

# The Eyepiece



## Seahawk Star Parties

- May 20th
- Sept 16th
- Oct 14th
- Nov 11th
- Dec 16th

[Click here for more info](#)



**Editor - Mike Jensen**

Hi Everyone!

This month's news letter is a bit shorter than most months. This for several reasons. Well, er, I did it again! I had my other knee replaced on April 19th and despite a few obstacles post surgery, I am on the mend! I created much of the newsletter before my surgery and then have been piece mealing it (20 minutes at a time) to get it finished.

Ok, so I mentioned two reasons it's a bit shorter. The second reason is clouds! Yes clouds, darnit. Every month I send out the call to our astrophotographers for images to fill the pages of our newsletter

and usually we're rewarded with a dozen or so. But to quote Linwood "My poor OTA has been inside so long it's covered in dust, nothing new from me." So, blame it on the clouds.

For June my intention is to do another Milky Way issue so start looking through your Milky Way images.

Also, look for an email from Eva our Social/Membership Director on possible pre meeting dinner.

We've got a great speaker set up for May (the) 4th. Michael Corvese will be speaking on Where the Moon Came From?

In June, Dr. Desika Narayanan, Assoc Prof. Astronomy, University of Florida. speaks on Forming the Brightest Galaxies in the Universe.

July is still being worked out, but rest assured it will be hot as a firecracker!

**SW FL Astronomical Society, Inc.**  
**3236 Forum Blvd #1160**  
**Fort Myers, FL 33905**

## MAY 2023

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## Club Officers & Positions

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## Monthly Meetings

Our monthly meetings are held on the **first Thursday of each month.**  
**The meetings begin at 7:00pm.**

***Each meeting is usually a combined live and Zoom meeting.***

The in person meeting is held at:  
Calusa Nature Center/Planetarium  
3450 Ortiz Ave,  
Fort Myers, FL 33905

Each meeting will have the same  
Zoom link/meeting ID.

Below are the dates for the next six  
meetings of 2023:

May 4, 2023  
June 1, 2023  
July 6, 2023  
August 3, 2023  
Sept. 7, 2023

Link to join Zoom meeting:  
<https://widener.zoom.us/j/98623448643>

Meeting ID: 986 2344 8643

One tap mobile:  
+13052241968,,98623448643#  
US (or)  
+13126266799,,98623448643#  
US

## Observing Program Dates

Below are the schedules for our Fri-  
day public nights at the FSW Ob-  
servatory (3rd Friday of the month)  
and the Saturday Solar Observing  
events (1st Saturday of the month)  
at county parks.

### FSW Observatory

5-19-23

### **Solar Observing/Park**

5-6-23 / Bayshore Live Oak



## Pre-Meeting Dinner 5pm May 4th

If you are a paid member, you will  
be on the email list for notification  
as to the restaurant we will be vis-  
iting for our pre meeting dinner.

Two months ago we met for the  
first time for a pre-meeting dinner.  
It was success, we were 15 and so  
engaged in our stories and con-  
versations that we almost forgot to  
attend the meeting. Many mem-  
bers asked whether we will turn  
this into a tradition, hence we are  
announcing that we will meet for  
a pre-meeting dinner at the Texas  
Roadhouse in Fort Myers on the  
04/06/2023 (Thursday) at 5pm. Eva  
will take care of the reservation,  
so please send her your RSVP to  
[af@avafrank.com](mailto:af@avafrank.com) latest this Friday  
03/31/2023. Eva will send you a  
separate email with more instruc-  
tions.

## President's Report

Its hard to believe its almost summer.

We had a good night out at Seahawk park on the 22nd. Unfortunately, we only had a half dozen people show up. Some were new members or prospects. Joe Dermody came out, his last event for this season before heading north.

We have a another star parties planned for May at Seahawk park on the 20th, then we take a break for the summer.

There will be another FSW observing night on Friday May 19th. There will also be a Solar Observing event on Saturday May 6th at Bayshore Live Oak park. These are the last events for the season.

Our program for this month is Where did the Moon Come From? by Michael Corvese.

**Have you paid your 2023 Membership dues? Only \$25 for great programs, great fellowship, observing and imaging advice and much much more!**

[Click here to pay online!](#)

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## GUEST SPEAKER PRESENTATIONS SERIES

We are excited to announce the initiation of the new "SWFAS Guest Speaker Presentations" series of talks. These will cover astronomical science and space exploration along with practical astronomy and astrophotography talks by various subject matter experts. We are lining up prominent scientists and researchers to explain the science and technology behind the exciting discoveries being made in recent years in astronomy.

The following presentations are already scheduled and we will be firming up talks in 2023 on a month-to-month basis.:

May 4, 2023

Michael Corvese -  
Where Did The Moon Come From?

June 1, 2023

Dr. Desika Narayanan, Assoc Prof. Astronomy, University of Florida. Forming the Brightest Galaxies in the Universe.

### May 4, 2023



**Michael Corvese -**  
Where Did The Moon Come From?



## NEAF/NEAIC 2023 Report

By Don Bishop



This past April, I had the pleasure to fly up to Suffern, New York to attend the 32nd annual Northeast Astronomy Forum commonly known as NEAF. Sponsored by the Rockland Astronomy Club, it is a two day symposium featuring talks by folks who are eminent in the fields of space and astronomy and a field house full of astro gear vendors displaying their offerings. After a three year hiatus due to covid restrictions it was held again this year and I felt like it would be a great opportunity to see a vast array of astronomy equipment first hand and talk to the experts.

Leading up to the weekend NEAF event was the two day Northeast Astro Imaging Conference known as NEAIC. This was held at a nearby hotel and consisted of three different lecture rooms with a number of speakers and topics to choose from. There were software developers who did deep dives into their products and equipment vendors who discussed their offerings and premiered their latest products. Along with this were fellow astrophotographers who discussed their particular specialties and explained how they did it. An added bonus was available during the half hour breaks between seminars and throughout the day. Vendors who catered to astrophotography set up their equipment in an adjacent hall and we could wander through there to see and handle the equipment. The engineers, designers and experts were available to answer questions and explain how their products worked. ZWO had a number of new releases including cameras, mounts and telescopes that generated a lot of interest among the attendees. On Thursday evening, I attended a workshop conducted by the NINA software contributor Dale Ghent who discussed his advanced sequencer logic and walked through its features. On Friday evening I went to another workshop put on by George Hilios who developed the NINA plug-in called Hocus Focus that is used for automated focus and can perform detailed analyses on the images.

