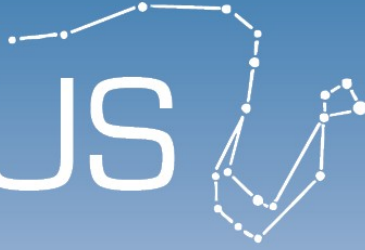




# FOCUS



Vol. 61, No. 7, September 201

DELAWARE ASTRONOMICAL SOCIETY

**Editor: Richard G. Spencer  
Chair, DAS Publications  
Committee**

*Next Meeting: Tuesday, September 17  
Mount Cuba Astronomical Observatory  
Board meeting: 7PM  
General meeting: 8PM*

Topic: "What I did this summer" by various club members



***Non-paginated  
order of Contents  
for the September  
issue***

***My relationship with  
page numbers  
continues to be  
troubled\*. Kindly  
respect my privacy  
on this matter--RGS***

- September Meeting Topic
- From the President
- DAS Board Meeting Agenda
- Report: Friday Night Lights
- DAS Astrophotography
- Summer AP-SIG Report
- Woodside Creamery Report
- September Scientist  
Birthday: *Enrico Fermi*
- Call for Volunteers
- Loaner Equipment
- Telescope Making SIG
- Website and Club
- Membership
- DAS Contacts

***Page numbers in some form  
should return in the next issue***

## From the President Rob Lancaster



Dear DAS Members,

I would like to welcome you back from what was hopefully a pleasant and astronomy filled summer. The weather was little warm at times, but I felt that it was much better for astronomy than last year. Unfortunately, we had to cancel our picnic this July due to the extremely high temperatures, but we rescheduled it for September and the weather was much better. We had to cancel some of our outreach events this summer, but not nearly as many as last summer. Hopefully this better weather continues into the fall. We have had several well-attended and very enjoyable book club and AP Sig meetings this summer, and our Tuesday Night Astronomy Workshops have been really exciting with clearer skies, great projects, and good discussions.

This summer, we also continued to help with the Mt. Cuba pods project. As you know, the DAS helped to dig a trench for the electrical work last spring. The electrician completed his work this summer, and the DAS just filled the trench back in during the last two Tuesdays. Also, we placed the pods in their final location and I pressure washed the Pads, the Pods, and walkways around the Sawin. Pretty soon, they should be ready for use. Thank you to Chris Horrocks for coordinating the projects, to Dana and Tom for working hard on the piers, and to all the volunteers that helped to work on The Pods and filling in the trench! We couldn't do it without you.

This fall, our club will be doing lots of exciting activities. Jeff is working hard getting the monthly meeting talks planned out. Remember that each month we have an Astrophotography Special Interest Group meeting, a Book Club Meeting, and a full DAS meeting. Remember also that each Tuesday that is not a Monthly meeting, we will have the more informal Astronomy Workshops where you can pursue your interests in Astronomy. We also have an assortment of outreach activities planned where you can share your love of Astronomy. Please consider volunteering at or participating in some of these events. They really are a lot of fun and we really appreciate all you do for the club! And remember that at this month's DAS Meeting, you can share all that you did this summer.

Thank you,

Rob Lancaster  
DAS President



## 9/17/19 DAS Board Meeting Agenda



1. Review of Minutes from Last Meeting—Bill McKibben
2. Treasurer's Report—Bob Trebilcock
3. Budget Planning for the 2019 – 2020 Fiscal Year—Bob Trebilcock
4. Donations Policy and Storeroom cleanout—Rob Lancaster
5. Reports on Projects in Progress
  - Pods Project/Trench Update—Chris Horrocks
  - Piers and Pods Update—Rob Lancaster and Tom Harding
  - 12" Scope and Refractor Update—Bill Hanagan
  - Buckley Scope Project—Jeff Lawrence
  - Other Projects?



**Report from Friday Night Lights  
Held on July 12, 2019**  
*Fred De Lucia*

*The skies  
cleared  
just in  
time for  
bright  
object  
observing*



*Photo by Bill Hanagan*

*The glorious  
moon, reminding all  
of the timeless lines  
of the immortal  
bard:*

*The moon shines bright.  
In such a night as this.  
When the sweet wind  
did gently kiss the trees  
and they did make no  
noise, in such a night.*





Another SOLD OUT and very successful Natural Lands' "Friday Night Lights" event was held this Summer with 4 astronomy clubs participating: the Delaware Astronomical Society, ChesMont Astronomical Society, Chester County Astronomical Society and the Bucks-Mont Astronomy Association. Over 700 attendees were wowed by a total of 25 amateur astronomers with telescopes ranging from 3" refractors to 25" Dobsonians and a mix of large binoculars.

Although clouds were plaguing the skies during set-up they parted just before dusk to initiate startling views of Saturn, Jupiter and the Moon and in the larger scopes a smattering of brighter deep sky objects. Then again, as if on cue, the clouds rolled in at 11PM signaling the end of the event but not before everyone had their share of brews, cookies, cider, s'mores and hot food from the food vendors on site while listening to the music of Vanessa Collier and Hoots & Hellsmouth.



