



# Howard Astronomical League Monthly Meeting

June 20<sup>th</sup>, 2024

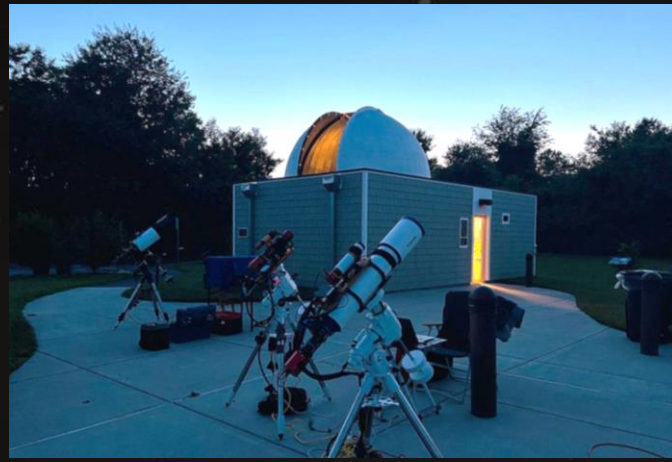
# Tonight's Agenda, June 20<sup>th</sup>, 2024

- ⇒ • Introductions
- Announcements
  - 2024 Schedule of Star Parties
  - Recent/Upcoming Outreach Events
  - Book of the Month – **Krystal Rolon**
- Featured speakers – **Chris Hoff & Sam Harnett of The World According to Sound**
- Astronomy Travel Report
  - Namibia – **Grace Coventry**
- What's Out in the Sky This Month...
  - Shallow Sky – **Jim Tomney**
  - What's up In Space – **Wayne Baggett**
- Members' Astro-Images and Sketches
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# HAL Star Parties...

## HAL's 2024 Scheduled Star Parties

Month	Date	Invitees
March	09	Members
March	16	Public
April	06	Members
April	13	Public
May	04	Members
May	18	Public
June	08	Members
June	15	Public
July	06	Members
July	13	Public
August	03	Members
August	10	Public
September	07	Members
September	14	Public
October	05	Members
October	26	Public
November	02	Members
November	09	Public



## Upcoming Events

- Solstice
  - Today, June 20<sup>th</sup>, longest day of the year
  - Astronomy Festival on the National Mall
- Moon
  - Full June 22<sup>nd</sup> (Strawberry Moon\*)
  - New July 5<sup>th</sup> (Also, Earth at Aphelion)
- Planets
  - Saturn, Mars & soon Jupiter - Low and in the east before sunrise

\* Marking the start of the wild strawberry harvest season by the Native American Ojibwe, Dakota, and Lakota tribes

Regional Star Party info...

<https://skyandtelescope.org/astronomy-resources/annual-stargazing-events/>

# June 15<sup>th</sup> Public Star Party (Phil Whitebloom, Host)

27 HAL members set up their scopes, estimated around 250 visitors (Phil counted over 100 cars)



# AFNM: Six HAL Volunteers have Signed up to Participate

## Astronomy Festival on the National Mall Saturday, June 22, 2024; 6 - 11 pm

7<sup>th</sup> to 9<sup>th</sup> Streets, SW, across from the [Hirshhorn Museum and Sculpture Garden](#)  
Metro: L'Enfant Plaza    Rain Location: Smithsonian Arts and Industries Building



**Celebrate the Summer Solstice with Telescope Views of the Sun, Star Clusters, and Colorful Double Stars at the Largest Astronomy Outreach Event in the USA**

**Astronomers, astronomy educators, and students volunteer to provide free public science education**

In Washington, DC, on Saturday June 22<sup>th</sup> from 6 to 11 pm, visitors will be given a free guided tour of the sky at Hofstra University's *Astronomy Festival on the National Mall* ([www.hofstra.edu/dcstars](http://www.hofstra.edu/dcstars)). This festival is and is organized by Dr. Donald Lubowich, Hofstra's Coordinator of Astronomy Outreach and presented in association with Smithsonian *Solstice Saturday*.

**We thank our Sponsors:** *Supernova level:* BAE Systems, DC Space Grant Consortium, [ePlanetarium](#), [George Mason University](#); *Nova level:* National Radio Astronomy Observatory

**Participating Organizations:** Associated Universities, Inc., Astronomical Society of the Pacific, BAE Systems, Inc., Caelus Rocketry, Carnegie Science, Chandra X-ray Observatory, [DarkSky International](#), [ePlanetarium](#), Johns Hopkins University/ Applied Physics Laboratory, Maryland Science Center, Maryland STEM Festival, NASA Astrophysics Division, NASA - Goddard Space Flight Center (Hubble Space Telescope), NASA Solar System Ambassadors, National Air and Space Museum, National Park Service, National Oceanic and Atmospheric Administration, NSF's [NOIRLab](#), National Radio Astronomy Observatory, National Science Foundation, Port Discovery Children's Museum, [Scistarter](#), SAO-Fred Lawrence Whipple Observatory, The Society Physics Students, The Trust for National Mall, [Unistellar](#), U.S. Naval Observatory, and the U.S. Naval Research Laboratory.

**Participating Colleges and Universities:** Georgetown University, George Mason University, George Washington University, Montgomery College, Rice University, University of [Maryland](#), University of Maryland Baltimore County, University of Virginia.