On Saturday I went to the nearby Rockland Community College where the main exhibition was held in their field house. We entered in via a balcony that overlooked the floor and it was quite a sight! It seemed like every vendor involved in the field of astronomy was represented there. NEAF has been described as the enthusiast's shopping MECCA for their astronomy gear needs and it didn't disappoint. Besides all of the expected companies, there were niche vendors who offered specialty products that fill a particular need. There were a number of new product introductions to be seen. Discounts and special deals were available that only happen during NEAF. The booths were staffed by owners, engineers and experts who were happy to discuss their products. I found it to be a very educational experience. Throughout the day there were a number of talks by former astronauts, scientists, NASA directors and other experts in the field of Astronomy. Being my first time there, I ended up spending all of my time in the exhibition hall and didn't get a chance to hear any of the talks. I guess that will be my excuse to go back another time.

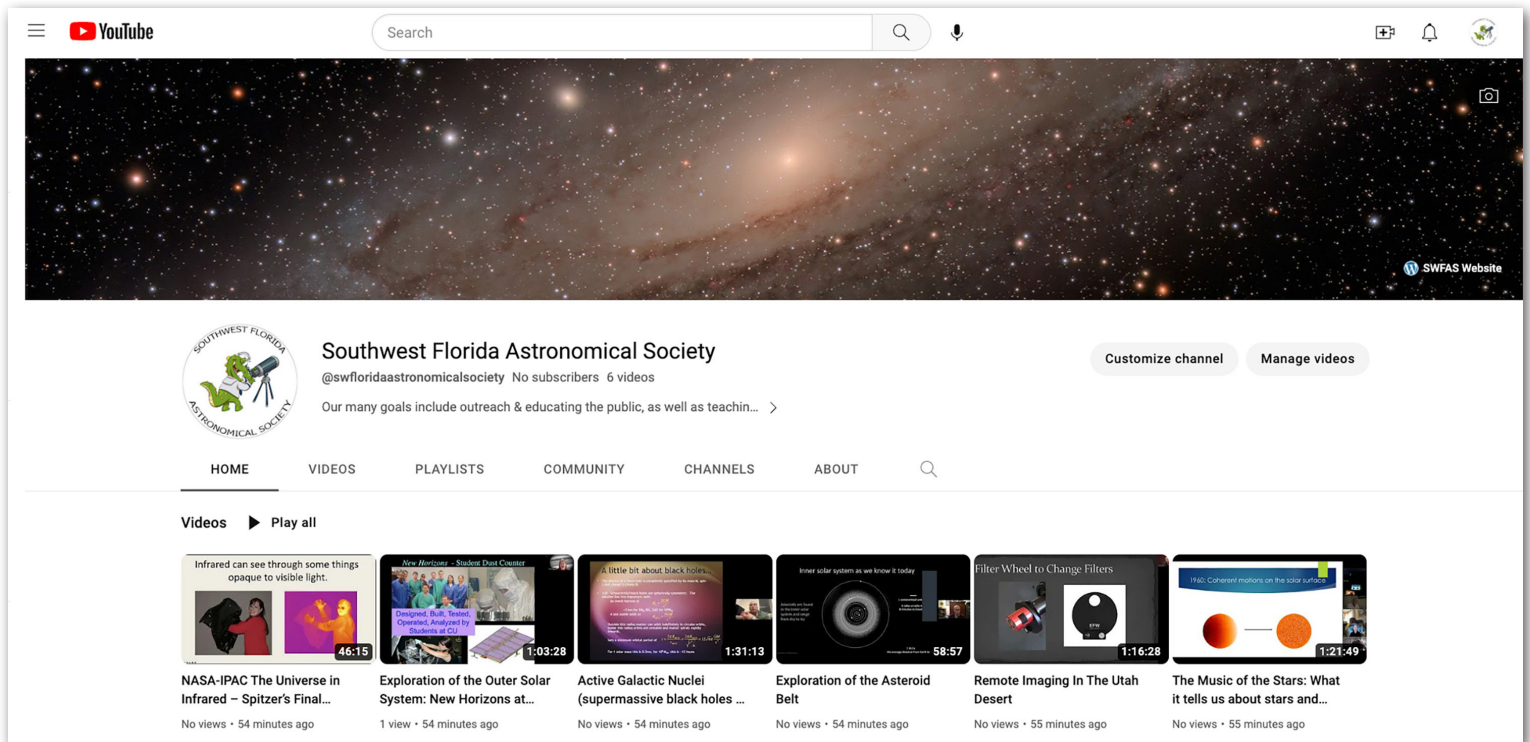








## We're On YouTube



The SWFAS is now on YouTube! Here's the link: [https://www.youtube.com/channel/UC5nvFAOKfX\\_07dAR-datzRYQ](https://www.youtube.com/channel/UC5nvFAOKfX_07dAR-datzRYQ) The channel was created mostly for the purpose of making our Speaker Series available to those who may have missed the lectures or may want to re-watch them. If other purposes come up, we'll evaluate them for broadcast on the channel.

## Future Spaceships Will Travel At 1 Million MPH

Two highly promising concepts are being funded by the NASA Institute for Advanced Concepts (NIAC). In terms of ISP and power levels, the new ion drives could have been five times better.

The development of multi-megawatt ion engines and antimatter propulsion is ongoing.

Voyager 1 is travelling at a speed of 38,000 mph (61,000 km/h). Both a gravitational slingshot and a chemical rocket were mostly used to accomplish this. Using gravitational boosts, the Juno, Helios I, and Helios II spacecraft attained speeds in the 150,000 mph range. The Sun's gravity will let the recently launched Parker Solar Probe travel

at 430,000 miles per hour.

Gravitational acceleration can increase the speed of a spacecraft by many times. However, using the gravity of Jupiter and the Sun to get more speed waste a lot of time. The spacecraft take many months to go around the Sun and get speed before starting the real mission.

Refueling a large rocket like the SpaceX BFR can produce surprisingly good trip times to Mars. Multiple orbital refueling of the SpaceX BFR at a high orbit can maximize the speed of the BFR. A fully fueled SpaceX BFR would shorten the one-way trip to Mars to as little as 40 days. A parabolic orbit would be used instead of a Hohmann

transfer.

Space Missions to Mars have been small spacecraft. The entire mission was launched from Earth. This means most of the fuel was used to get the system off of the Earth. The final stage is tiny and slow. By refueling the SpaceX BFR in orbit, it is possible for a large chemically powered space mission with up to 10.0 kilometer per second Delta-V. This is about 100 hundred times larger than prior Earth to Mars missions and three times faster.