*A large crowd gathered in this beautiful Woodstock-like site!*







*Eager anticipation of nightfall! That time at which--*

*The twilight tints have left the sky, and night commences her watch  
over the world, high in the heavens is her taper lit, around which will  
soon glow a thousand kindred flames.*

--Henry James Slack

Refractors, lined  
up like so many  
pike warriors





Across the field, assembled Dobs, ready for battle, sleeping giants.





# Summer 2019 Astrophotos by AP- SIG & DAS Members

## The Lagoon Nebula (M8) by Bill Hanagan



Copyright 2019 Wm. D. Hanagan, Jr.

My image of M8 was produced from data acquired jointly with Rick Spencer.



This is an RGB + H-alpha image. The H-alpha data was added to the red channel of the RGB image to boost the visibility of the nebula and its details without changing the colors of stars. There's a lot of detail in this image and it took a lot of hard work to put it there. You need to zoom in to really appreciate it all! As intended, you can zoom in a long way before anything looking like grain or noise becomes visible. For those who have a limited zoom feature on their browser, there are two cropped and enlarged versions of the same image appearing immediately below and later in the article.

Note in particular the small red hour-glass shaped area at the heart of the nebula. In terms of color, this is just as deep-red as any other part of the nebula, but being brighter, it ends up looking white in most photos when the image is stretched to reveal



details in the fainter areas of the nebula.

**Here are the data acquisition details.**

- Total exposure time: 80 minutes, 20 each for R,G,B, & H-alpha

- Sub-exposures: 5 minutes each, dithered
- Site: Rick Spencer's back yard, 6/26/2019
- Sky: moonless and technically clear, but dominated by wispy, high clouds and poor transparency, with average seeing
- Optics: 10" Takahashi CCA-250 with an 0.72 focal reducer, operating at 890 mm and f/3.6 (f/4.4 based on light loss)
- Telescope mount: Astro-Physics AP1100GTO with CP4, dithered
- Imaging Camera: QSI-683wsg8, with off-axis guider (OAG), operated at -10C
- Guiding camera: Starlight Xpress Ultrastar, mounted in the OAG
- Software: Windows 10, ASCOM, Astro-Physics Command Center (APCC), Cartes du Ciel (SkyChart), Nebulosity4, and PHD2

### **Here are the image processing details.**

I did all of the image processing using PixInsight. The most important processing steps are described sequentially below. Combined words like "ImageCalibration" and "StarAlignment" are not typos—they denote specific PixInsight Processes and Scripts that were used to transform the raw data into the final image.

- ImageCalibration was done using a master dark frame and separate master flat frames for each channel. 24 individual dark frames were used along with 10 flats each for the R, G, and B channels and 4 flats for the H-alpha.
- StarAlignment and ImageIntegration were performed to combine the calibrated sub-exposures for each channel into master light frames. Thanks to the fact that the sub-exposures were dithered during acquisition, the pixel rejection phase of ImageIntegration was able to do a pretty good job of removing hot pixels and cosmic ray trails.
- The remaining hot pixels and cosmic ray trails were eliminated using CosmeticCorrection.
- Edge pixels affected by StarAlignment were identified using Blink and trimmed from all masters using DynamicCrop. At most, 12 pixels needed to be trimmed along any one edge so the loss of image area is negligible.
- LinearFit was used to balance the brightness of the master light frames prior to combining them all into a single image.



- PixelMath was used to combine the red and H-alpha masters into a combined master for the red channel.
- ChannelCombination was used to combine the composite R channel with the G, and B masters to produce a linear (not yet stretched) RGBH-alpha image.
- Dynamic Background Extraction was employed to remove sky background gradients and to neutralize the color of the background sky.
- ColorCalibration was used to adjust the color balance at the high end of the brightness scale using a large group of stars in the image as a white reference.
- Deconvolution was used to sharpen the assembled image.
- HistogramTransformation was employed to expand the compressed tonal range of the deep-sky object for display.
- DynamicCrop was used a second time to remove excess background area on the left side of the image.

• **The Pinwheel Galaxy (M101)** by Bill Hanagan





My version of M101, the Pinwheel Galaxy, appears above at full size. It was produced from data acquired jointly with Rick Spencer. A cropped and zoomed version of this image has been included farther down for those whose browsers don't support zooming.

Note the asymmetric spiral arm extending far above the main body of the galaxy. This is explained by tidal forces exerted by M101's companion galaxies which are not in the photo. In the upper left there is also a small blue reflection nebula. If you zoom in and pan around you can find a number of small galaxies.



This is an RGB + H-alpha image. The H-alpha data was included to boost the visibility of the red star forming regions within the spiral arms of the galaxy. The blue regions are populated by young, hot stars that presumably have already scavenged the hydrogen from their immediate vicinity.

