watching for the weekend, a night or two before the peak. You may be able to spot a couple dozen meteors an hour from areas with clear dark skies. Meteors can appear in any part of the sky and you don't need any special equipment to view them; just find an area away from lights, lie down on a comfy lawn chair or blanket, relax, and patiently look up. These brief bright streaks are caused by Earth moving through the stream of fine dust particles left by the passage of Comet Halley. While we have to wait another 43 years for the famous comet grace our skies once more, we are treated to this beautiful cosmic postcard every year.

While you're up meteor watching, try to find a delightful

naked eye star cluster: the **Coma Star Cluster** (aka Melotte 111) in the small constellation of Coma Berenices. It can be spotted after sunset in the east and for almost the entire night during the month of May. Look for it inside the area of the sky roughly framed between the constellations of Leo, Boötes, and Ursa Major. The cluster's sparkly members are also known as "Berenice's Hair" in honor of Egyptian Queen Berenices II's sacrifice of her lovely tresses. Binoculars will bring out even more stars in this large young cluster.

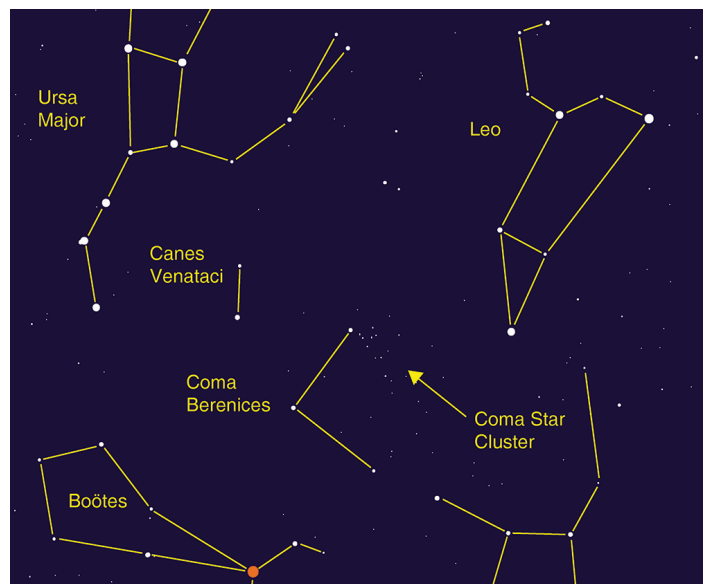
May marks the 50th anniversary of the Lunar Module's test run by the **Apollo 10** mission! On May 22, 1969, NASA astronauts Thomas Safford and Eugene Cernan piloted the Lunar Module - nicknamed "Snoopy" - on a test descent towards the lunar surface. Undocking from "Charlie Brown" - the Command Module, piloted by John Young - they descended to 47,400 feet above the surface of the Moon before returning safely to the orbiting Command Module. Their success paved the way for the first humans to land on the Moon later that year with Apollo 11. Look for the Moon on the morning of May 22, before or after dawn, and contemplate what it must have felt like to hover mere miles above the lunar surface. You'll also see the bright giant planets Saturn and Jupiter on either side of the Moon before sunrise. When will humans travel to those distant worlds?

You can catch up on all of NASA's current and future missions at nasa.gov



A view of Apollo 10's Lunar Module from the Command Module as it returned from maneuvers above the lunar surface.

Photo Credit: NASA Source: <http://bit.ly/apollo10view>



Try to spot the Coma Star Cluster! Image created with assistance from Stellarium