[Click this link for more info, pics and video.](#)

# BACK TO THE FUTURE

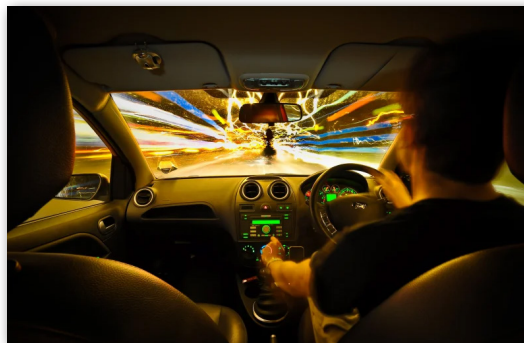
## What is Time Dilation?

### Would you really age more slowly on a spaceship at close to light speed?

Time dilation is a concept that pops up in lots of sci-fi, including Orson Scott Card's *Ender's Game*, where one character ages only eight years in space while 50 years pass on Earth. This is precisely the scenario outlined in the famous thought experiment the Twin Paradox: an astronaut with an identical twin at mission control makes a journey into space on a high-speed rocket and returns home to find that the twin has aged faster.

Time dilation goes back to Einstein's theory of special relativity, which teaches us that motion through space actually creates alterations in the flow of time. The faster you move through the three dimensions that define physical space, the more slowly you're moving through the fourth dimension, time—at least relative to another object. Time is measured differently for the twin who moved through space and the twin who stayed on Earth. The clock in motion will tick more slowly than the clocks we're watching on Earth. If you're able to travel near the speed of light, the effects are much more pronounced.

Unlike the Twin Paradox, time dilation isn't a thought experiment or a hypothetical concept—it's real. The 1971 Hafele-Keating experiments proved as much, when two atomic clocks were flown on planes traveling in opposite directions. The relative motion actually had a measurable impact and created a time



difference between the two clocks. This has also been confirmed in other physics experiments (e.g., fast-moving muon particles take longer to decay).

So in your question, an astronaut returning from a space journey at "relativistic speeds" (where the effects of relativity start to manifest—generally at least one-tenth the speed of light) would, upon return, be younger than same-age

friends and family who stayed on Earth. Exactly how much younger depends on exactly how fast the spacecraft had been moving and accelerating, so it's not something we can readily answer. But if you're trying to reach an exoplanet 10 to 50 light-years away and still make it home before you yourself die of old age, you'd have to be moving at close to light speed.

There's another wrinkle here worth mentioning: time dilation as a result of gravitational effects. You might have seen Christopher Nolan's movie *Interstellar*, where the close proximity of a black hole causes time on another planet to slow down tremendously (one hour on that planet is seven Earth years).

This form of time dilation is also real, and it's because in Einstein's theory of general relativity, gravity can bend spacetime, and therefore time itself. The closer the clock is to the source of gravitation, the slower time passes; the farther away the clock is from gravity, the faster time will pass. (We can save the details of that explanation for a future *Airlock*.)

## The Astronomical League Report



### The Astronomical League

As a member of the Southwest Florida Astronomical Society you are automatically also a member of the Astronomical League, a nationwide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you including receipt of The Reflector, the AL's quarterly newsletter, use of the Book Service, through which you can buy astronomy related books at a 10% discount. You can also participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others. To learn more about the Astronomical League and its benefits for you, visit <http://www.astroleague.org>

### Reflector Magazine

You should have received an email from the Astronomical League allowing you to download your latest quarterly digital copy of the Reflector magazine on around March 19. It is also available via the web at <https://www.astroleague.org/reflector>

### ALCON 2023

The ALCON conference for 2023 will be held July 26 – 29 in Baton Rouge, LA. Details are available at: [What's Up with the Astro League March 2023 | The Astronomical League](#)



### Monthly highlight of the Astronomical League Observing Programs

(Article prepared by SWFAS Astronomical League Coordinator John MacLean)

### Foundations of Imaging Observing Program

This month our focus is on one of the newest of the League's Observing Programs with an overview of the Imaging Observing Program: Foundations of Imaging Observing Program | The Astronomical League ([astroleague.org](http://astroleague.org))

Amateur astronomers take images for three main purposes or objectives:

- To create Artistic images (non-linear data),
- To aid in Observing things that are beyond the range of the human eye (linear or nonlinear data),
- To collect Scientific Data that extends the bounds of astronomical knowledge (linear data).

The Fundamentals of Imaging Program is designed to give the participant a chance to experience all three of these different purposes with a wide range of targets.

### Imaging Targets

Participants have an opportunity for exploring a wide range of targets covering the following:



- Constellations & Asterisms
- Nightscapes (e.g. Milky Way)
- Meteors
- Lunar & Solar
- Stars (binary, variable, nova)
- Planets
- Deep Sky
- Comets & asteroids
- Eclipses & Occultations

### Equipment

Ranges from DSLR with wide field optics to dedicated CCD/CMOS astrophotography cameras mounted utilizing tracked and guided mounts.

### Imaging Activities

Solar System (Minimum of 27 images required)

Imaging examples include:

- Entire solar disk including sunspots (white light or hydrogen-alpha filters)
- Any seven of the lunar features covered in the Lunar or Lunar II program
- Two of Saturn, Mars, Venus
- Jupiter including the GRS
- Jupiter including an occultation
- Dwarf planets Pluto and Ceres twice over a 1-2 month period
- A comet over 1 – 2 nights
- Additional optional targets include solar and lunar eclipses, nightscapes, lunar occultations

### Deep Sky Objects (Minimum 25 images)

- Must include at least two of the following types:
  - o Open Clusters
  - o Globular Clusters
  - o Dark Nebulae
  - o Galaxies
- Bright Nebulae to include at least one of the following:
  - o Star forming regions
  - o Reflection nebulae
  - o Planetary nebulae
  - o Supernova remnants
- Must include both M42 and M31. M42 must include the Trapezium not overexposed along with associated wispy nebulosity. M31 must clearly show the dust lanes, proper color, and a not-overblown core.
- Optional targets include 5 double-stars from the Double Star Program where the separation angles must be measured, 2 Variable stars from the AAVSO index using photometry to measure brightness over time.

### Imaging Criteria

Include:

- In-focus, round stars with no excessive bloat
- No distracting artifacts including noise, bloat, highlight clipping, collimation errors, etc.
- Accurate colors as allowed by the equipment and be free of gradients
- Use of tools like eXcalibrator, G2V, and the Pixinsight Photometric Calibration Tool is encouraged

## Amazing Webb Image of a Ringed World

Following in the footsteps of the Neptune image released in 2022, NASA's James Webb Space Telescope has taken a stunning image of the solar system's other ice giant, the planet Uranus. The new image features dramatic rings as well as bright features in the planet's atmosphere. The Webb data demonstrates the observatory's unprecedented sensitivity for the faintest dusty rings, which have only ever been imaged by two other facilities: the Voyager 2 spacecraft as it flew past the planet in 1986, and the Keck Observatory with advanced adaptive optics.