### **Here are the data acquisition details.**

- Total exposure time: 2 hours 20 minutes total, 40 minutes for R, 30 for G, 50 for B, & 20 for H-alpha
- Sub-exposures: 10 minutes each, dithered.
- Site: Rick Spencer's back yard, 7/3/2019
- Sky: moonless, with good transparency and average seeing
- Optics: 10" Takahashi CCA-250 in native mode, operating at 1250 mm and f/5 (f/6.1 based on light loss)
- Telescope mount: Astro-Physics AP1100GTO with CP4, dithered
- Imaging Camera: QSI-683wsg8, with off-axis guider (OAG), operated at -10C
- Guiding camera: Starlight Xpress Ultrastar, mounted in the OAG
- Software: Windows 10, ASCOM, Astro-Physics Command Center (APCC), Cartes du Ciel (SkyChart), Nebulosity4, and PHD2

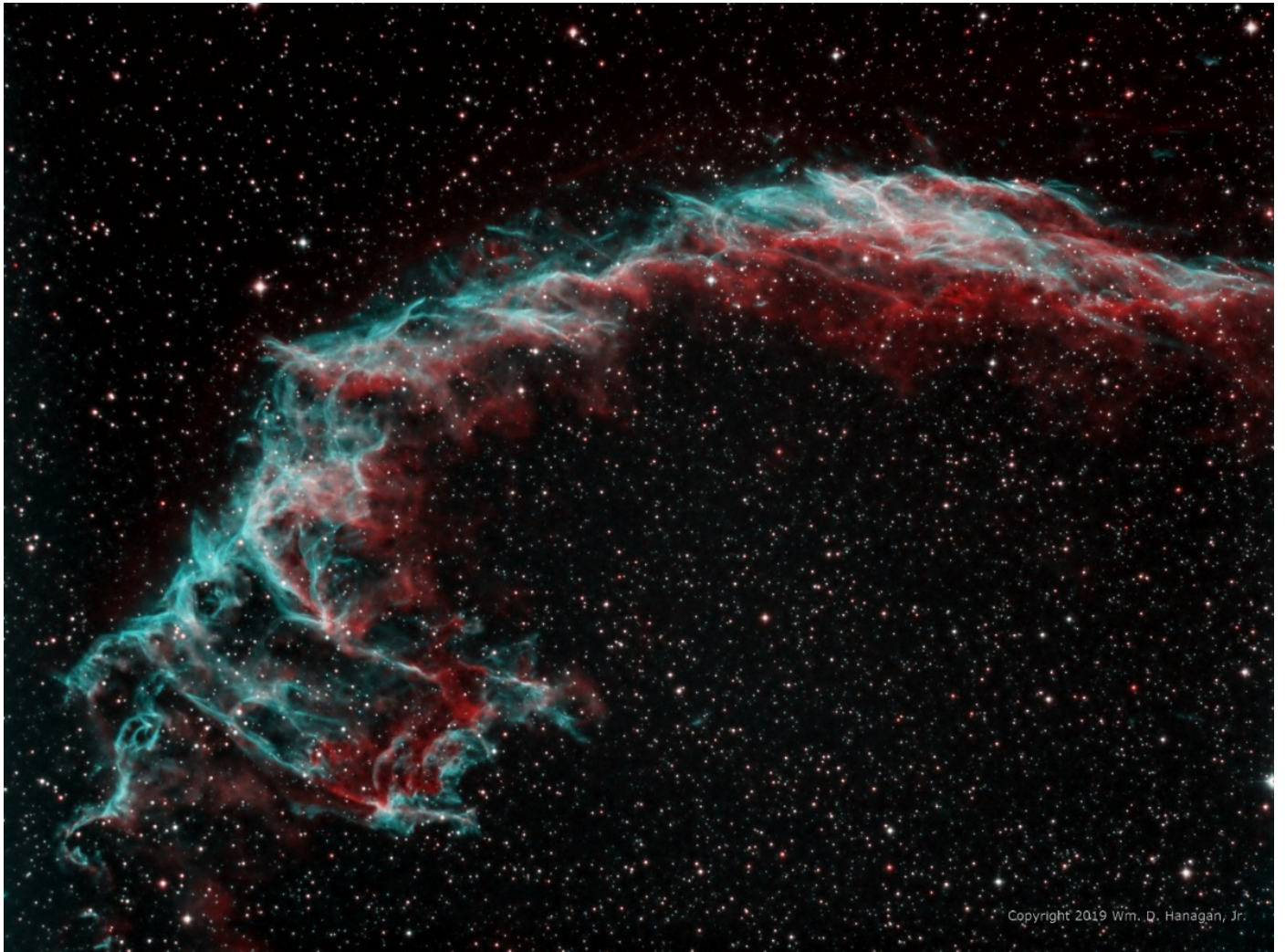
### **Here are the image processing details.**

- Blink was used to examine sub-exposures, none were rejected.
- Sub-exposures for the R, G, and B channels were aligned and integrated as usual to produce R, G, and B master light frames. Thanks to the fact that the mount was dithered between sub-exposures, pixel rejection was able to eliminate the majority of hot pixels, cosmic ray trails, and airplane trails.
- Since ImageIntegration won't work on just two frames, I used the PixelMath "min" operator to combine the two H-alpha frames. This eliminates many artifacts and improves S/N. Ideally, more H-alpha frames should have been acquired, but time ran out.
- CosmeticCorrection was used to remove all remaining hot pixels and faint cosmic ray trails. There weren't a lot, but there were enough to warrant the extra step.