**Participating Astronomy Clubs:** Amateur Astronomers Association, Amateur Observers' Society of NY, Goddard Astronomy Club, Howard Astronomical League, National Capital Astronomers, Northern Virginia Astronomy Club, Westminster Astronomy Society

# Book of the Month

Title:

- Observer's Guide to Stellar Evolution

Author:

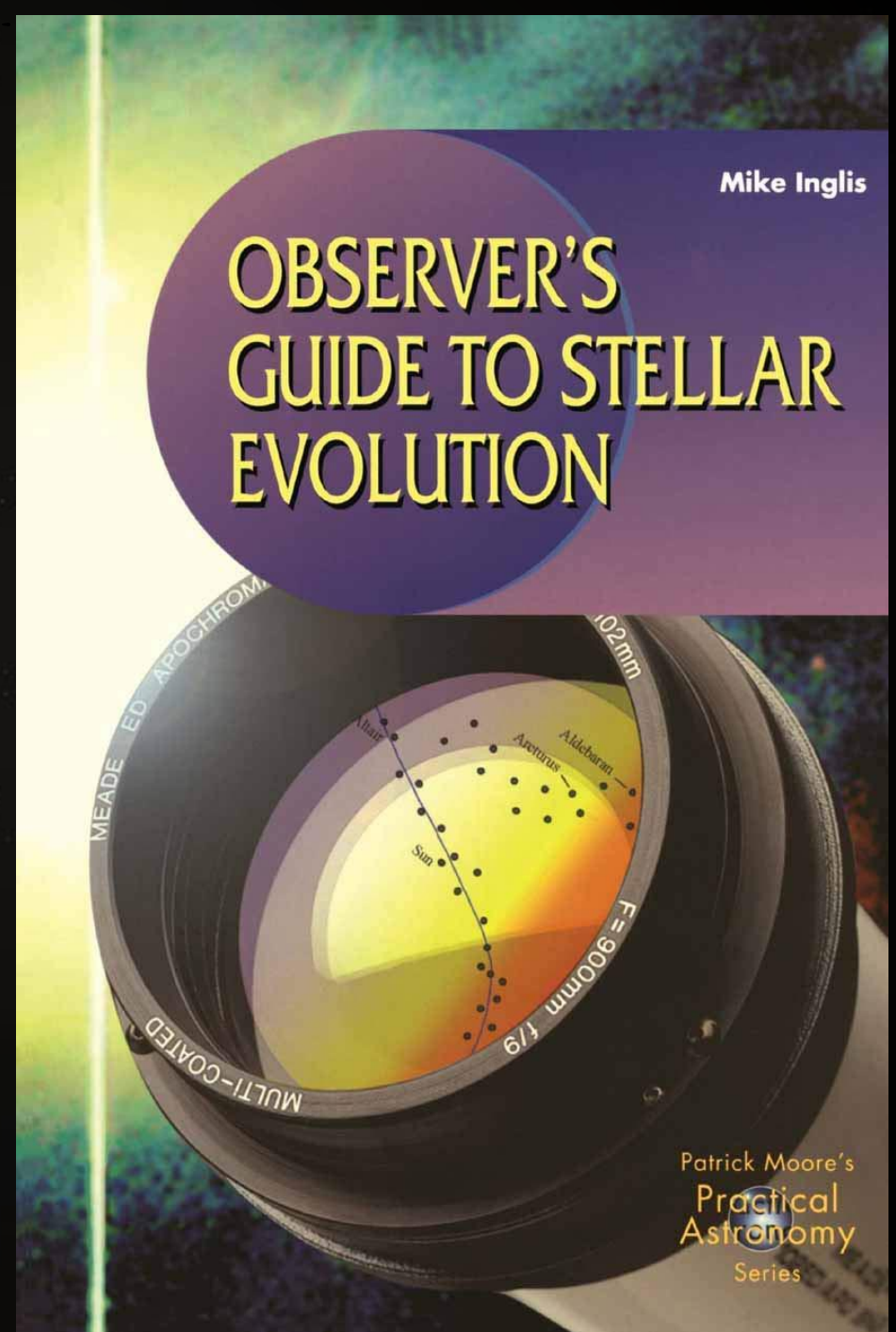
- Mike Inglis

Length:

- 255 pages

Audience Level:

- Beginner Friendly
- Intermediate
- Advance/Experienced



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Topic: Cosmic Visions

## **Chris Hoff & Sam Harnett**

Chris Hoff and Sam Harnett are the founders of The World According to Sound podcast, which started as a series of 90 second podcasts in 2016 and has evolved into a series of award-winning in-depth audio programs. Their philosophy is that intentional, communal listening is a way to reclaim autonomy in a visually dominated world. Their radio show minimizes speech and makes sound the focus, to give listeners a sonic space to have their own thoughts. Chris Hoff began his career in audio as an engineer for public radio and later podcasts. Sam Harnett started as a reporter covering labor and technology. They are currently producing their radio program as well as performing live experiential shows..