The seventh planet from the Sun, Uranus is unique: It rotates on its side, at roughly a 90-degree angle from the plane of its orbit. This causes extreme seasons since the planet's poles experience many years of constant sunlight followed by an equal number of years of complete darkness. (Uranus takes 84 years to orbit the Sun.) Currently, it is late spring for the northern pole, which is visible here; Uranus' northern summer will be in 2028. In contrast, when Voyager 2 visited Uranus it was summer at the south pole. The south pole is now on the 'dark side' of the planet, out of view and facing the darkness of space.

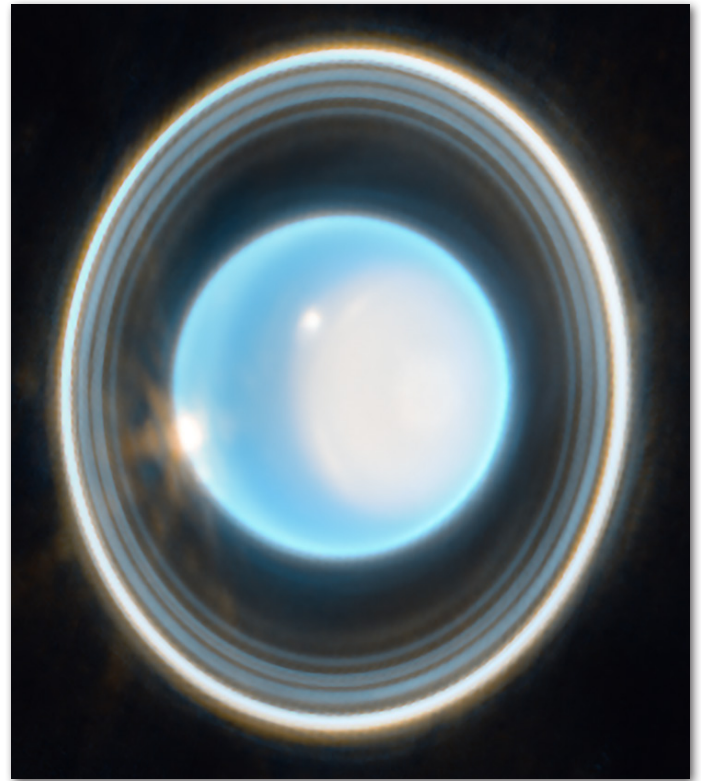
This infrared image from Webb's Near-Infrared Camera (NIRCam) combines data from two filters at 1.4 and 3.0 microns, which are shown here in blue and orange, respectively. The planet displays a blue hue in the resulting representative-color image.

When Voyager 2 looked at Uranus, its camera showed an almost featureless blue-green ball in visible wavelengths. With the infrared wavelengths and extra sensitivity of Webb we see more detail, showing how dynamic the atmosphere of Uranus really is.

On the right side of the planet there's an area of brightening at the pole facing the Sun, known as a polar cap. This polar cap is unique to Uranus – it seems to appear when the pole enters direct sunlight in the summer and vanish in the fall; these Webb data will help scientists understand the currently mysterious mechanism. Webb revealed a surprising aspect of the polar cap: a subtle enhanced brightening at the center of the cap. The sensitivity and longer wavelengths of Webb's NIRCam may be why we can see this enhanced Uranus polar feature when it has not been seen as clearly with other powerful telescopes like the Hubble Space Telescope and Keck Observatory.

At the edge of the polar cap lies a bright cloud as well as a few fainter extended features just beyond the cap's edge, and a second very bright cloud is seen at the planet's left limb. Such clouds are typical for Uranus in infrared wavelengths, and likely are connected to storm activity.

This planet is characterized as an ice giant due to the chemical make-up of its interior. Most of its mass is thought to be a hot, dense fluid of "icy" materials – water, methane, and ammonia – above a small rocky core.



This zoomed-in image of Uranus, captured by Webb's Near-Infrared Camera (NIRCam) Feb. 6, 2023, reveals stunning views of the planet's rings. The planet displays a blue hue in this representative-color image, made by combining data from two filters (F140M, F300M) at 1.4 and 3.0 microns, which are shown here as blue and orange, respectively

Credits: NASA, ESA, CSA, STScI. Image processing: J. DePasquale (STScI)

Download the full-resolution version from the Space Telescope Science Institute.



Uranus has 13 known rings and 11 of them are visible in this Webb image. Some of these rings are so bright with Webb that when they are close together, they appear to merge into a larger ring. Nine are classed as the main rings of the planet, and two are the fainter dusty rings (such as the diffuse zeta ring closest to the planet) that weren't discovered until the 1986 flyby by Voyager 2. Scientists expect that future Webb images of Uranus will reveal the two faint outer rings that were discovered with Hubble during the 2007 ring-plane crossing.

Webb also captured many of Uranus' 27 known moons (most of which are too small and faint to be seen here); the six brightest are identified in the wide-view image. This was only a short, 12-minute exposure image of Uranus with just two filters. It is just the tip of the iceberg of what Webb can do when observing this mysterious planet. In 2022, the National Academies of Sciences, Engineering, and Medicine identified Uranus science as a priority in its 2023-2033 Planetary Science and Astrobiology decadal survey. Additional studies of Uranus are happening now, and more are planned in Webb's first year of science operations.

The James Webb Space Telescope is the world's premier space science observatory. Webb will solve mysteries in our solar system, look beyond to distant worlds around other stars, and probe the mysterious structures and origins of our universe and our place in it. Webb is an international program led by NASA with its partners, ESA (European Space Agency) and the Canadian Space Agency.

## *Webb Captures Galactic Merger*

Shining like a brilliant beacon amidst a sea of galaxies, Arp 220 lights up the night sky in this view from NASA's James Webb Space Telescope. Actually two spiral galaxies in the process of merging, Arp 220 glows brightest in infrared light, making it an ideal target for Webb. It is an ultra-luminous infrared galaxy (ULIRG) with a luminosity of more than a trillion suns. In comparison, our Milky Way galaxy has a much more modest luminosity of about ten billion suns.