- A Synthetic Luminance (SynthLum) was created by adding all master light frames using PixelMath.
- The maximum inward edge shift resulting from StarAlignment and dithering was determined using Blink and the masters were all cropped identically to eliminate affected edge pixels.
- DBE was applied twice to the R, G, B, and L masters because a mild background gradient survived the first application.
- DBE was only applied once to the H-alpha master because the background was much cleaner than for the R, G, or B masters.
- The SynthLum master was deconvoluted using an external point-spread function (PSF), a star mask for local de-ringing support, and a range mask over the image to avoid sharpening the background noise.
- MultiscaleLinearTransform was applied to the SynthLum to reduce noise in the 4 smallest wavelet layers.
- The red and H-alpha masters were combined using PixelMath to produce a composite red channel. I could have accentuated the red channel more than I did to make the H-alpha emitting star forming regions more striking, but this would overpower the adjacent blue regions which are dominated by young stars.
- LinearFit was applied to the master light frames to prepare them for combination.
- ChannelCombination was used on the R, G, and B channels to produce an RGB image.
- The RGB image and the SynthLum master were stretched using HistogramTransformation to prepare them combination.
- LRGBCombination was used to integrate the SynthLum with the RGB image and to perform some chrominance noise reduction
- The tonal range and saturation of the LRGB image was fine-tuned using CurvesTransformation, with a luminance mask applied to protect faint background regions from being over-stretched.

## The Eastern Veil Nebula (NGC6992) by Bill Hanagan



All of my images of the Eastern Veil Nebula were produced from data acquired jointly with Rick Spencer.

Here's the widest view, which shows the entire Eastern Veil Nebula.

This is a "mapped color" RGB image created from two channels of narrowband emission data, one H-alpha (656.3 nm, red) and the other OIII (500.7 nm, blue-green). For this particular image, I chose to assign the value of the H-alpha data to the red channel of the resulting RGB image and the OIII data to both the blue and green channels. This is commonly referred to as "HOO" mapping for short.

It should be noted that all of the data for this image was obtained on a night when the moon was 90% illuminated! This image is proof that, with narrowband imaging, you don't have to wait for a moonless night to do astrophotography!

As with the earlier image of M8, there's a lot of detail in this image and you need to zoom in to really appreciate it all! For those who have a limited zoom feature on their



browser, I've included two enlarged areas of this image interspersed below. One of the amazing things about all of the various parts of the Veil Nebula is the large distances between all of the delicate filaments of the Hydrogen and Oxygen emissions.

### Here are the image acquisition details.

- Total exposure time: 2 hours 30 minutes, 50 minutes for H-alpha (3 nm



bandpass) and 100 minutes for OIII (3 nm bandpass)

- Sub-exposures: 10 minutes each, dithered, with H-alpha acquired first to minimize the effect that moonlight would have on the OIII data.
- Site: Rick Spencer's back yard, 8/11/2019
- Sky conditions: "clear" with 90% illuminated moon.
- Optics: 10" Takahashi CCA-250 with an 0.72 focal reducer, operating at 890 mm and f/3.6 (f/4.4 based on light loss)
- Telescope mount: Astro-Physics AP1100GTO with CP4
- Imaging Camera: QSI-683wsg8, with off-axis guider (OAG), operated at -10C