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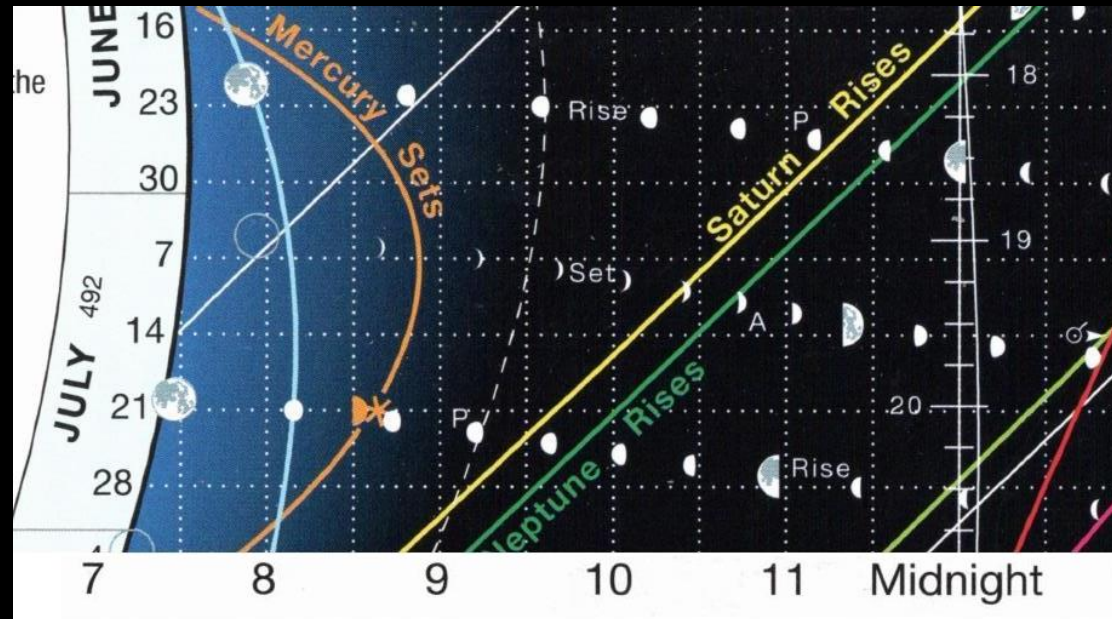
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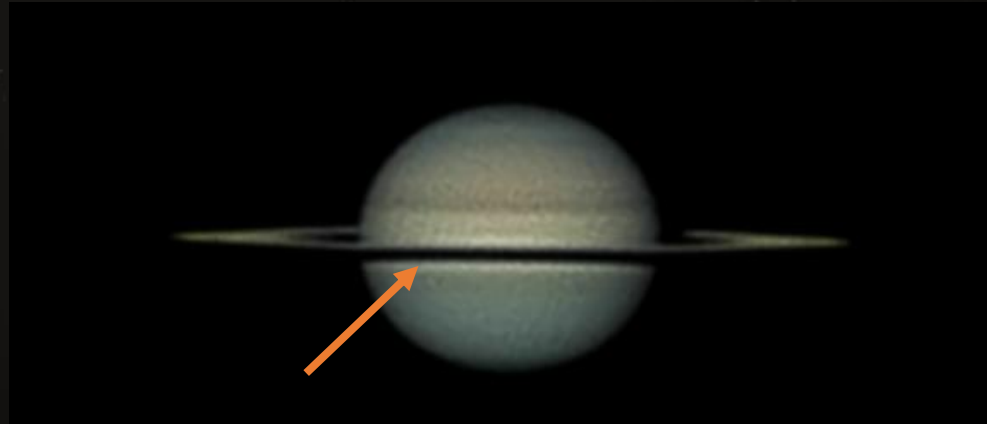
# Shallow Sky Highlights for June-July 2024

- *Despite all the recent hype about the early morning “planet parade”, **Saturn** is pretty much the only planetary target as the others are still climbing out of the Solar glare.*
- **It is still a morning object, rising a little after midnight and on the meridian as dawn approaches.**



# Saturn Equinox Approaching

- *Saturn has a significant axial tilt like Earth. Whenever it approaches an equinox (i.e., when the Sun crosses the Saturnian equator) we see the rings more on edge.*
- *We're heading for a 2025 equinox, so the rings are now closing up pretty significantly – which can be disappointing! BUT...*

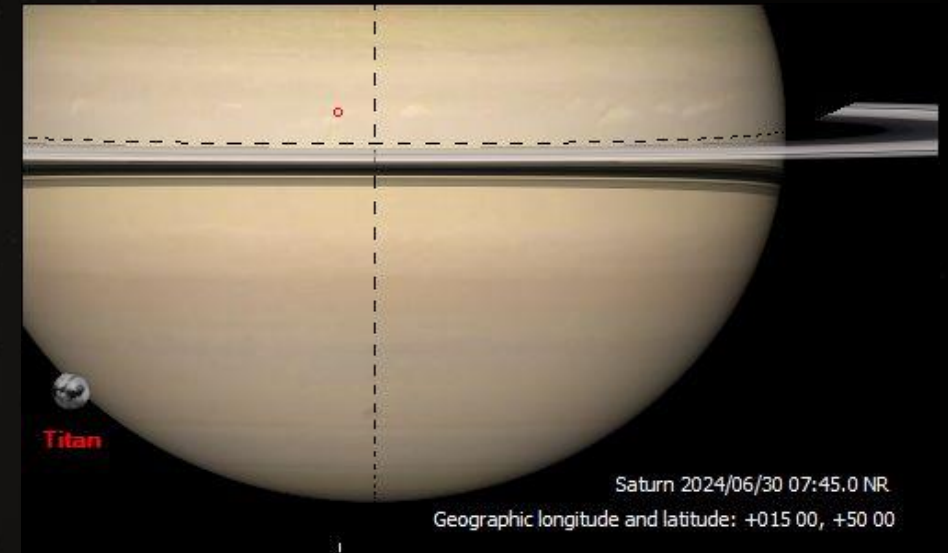


- *Because of this Earth-Sun-Saturn geometry, for the next few weeks you can get to see the shadow of the rings cast on the planet quite clearly, even in a small scope. Usually it is hard to see, covered up by the rings.*

# Saturn Moon Events

- *This alignment also means that for the first time in about 14 years we get to see the moons of Saturn undergo eclipses, transits, and occultations.*
- *With the possible exception of Titan events, these are more subtle than the sort of events we see with Jupiter's 4 bright moons. Saturn's moons are fainter and smaller than the Galilean moons.*
- *Here's a list of some Saturnian moon events that you might try to catch over the next few weeks.*