Located 250 million light-years away in the constellation of Serpens, the Serpent, Arp 220 is the 220th object in Halton Arp's Atlas of Peculiar Galaxies. It is the nearest ULIRG and the brightest of the three galactic mergers closest to Earth.

The collision of the two spiral galaxies began about 700 million years ago. It sparked an enormous burst of star formation. About 200 huge star clusters reside in a packed, dusty region about 5,000 light-years across (about 5 percent of the Milky Way's diameter). The amount of gas in this tiny region is equal to all of the gas in the entire Milky Way galaxy.

Previous radio telescope observations revealed about 100 supernova remnants in an area of less than 500 light-years. NASA's Hubble Space Telescope uncovered the cores of the parent galaxies 1,200 light-years apart. Each of the cores has a rotating, star-forming ring blasting out the dazzling infrared light so apparent in this Webb view. This glaring light creates diffraction spikes — the starburst feature that dominates this image.

On the outskirts of this merger, Webb reveals faint tidal tails, or material drawn off the galaxies by gravity, represented in blue — evidence of the galactic dance that is occurring. Organic material represented in reddish-orange appears in streams and filaments across Arp 220.



A stunning smash-up of two spiral galaxies shines in infrared with the light of more than a trillion suns. Collectively called Arp 220, the colliding galaxies ignited a tremendous burst of star birth. Each of the combining galactic cores is encircled by a rotating, star-forming ring blasting out the glaring light that Webb captured in infrared. This brilliant light creates a prominent, spiked, starburst feature.

ble

## ABOUT THE ASTRO SIG

*Every month we get together on a Zoom call with a pretty loose agenda and manage to have an absolute blast talking about Astrophotography. I hope you'll join us if you're interested in Astrophotography.*

Join us in April (18th) as we have booked Dr. Mario Motta to give a talk on his work with WD 1145, A research effort over 2 years with the Harvard Cfa team, and we discovered the first white dwarf eating it's planets( others have been found since).

## IMAGING TRIPS TO BIG CYPRESS

Big Cypress National Park is about a 75 minute drive from Ft. Myers and it is probably one of the darkest areas in the state of Florida. We have a great place to set up and frequently meet astrophotographers and observers from other parts of the state.

The best way to stay tuned in to our impromptu field trips is to get on our Astro SIG Google Groups email list. [Contact Mike Jensen.](#)

## Astro Sig Schedule 2023

All Meetings at 6:30pm

May 16th  
June 20th  
July 18th  
August 15th  
September 19th  
October 17th  
November 21st  
December 19th

## The Astrophotography SIG

Our Astro SIG group is really growing in strength. From a meeting perspective, we are small, but our email list is about 40 and of those about 10 consistently contribute images for use on our website and in the newsletter. I truly believe that some of our images are unequalled in quality.

Many of our group are out imaging almost every possible night and reporting the results on our email group.

I am especially proud at the way our group shares lessons learned and methods taken to get the best out of there gear and the best images. Please see our images beginning on the next page.



## ASTRO SIG MEETING ZOOM LINK

<https://us02web.zoom.us/j/81077794455?pwd=eGpxalRET1BPckdEcmt-JQ290WU5jdz09>

Meeting ID: 810 7779 4455  
Passcode: Phot@SIG23

me adjusting my polar alignment for 20min straight so I can expose 0,005 seconds longer







## Astronomy Picture of the Day

By Mike Jensen

If you're not plugged in to the Astronomy Picture of the Day (APOD) you're really missing out. Seriously!

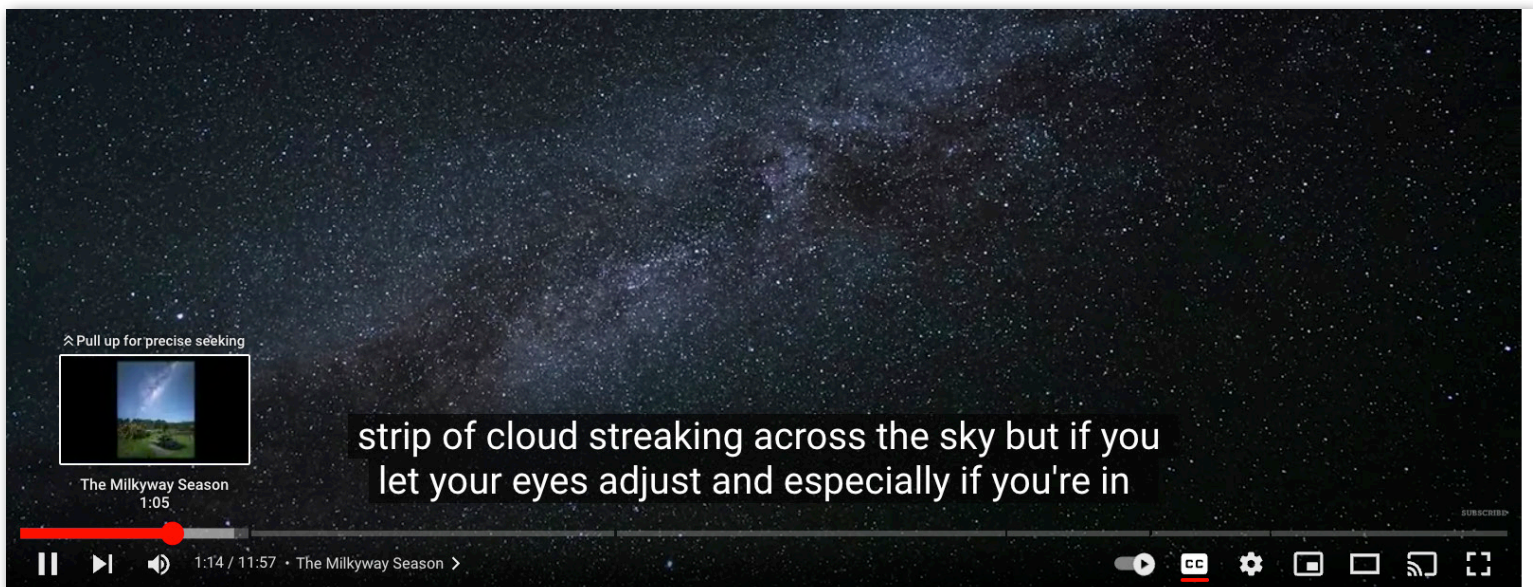
The APOD's are usually pics that are either submitted, or popular on social media, but they are always amazingly stellar (excuse the pun) images.

I get the APOD by email and I usually see it on the APOD Facebook page. I mean look at the screenshot of their webpage on the right. Can you get any more government looking than that webpage?