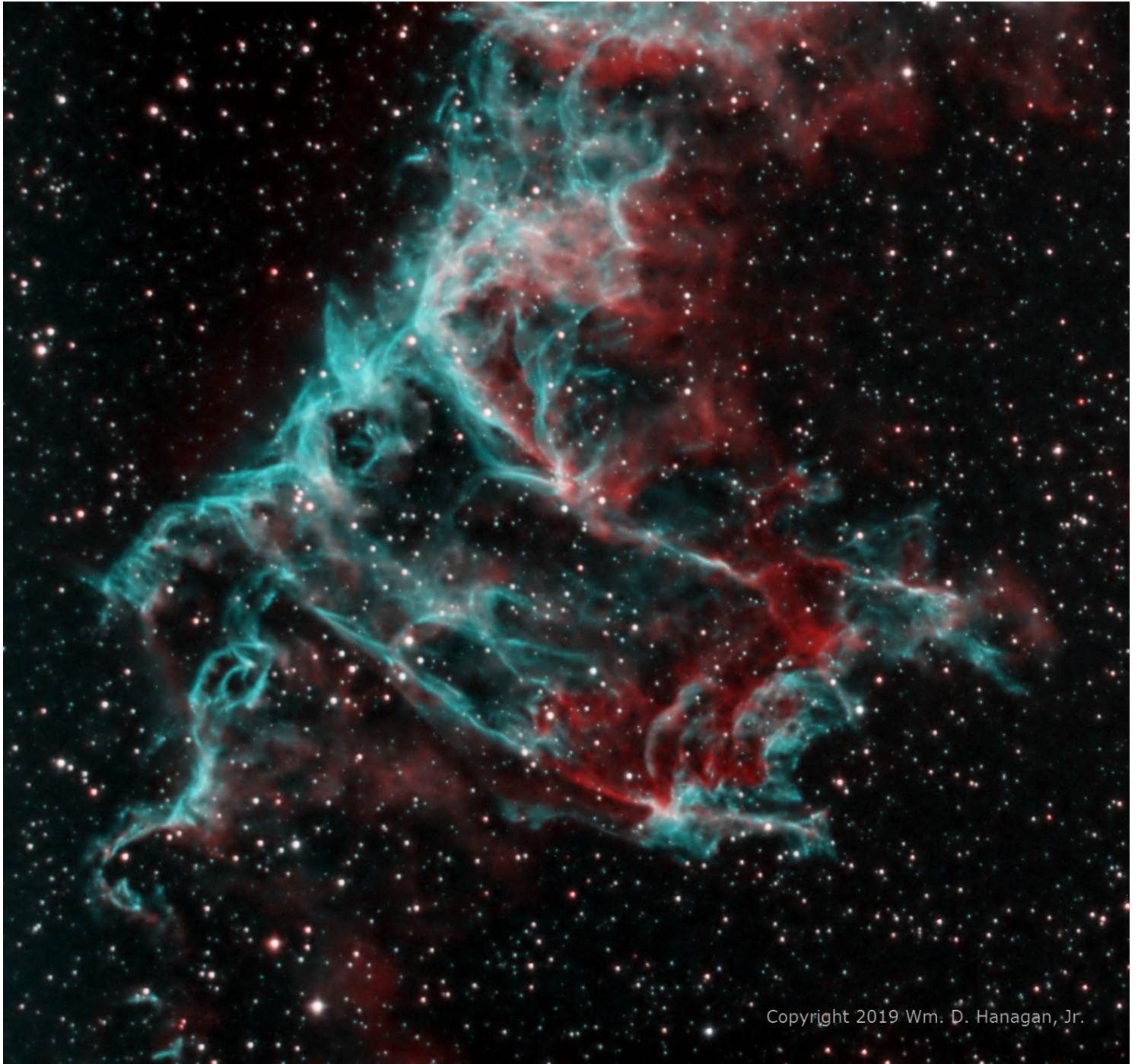
- Guiding camera: Starlight Xpress Ultrastar, mounted in the OAG
- Software: Windows 10, ASCOM, Astro-Physics Command Center (APCC), Cartes du Ciel (SkyChart), Nebulosity4, and PHD2

### **Here are the image processing details.**

I did all of the image processing using PixInsight. The most important processing steps are described sequentially below. Combined words like “ImageCalibration” and “StarAlignment” are not typos—they denote specific PixInsight Processes and Scripts that were used to transform the raw data into the final image.

- All sub-exposures were calibrated against a single master dark frame made using 24 x 10 minute dark frames.
- The sub-exposures were examined using Blink and none were rejected.
- StarAlignment and ImageIntegration were employed as usual to produce separate Ha and OIII master light frames.
- CosmeticCorrection was used to remove the remaining hot pixels and faint cosmic ray trails.
- The maximum shift of any image for each of the 4 edges was determined using Blink. DynamicCrop was used to remove the affected pixels from both master light frames.
- DynamicBackgroundExtraction was used separately on both the H-alpha and OIII masters. Deconvolution was used on both the H-alpha and OIII masters. Separate external point spread functions were obtained using DynamicPSF. Star masks were used for local de-ringing support, and range masks were applied the images to avoid sharpening background noise.
- MultiscaleLinearTransform was applied separately to both masters to reduce background noise.
- Both H-alpha and OIII masters were stretched with HistogramTransformation.
- The H-alpha and OIII masters were combined with PixelMath according the HOO mapping scheme to produce the final RGB image.