Time	Moon	Event
6/22/2024 04:00 AM	Titan	Occultation
6/30/2024 04:00 AM	Titan	Transit
7/8/2024 02:30 AM	Titan	Occultation
7/9/2024 01:50 AM	Rhea	Eclipse
7/16/2024 02:30 AM	Titan	Transit



Titan starting to cross in front of Saturn  
Morning of June 30<sup>th</sup>

# What's Up in Space: GAIA Black Hole Discovery

- GAIA launched by ESA in 2013 from French Guiana
  - Mission is to investigate the origin and evolution of the Milky Way by conducting a census of 1 billion stars
    - Create a 3D map of the Milky Way with both positions and space velocities of the stars
  - Orbits the Sun-Earth L2 point
  - Has two identical imaging instruments, two photometers, and one radial velocity spectrometer
  - Measures the astrometric positions, brightness, and radial velocities of stars down to mag 20
  - Measures positions with an accuracy as good as 24 microarcseconds (0.000024 arcseconds)

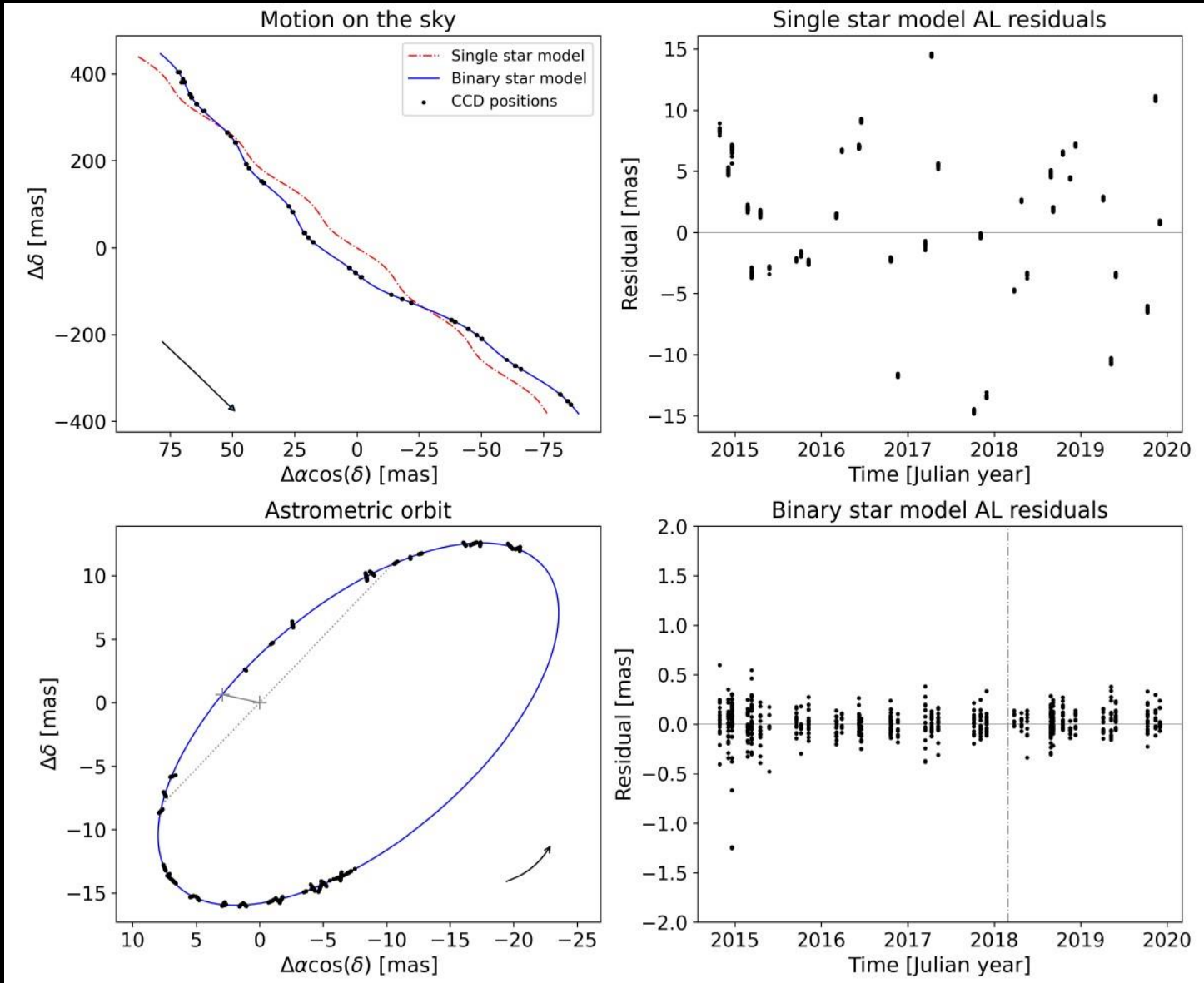


Image Courtesy ESA; from <https://science.nasa.gov/mission/gaia/>

# What's Up in Space: GAIA Black Hole Discovery

- Previous black holes from Gaia
  - Data included in Gaia's DR3 was studied and found two black holes: BH1 and BH2
  - BH1 has a mass of  $10 M_{\text{sun}}$ , and BH2 is  $9 M_{\text{sun}}$  (El-Badry, K., et al. 2023, MNRAS, 521,4323)
- New black hole – BH3
  - Found during preparation of the data for DR4 (Panuzzo, P., et al. 2024, A&A preprint, April 8, 2024)
    - Discovered while validating the solutions of binary systems in the data
  - The directly-observed companion star is a very-low metallicity G giant
    - Magnitude of 11.2 (Gaia G-band)
    - Distance using Gaia parallax is 590 pc (1900 ly)
    - Shows an orbital period of 11.6 years
    - The primary object is not visible