So, as with all govt. web pages, it takes a bit of learning and rooting around to find the info you need. Here's the main link:

<https://apod.nasa.gov/apod/archivepix.html>

To get on the email list, go to this link: <https://apodemail.org/>



The Milkyway Season | Where to find the milkyway in the night sky



Mike Smith  
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Today I talk about the milkyway season and how it appears throughout the year, when you can see it, in what direction and how you might plan your milkyway night of photography. Astrophotography is a really fun hobby and you can see some amazing things in the night sky. I've seen may shooting stars, long asteroids burning up and the milkyway many times, and it is all because I am in to milkyway astrophotography. Show more

**M81/82 by John Udart**

My first galaxy with the new gear! M81 is a grand design spiral galaxy that forms a physical pair with irregular starburst galaxy M82. They are separated by 150,000 light years in space and are about 12 million light-years away from earth. This image was taken with my William Optics GT71 and has 6 hours (90x240") of integration time at a focal length of 336mm.





### **M 51 Rework with additional data by Mike Jensen**

The cool thing about Astrophotography is that we can add data (images) from session after session to obtain a better and more in depth image. In this image, I took five nights of data from 2022 and another from 2023 and then processed the data in PixInsight (rather than APP) for a new image.

The Whirlpool Galaxy, also known as Messier 51a or NGC 5194, is an interacting grand-design spiral galaxy with a Seyfert 2 active galactic nucleus. It lies in the constellation Canes Venatici, and was the first galaxy to be classified as a spiral galaxy.