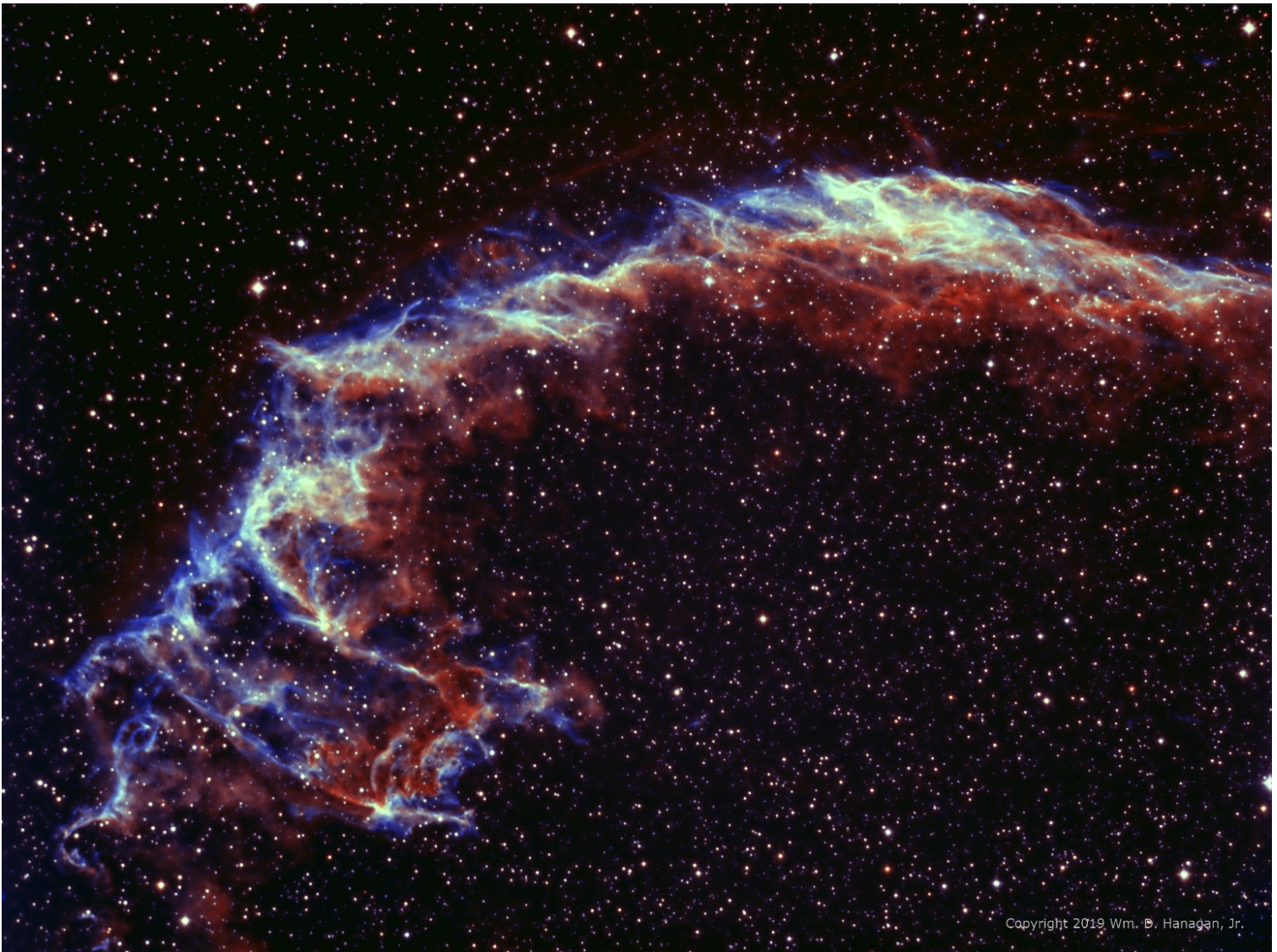
This particular part of the Eastern Veil is IC1340. It's one of several objects commonly referred to as "The Bat Nebula!"



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Lastly, here's a version of the same image that uses a different color mapping sequence where R = Ha, B = OIII, and G = 1.5 x (Ha x OIII). The formula for the green channel is Steve Cannistra's synthetic green. All other data acquisition and image processing was the same as for the HOO mapped image.



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You might wonder where the green is! Because of the math, the green channel goes high only at the intersection of high OIII (B) and high H-alpha (R) emission. The added green balances out against the high red and blue to produce a more or less "white" highlight in the photo. This helps to show where the population of Hydrogen and Oxygen in the nebula is roughly equal, but it also adds a little visual kick. I hope you like the results!