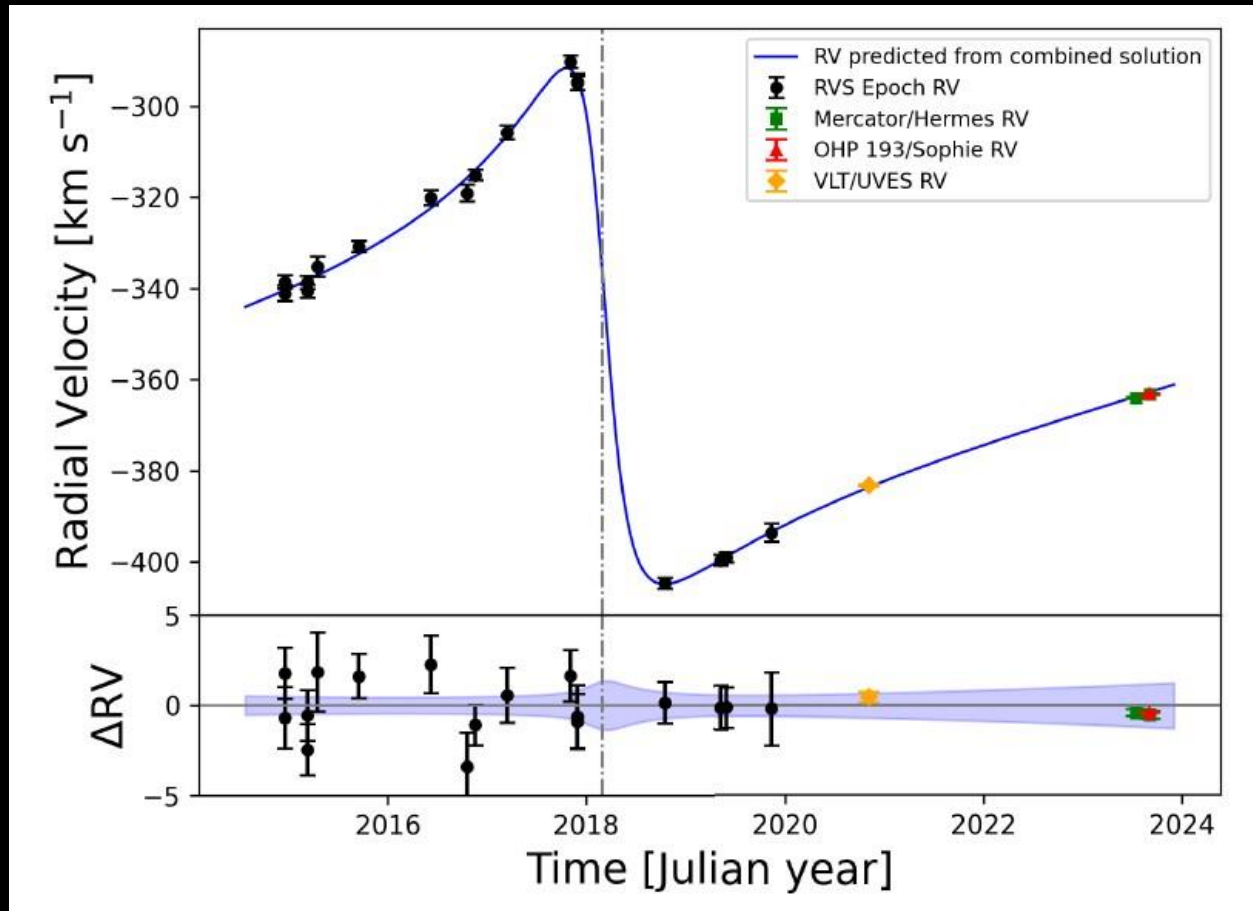
# What's Up in Space: GAIA Black Hole Discovery



- Observational data
  - Top: Motion on sky, including parallax, proper motion, and orbital motion
  - Bottom: Astrometric orbit after subtracting parallax and proper motion
    - “+” show barycenter and periastron, dotted line shows the line of nodes

Panuzzo, P., et al. 2024, A&A preprint, April 8, 2024

# What's Up in Space: GAIA Black Hole Discovery



Panuzzo, P., et al. 2024, A&A preprint, April 8, 2024

- Observational data
  - Radial velocity data with predicted value from orbit solution (solid curve)
    - Includes Gaia data (black) and ground-based observations (green, orange, yellow)
    - Vertical dashed line shows time of periastron passage
  - Spectroscopic and photometric studies result in a mass of the observed star to be  $0.76 M_{\text{sun}}$
- Combining the orbit solution with the radial velocity data and the stellar mass, the derived primary object mass is  $32.7 M_{\text{sun}}$

# What's Up in Space: GAIA Black Hole Discovery

- Primary object ( $32.7 M_{\text{sun}}$ ) identification
  - Since the primary object is invisible at the 590 pc distance, cannot be a normal star (or a close binary of normal stars) with the derived mass
  - Also inconsistent with a single or binary neutron star
  - Remaining possibilities
    - Single black hole
    - Binary black hole
    - Binary of black hole + other compact object
  - Further study is needed to distinguish among these possibilities
  - If this is a single black hole, it is the most massive stellar mass black hole discovered in the Milky Way