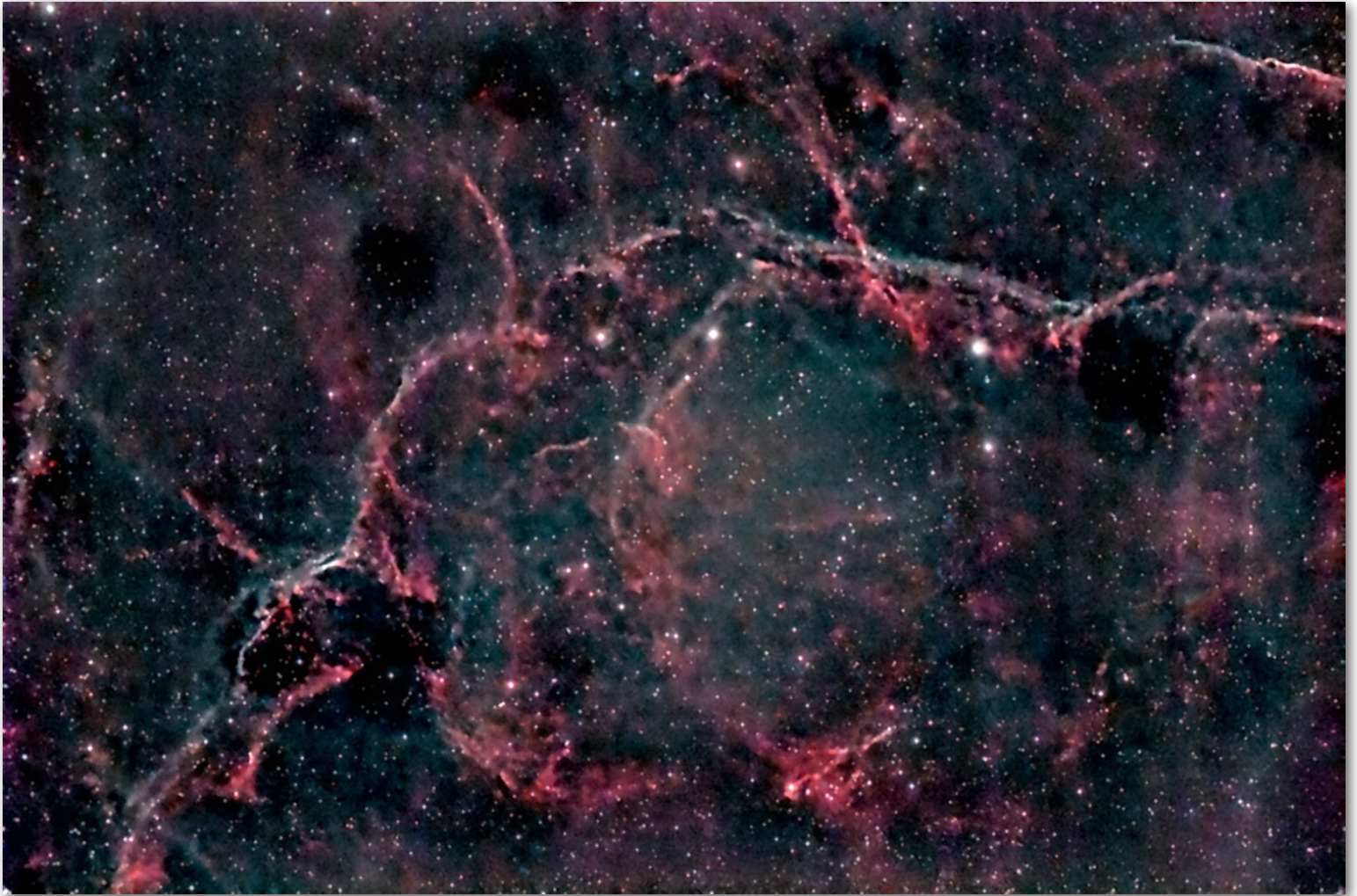
Age: 400.3 million years

Radius: 30,000 light years

Apparent mass: ~160 billion  $M_{\odot}$

Distance to Earth: 23.16 million light years

Stars: 100 billion



### **The GUM 16 Vela Supernova Remnant by Dr. Mario Motta**

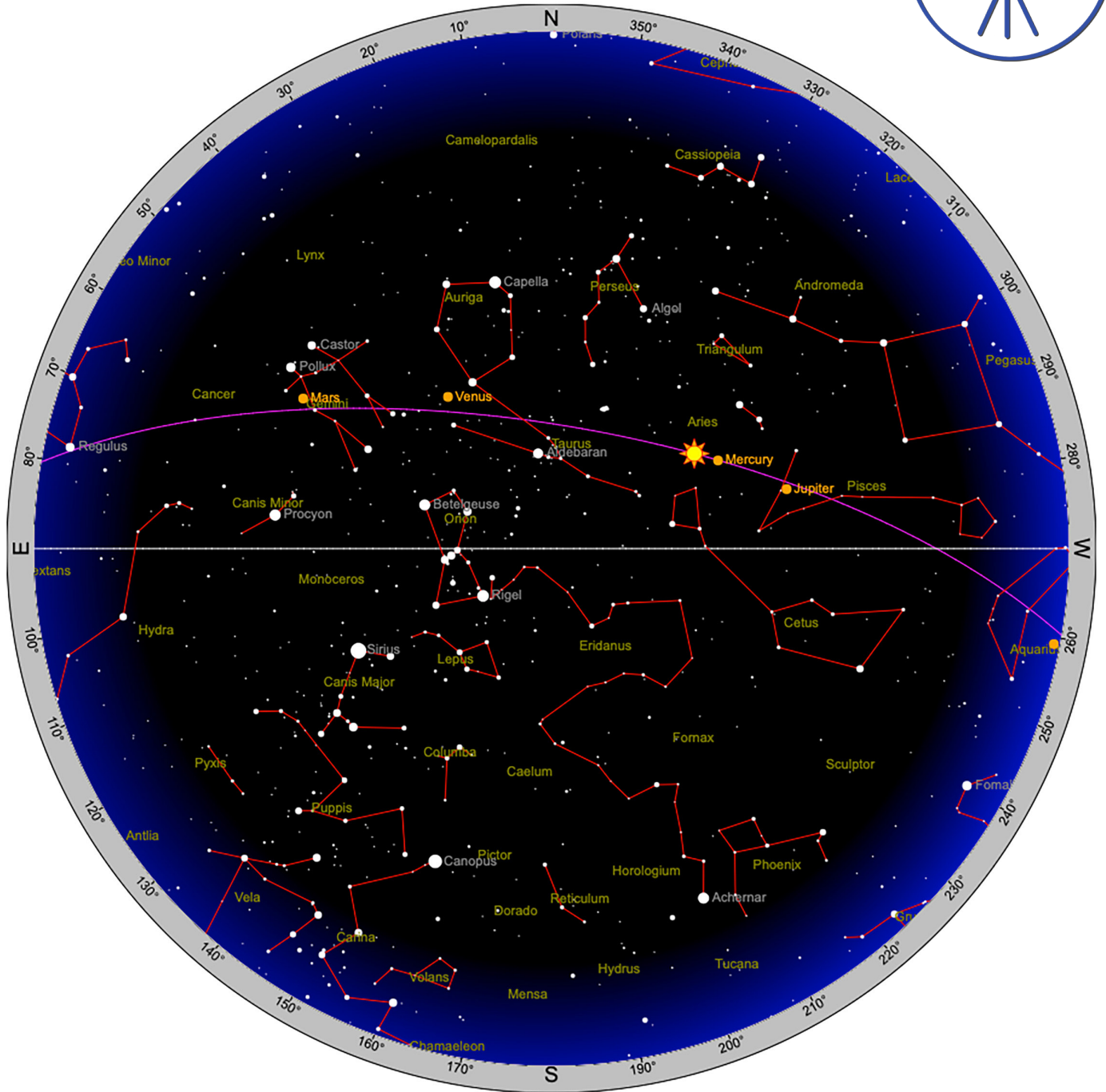
Taken with my smaller scope for widefield (86 mm nighthawk), from Naples with dual band filter and ZWO ASI 071 color camera. \*\* Editor's additions: The Vela supernova remnant is a supernova remnant in the southern constellation Vela. Its source Type II supernova exploded approximately 11,000–12,300 years ago. A supernova is the biggest explosion that humans have ever seen. Each blast is the extremely bright, super-powerful explosion of a star.



# Sky Chart

## Interactive sky chart

Year  Month  Day  -  Hour  -  Minute  -



You can download or view this map better at: <https://heavens-above.com/skychart2.aspx?lat=0&lng=0&loc=Unspecified&alt=0&tz=UCT>

## Planet Positions

Click on the graphic above to go to Time and Date for a great simulation of the rotation of the constellations and the rising/setting of the planets. The chart below is set for the date of our meeting but can be programmed for any date and time. The chart can also be found at [this link on Heavens Above](#).