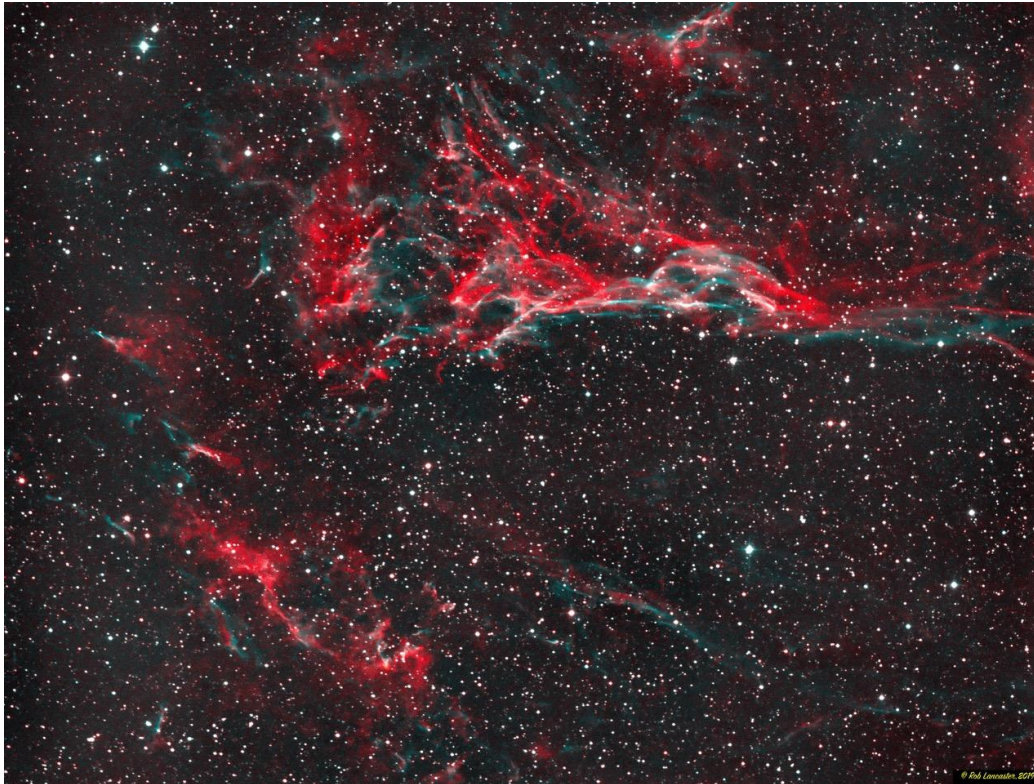
--- Bill Hanagan



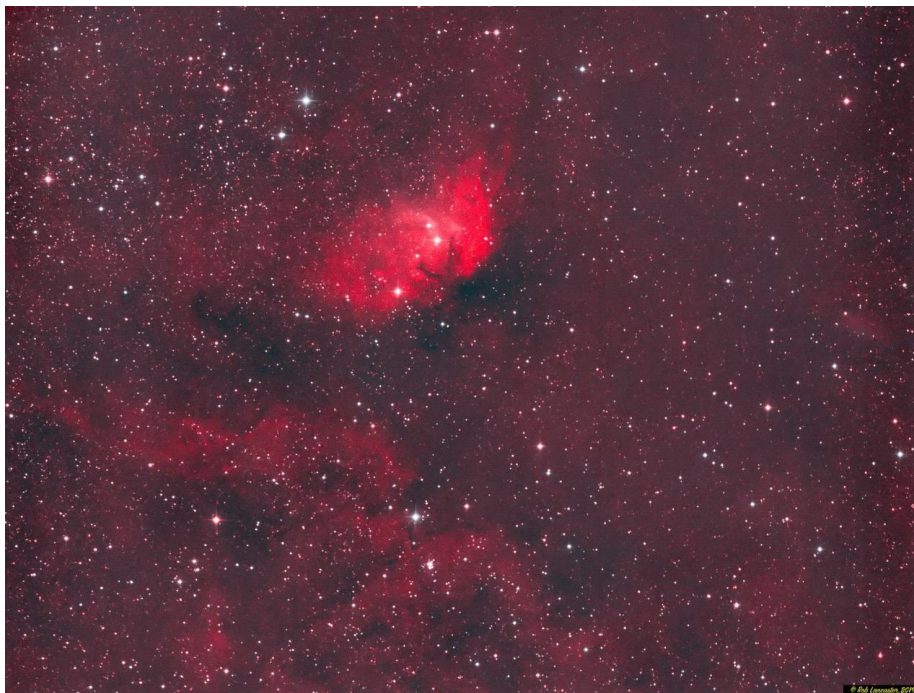
***From Rob Lancaster, who had a particularly active summer of astro imaging!***

***All of Rob's devices were connected to a raspberry pi with his MacBook controlling the imaging session wirelessly.***

Pickering's Triangle 20 Ha, 15 OIII images, 5 minutes each. Imaged with my 6 inch telescope and my SBIG camera at home in my driveway.