The paper announcing the discovery is Panuzzo, P., et al. 2024, A&A preprint, April 8, 2024, available at <https://www.eso.org/public/archives/releases/sciencepapers/eso2408/eso2408a-panuzzo-et-al.pdf>

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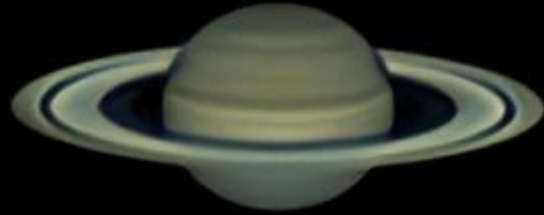


Gary Frishkorn

## Saturn's Changing Ring Tilt



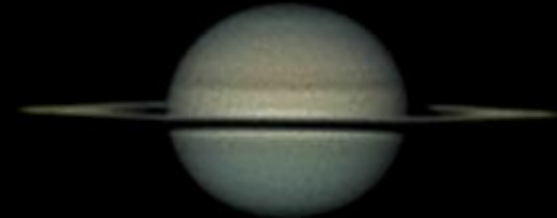
2021



2022



2023




2024

*Jim Tomney*

Jim Tomney



 Seestar S50

Marriottsville / 2024.06.15 23:41

M 51

66min

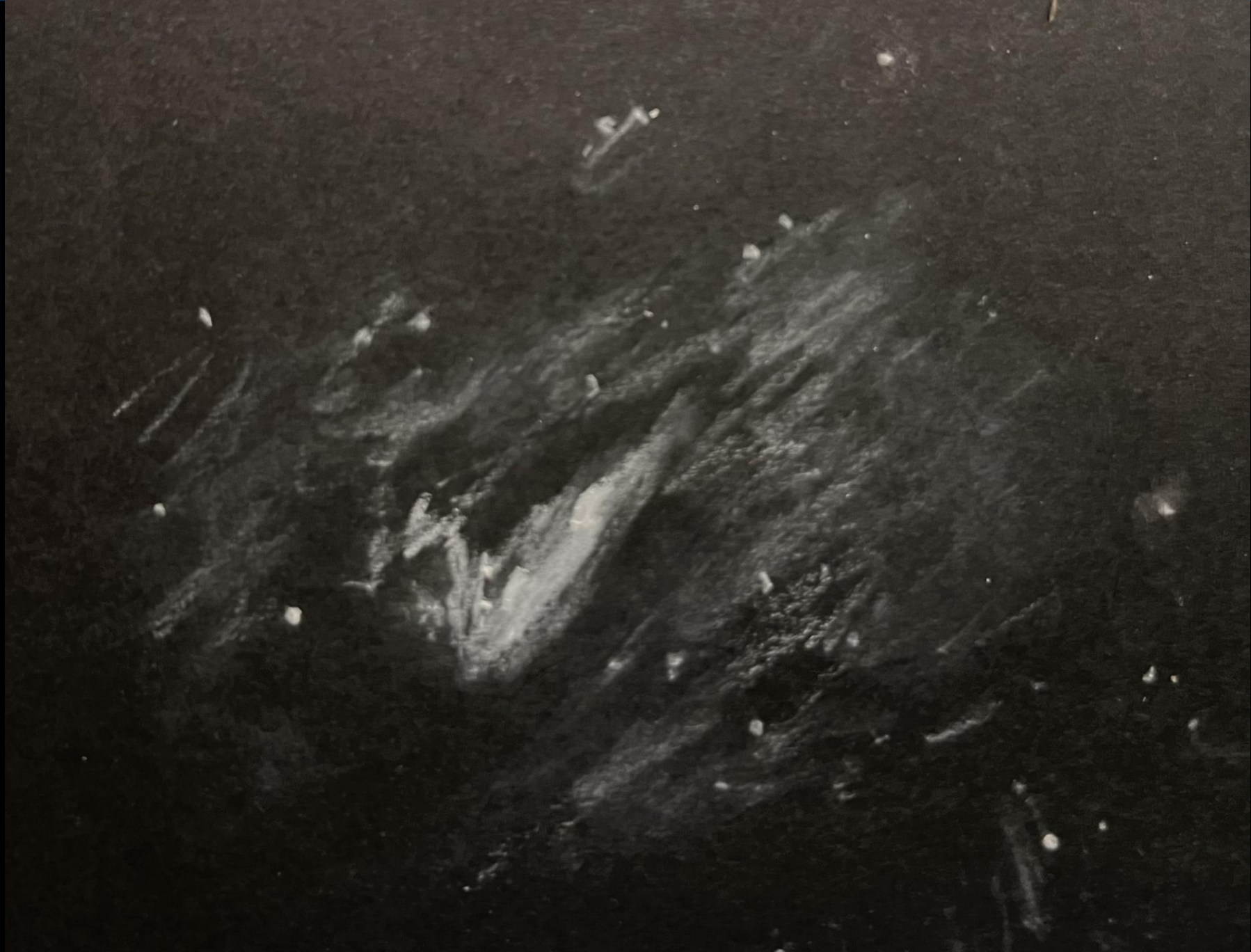
Harrini Meenashi Sundar



Telescope: 24-inch Bruce Doublet located in Arequipa, Peru  
Exposure time: 180 minutes  
Capture date: October 31, 1924

This data was retrieved via the Harvard DASCH (Digital Access to a Sky Century @ Harvard) Database.

From their website: "The core of the collection was founded with the generous funding of astronomer and philanthropist Anna Palmer Draper and the creation of the Henry Draper Memorial collection in 1886.