### Planet Summary

Year  Month  Day  Time

|                         | Mercury  | Venus  | Mars   | Jupiter  | Saturn  | Uranus  | Neptune  | Pluto   |
|-------------------------|--|--|--|--|---|---|--|---|
| Right ascension         | 2 <sup>h</sup> 27 <sup>m</sup> 51.9 <sup>s</sup> | 5 <sup>h</sup> 43 <sup>m</sup> 42.7 <sup>s</sup> | 7 <sup>h</sup> 30 <sup>m</sup> 26.4 <sup>s</sup> | 1 <sup>h</sup> 41 <sup>m</sup> 14.4 <sup>s</sup> | 22 <sup>h</sup> 30 <sup>m</sup> 44.2 <sup>s</sup> | 3 <sup>h</sup> 3 <sup>m</sup> 47.0 <sup>s</sup> | 23 <sup>h</sup> 49 <sup>m</sup> 5.6 <sup>s</sup> | 20 <sup>h</sup> 11 <sup>m</sup> 11.2 <sup>s</sup> |
| Declination             | 14° 34' 1"                                       | 25° 55' 7"                                       | 23° 33' 37"                                      | 9° 21' 34"                                       | -10° 52' 46"                                      | 16° 58' 39"                                     | -2° 28' 33"                                      | -22° 35' 33"                                      |
| Range (AU)              | 0.559  | 0.954  | 1.771  | 5.911  | 10.133  | 20.656  | 30.588   | 34.512  |
| Elongation from Sun     | 4.2°   | 42.9°  | 67.1°  | 16.7°  | 68.2°   | 4.8°  | 47.0°  | 103.5°  |
| Brightness              | 5.1  | -4.0   | 1.4  | -1.9   | 1.0   | 5.9   | 7.9  | 14.4  |
| Equatorial Diameter     | 12.03"   | 17.48"   | 5.29"  | 33.35"   | 16.40"  | 3.41"   | 2.23"  | 0.09"   |
| Phase Angle             | 170.6°   | 72.6°  | 34.0°  | 3.4°   | 5.5°  | 0.2°  | 1.4°   | 1.6°  |
| Constellation           | Aries  | Taurus   | Gemini   | Pisces   | Aquarius  | Aries   | Pisces   | Capricornus                                       |
| Meridian transit        | 11:40  | 14:55  | 16:42  | 10:53  | 07:43   | 12:15   | 09:00  | 05:24   |
| Rises                   | 05:41  | 08:55  | 10:42  | 04:54  | 01:44   | 06:16   | 03:02  | 23:21   |
| Sets                    | 17:38  | 20:55  | 22:41  | 16:52  | 13:42   | 18:14   | 15:00  | 11:23   |
| Altitude                | 56.7°  | 58.5°  | 40.1°  | 47.2°  | 0.4°  | 63.0°   | 20.0°  | -31.5°  |
| Azimuth                 | 297.2°   | 33.3°  | 58.5°  | 283.8°   | 259.1°  | 310.0°  | 267.4°   | 243.2°  |
| Inferior Conjunction    | 2023-May-01<br>2023-Sep-06                       | 2022-Jan-09<br>2023-Aug-13                       | -  | -  | -   | -   | -  | -   |
| Opposition              | -  | -  | 2022-Dec-08<br>2025-Jan-16                       | 2022-Sep-26<br>2023-Nov-03                       | 2022-Aug-14<br>2023-Aug-27                        | 2022-Nov-09<br>2023-Nov-13                      | 2022-Sep-16<br>2023-Sep-19                       | 2022-Jul-20<br>2023-Jul-22                        |
| Superior Conjunction    | 2023-Mar-17<br>2023-Jul-01                       | 2022-Oct-22<br>2024-Jun-04                       | 2021-Oct-08<br>2023-Nov-18                       | 2023-Apr-11<br>2024-May-18                       | 2023-Feb-16<br>2024-Feb-28                        | 2022-May-05<br>2023-May-09                      | 2023-Mar-15<br>2024-Mar-17                       | 2023-Jan-18<br>2024-Jan-20                        |
| Max. eastern elongation | 2023-Apr-11<br>2023-Aug-10                       | 2021-Oct-29<br>2023-Jun-04                       | -  | -  | -   | -   | -  | -   |
| Max. western elongation | 2023-Jan-30<br>2023-May-29                       | 2022-Mar-20<br>2023-Oct-23                       | -  | -  | -   | -   | -  | -   |
| Perihelion              | 2023-Mar-31<br>2023-Jun-27                       | 2023-Apr-17<br>2023-Nov-28                       | 2022-Jun-21<br>2024-May-08                       | 2023-Jan-20<br>2034-Dec-05                       | 2003-Jul-26<br>2032-Nov-28                        | 1966-May-22<br>2050-Aug-17                      | 1876-Aug-26<br>2042-Sep-03                       | 1989-Sep-05<br>2237-Sep-15                        |
| Aphelion                | 2023-Feb-15<br>2023-May-14                       | 2022-Dec-26<br>2023-Aug-07                       | 2021-Jul-13<br>2023-May-30                       | 2017-Feb-17<br>2028-Dec-28                       | 2018-Apr-17<br>2047-Jul-15                        | 2009-Feb-27<br>2092-Nov-23                      | 1959-Jul-17<br>2125-Dec-01                       | 1866-Jun-04<br>2114-Feb-19                        |



Southwest Florida Astronomical Society Membership meeting minutes Zoom and in person on April 6, 2023 at the Calusa Nature Planetarium

President Brian Risley called the meeting to order promptly at 7PM by asking Treasurer / Program Chairman John MacLean to introduce our in person guest speaker. John graciously introduced Doctor Derek Buzasi, Professor at Florida Gulf Coast University speaking on The Music of the Stars: what it tells us about stars and exoplanets..He took us through 1960 coherent motions of the solar surface, 1975 the Sun's ringing like a bell, to today where multiple notes are known. Helioseismology and Asteroseismology, both revolutionized our understanding of the Sun and stars applying examples of Altair and the Kepler mission. Tess = Transiting, Exoplanet, Survey, Satellite. Seismology is the study of oscillations in the stars. Many questions were asked and all applauded.

Brian started the business agenda by introducing any new attendees: Jay Hawkins, Pete Gross and Jeff Wax. Brian then thanked Tom Klein for his computer zoom assistance. Brian commented on unpaid dues and John advised that 31 have yet to pay. John said that he will notify them of their lapse in dues for 2023 as the Astronomical League must be notified of our true membership count.

Review Outreach Events:

Seahawk Park Star Party of 3/25/23 was a success with 20 attendees per Joe Dermody.

FSW/ Charlotte Observing Events were held. Two Solar events with 30 to 40 people attending each. And two FSW planetarium events with 70 to 80 people attending each. Tom Segur advised that our Sun is in a very active stage right now.

Upcoming Outreach Events:

Seahawk Park Star Party on 4/22/23 from sunset until. Brian asked that members bring their scopes.....please.

FSW/ Charlotte Observing Events per Tom Segur are the last ones for the season..... Solar Observing 5/6/23 at Bayshore Live Oak Park..... And FSW Observing on 4/21/23 .

By-Law Review:

Brian was asking for more participation as the committee only has the officers and Sean Dey as members. Dan D also asked stating that the committee ought be made up of 7 members, thus needed two more participants from the general membership.....no one stepped up.....Brian asked that they contact him directly.

Officer and Committee reports:

President's Report... President Brian Risley encouraged participation as volunteers from the members in attendance..... 35 in person and 10 on zoom....Brian discussed the NightSky network and the need to update the calendar.....he also stated that he would not be available to work on the equipment for several months given his personal and business schedule.

Vice President's Report / Website and Newsletter Committee Reports: Vice President Mike Jensen asked again for participants to join in an effort to revise the by-laws. He stressed the need for volunteer action that this Society can't be just run by a few. We should help with bringing scopes to the Outreach Events. That dues must be paid given the timeframe of the list on members needed to be sent to the Astronomical League. Mike asked all to submit articles for the newsletter and many members chimed in to state what a great job Mike was doing on the letter. Mike let all know that past speakers presentations can be found on his YouTube link and that nothing else to report on the Website group.

Secretary's Report: Dan Dannenhauer asked that his March minutes be approved. John MacLean moved the motion and Sean Dey seconded. Motion to approve the minutes passed unanimously.

Treasurer's Report/ Program and ALCOR Committee Reports: Treasurer John MacLean stated that no Treasurer's report will be given at the membership meetings, that the members of the Board receive and approve them monthly and that the summary will be shared in the monthly newsletter. John advised that the Quarterly reports have been submitted and are current. He also advised that he will be reaching out to those who have yet to pay their 2023 dues as a last chance before he would be submitting the list of names of members to the Astronomical League. John said that an amateur astronomer will be speaking at our May meeting regarding the topic of the Moon. John wants there to be a June or July meeting wherein our members can bring in their own scopes for fellow members with knowledge to assist in whatever needs are required.

Social Events Committee Report: Chairperson Ava Frankenberger stated:

That all future dinner meetings on the day of the monthly meeting will begin at 4:30PM and that she is searching for a restaurant that takes reservations.