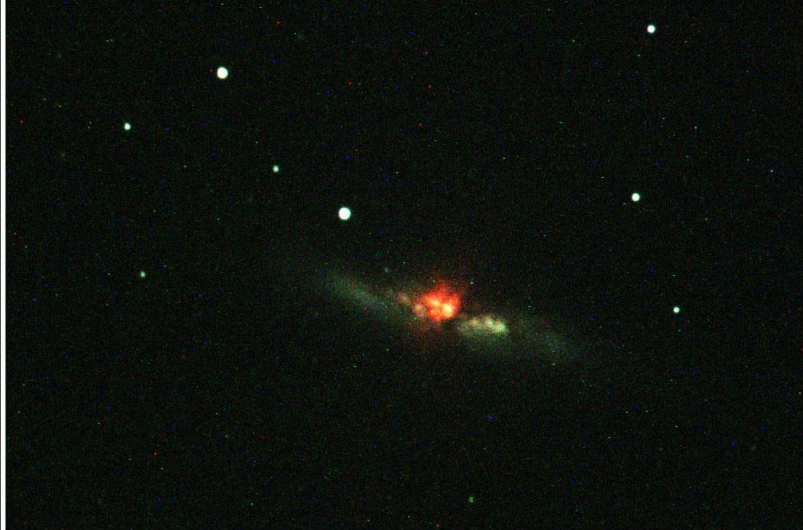




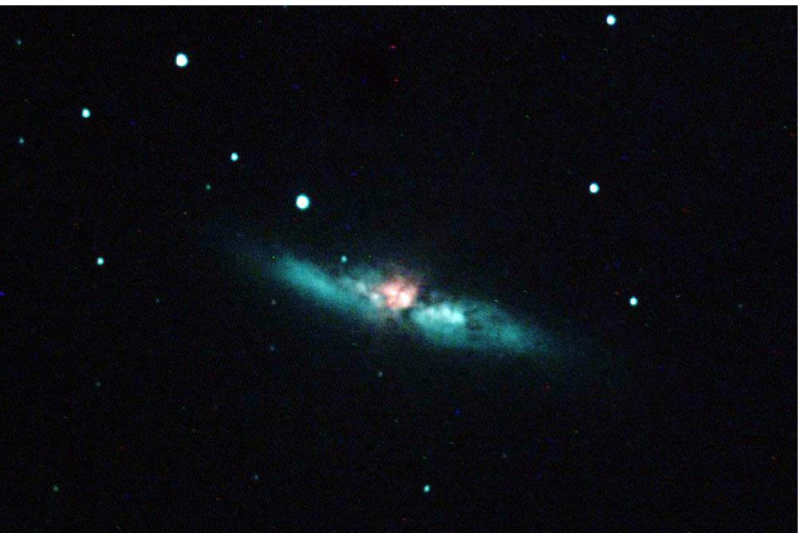


exp 240 gain +5 Ultimate  
3nm Ha OIII

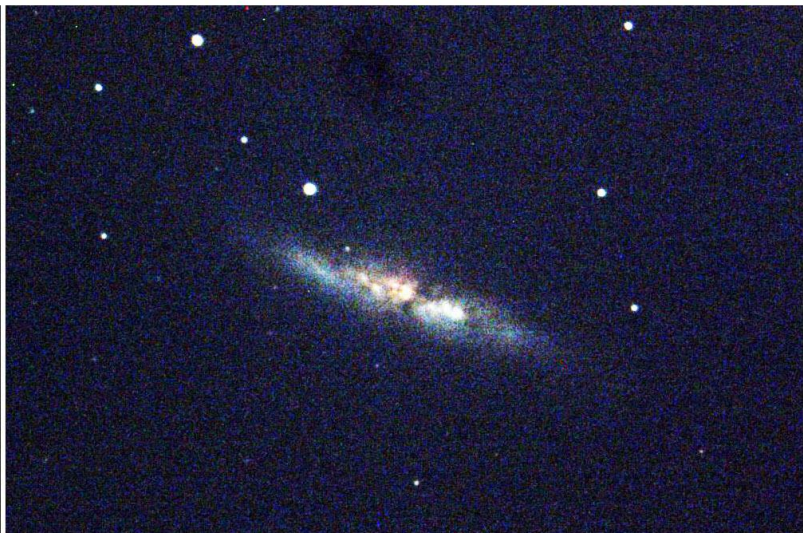
M82



exp 180 gain +5 Extreme  
7nm Ha OIII



exp 45 gain +5 Enhance  
20-30nm Ha Hb OIII



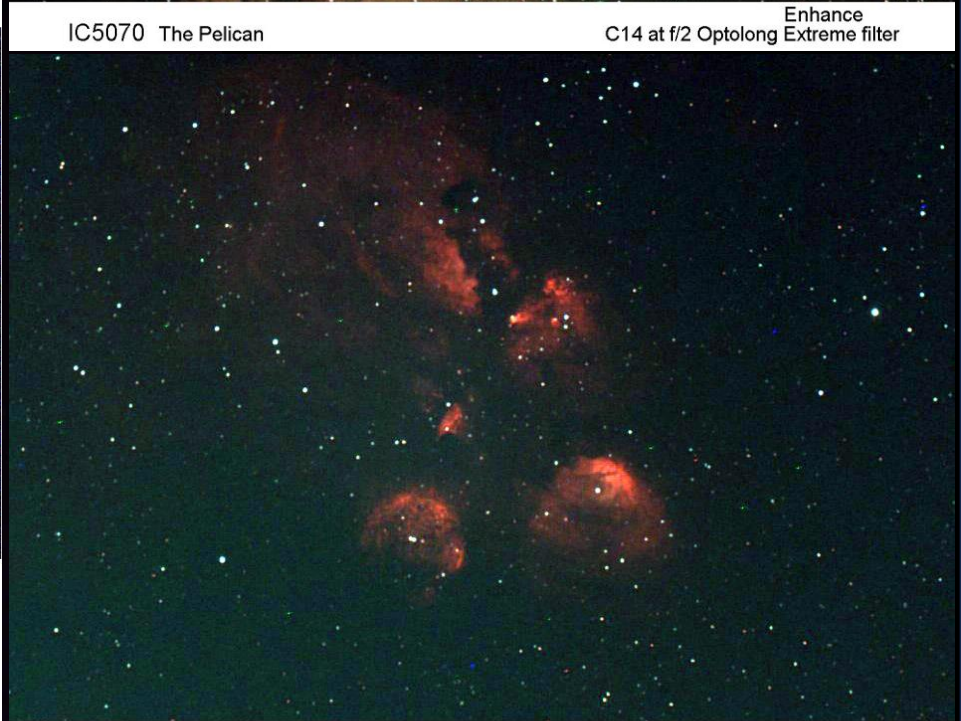
exp 7.5 gain +5 no filter

Celestron 14-inch ZWO2600MC



IC5070 The Pelican

Enhance  
C14 at f/2 Optolong Extreme filter




NGC6334 The Cat's Paw

14 degrees altitude

C14 at f/2 Optolong Enhance filter

Stephen Gauss

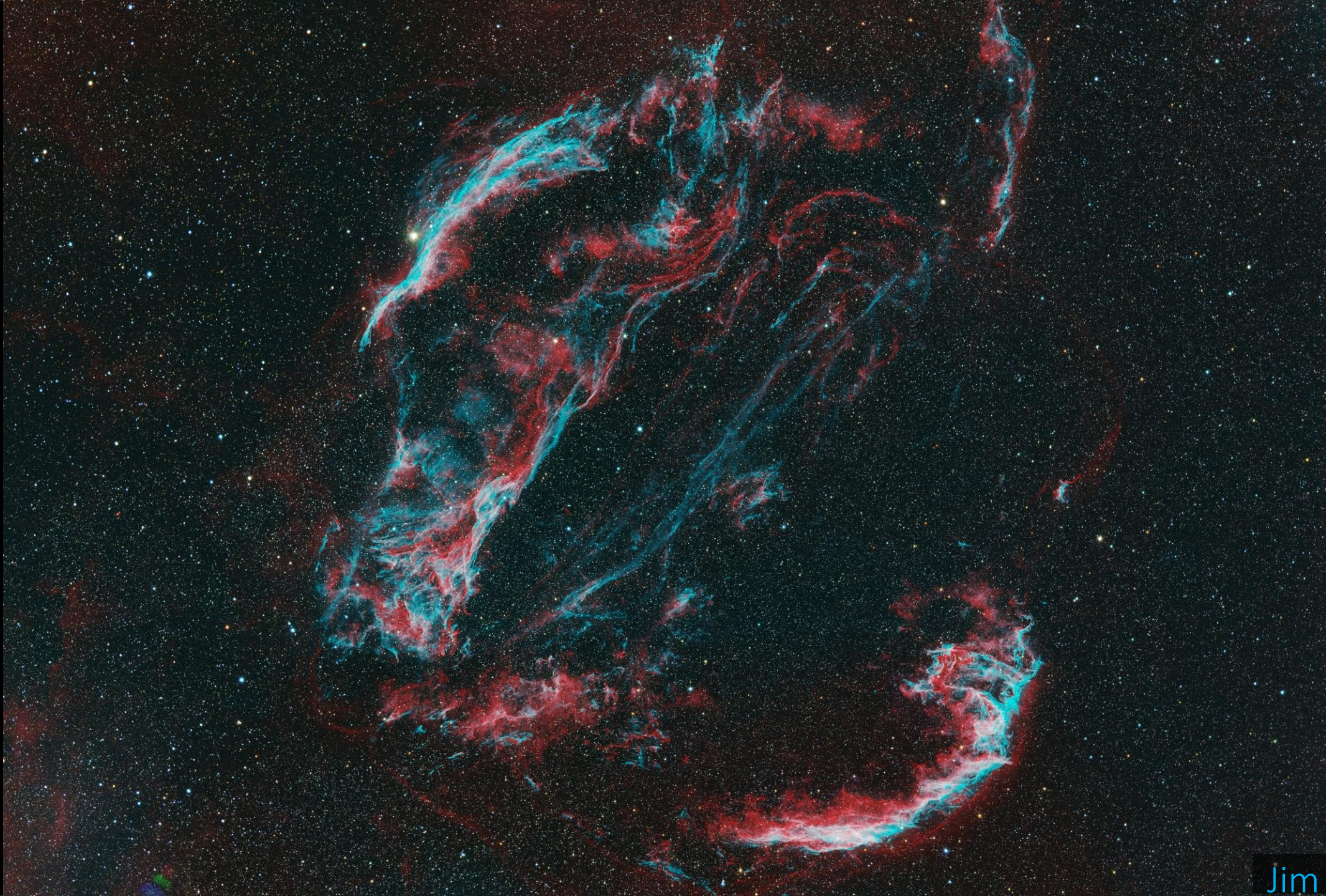


M63 (Sunflower Galaxy)  
May 31, June 8, 2024  
Alpha Ridge Park

8-inch RC  
LRGB (36,15,17,18)x4min  
5h44m Total Exposure Time

ASI1600MM-C  
Gain 139 (1e/ADU)  
Wayne Baggett

Wayne Baggett



Jim Johnson

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Thank you