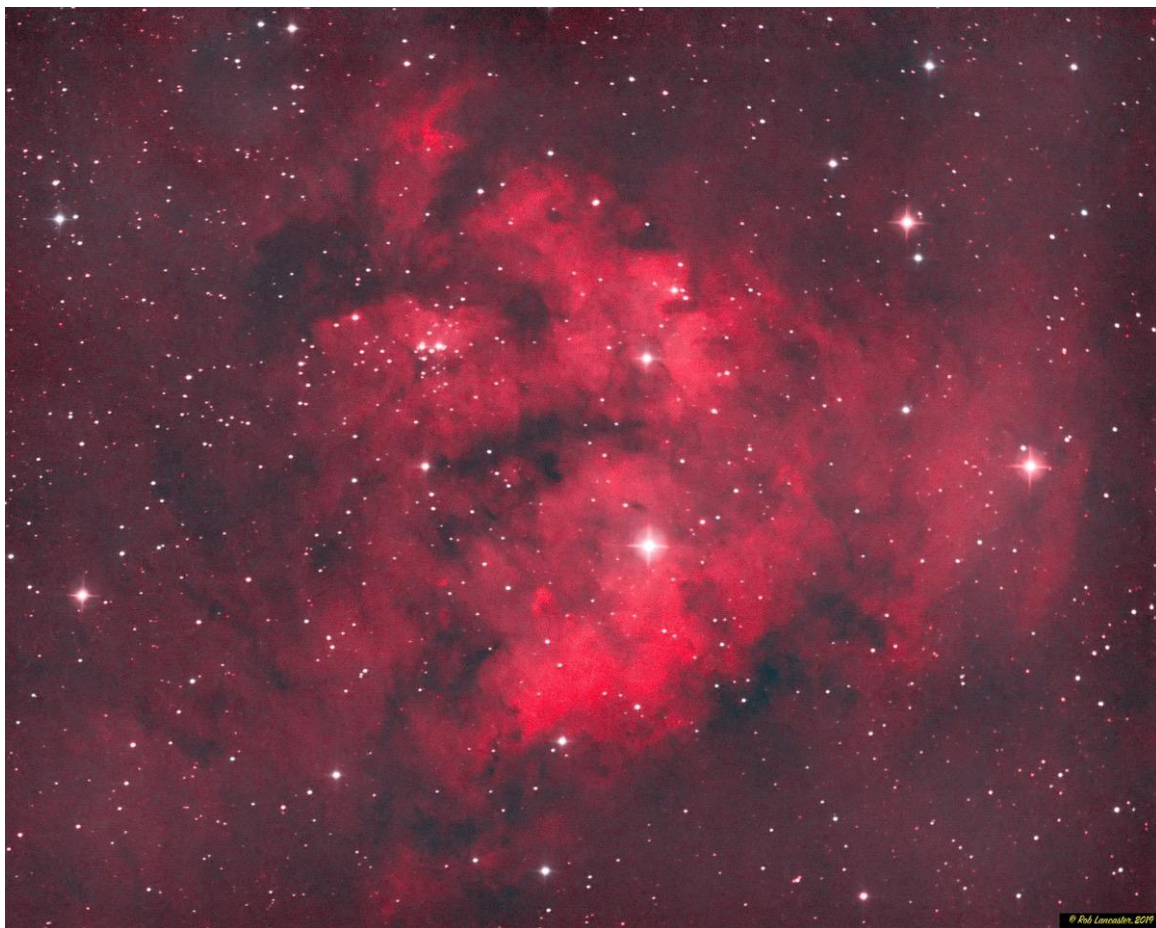


The Tulip Nebula, SH2 101, Stack of 10 Ha, 10 OIII images, 5 minutes each. Imaged with My 6 inch telescope and my SBIG camera at home in my driveway.

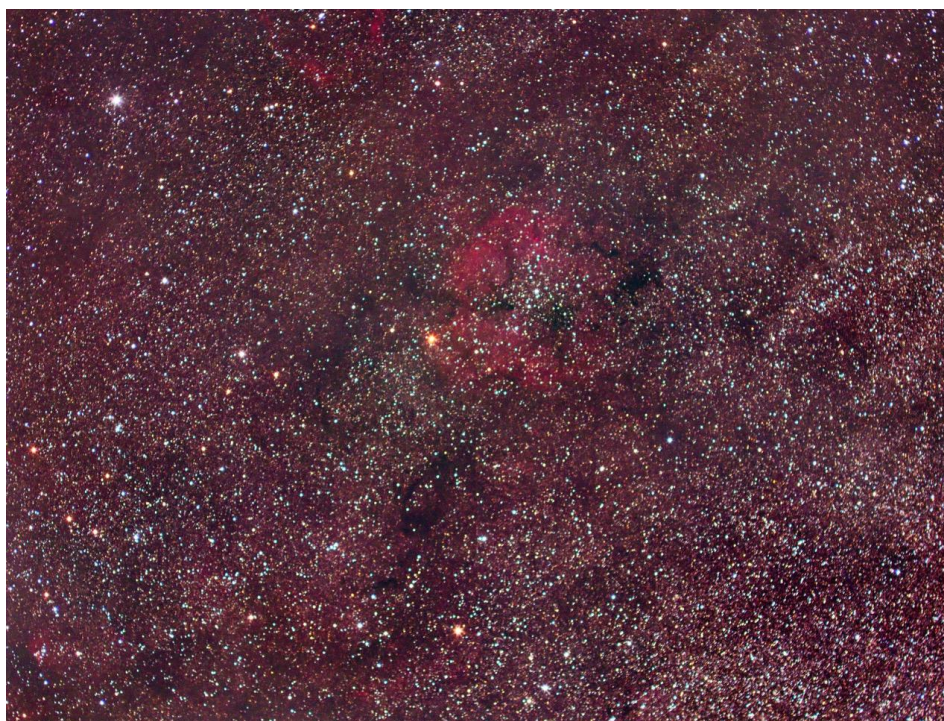




I call this the Wizards Hat, SH2 171, 19 Ha, 20 OIII images, 5 minutes each. Imaged with My 6 inch telescope and my SBIG camera at home in my driveway.

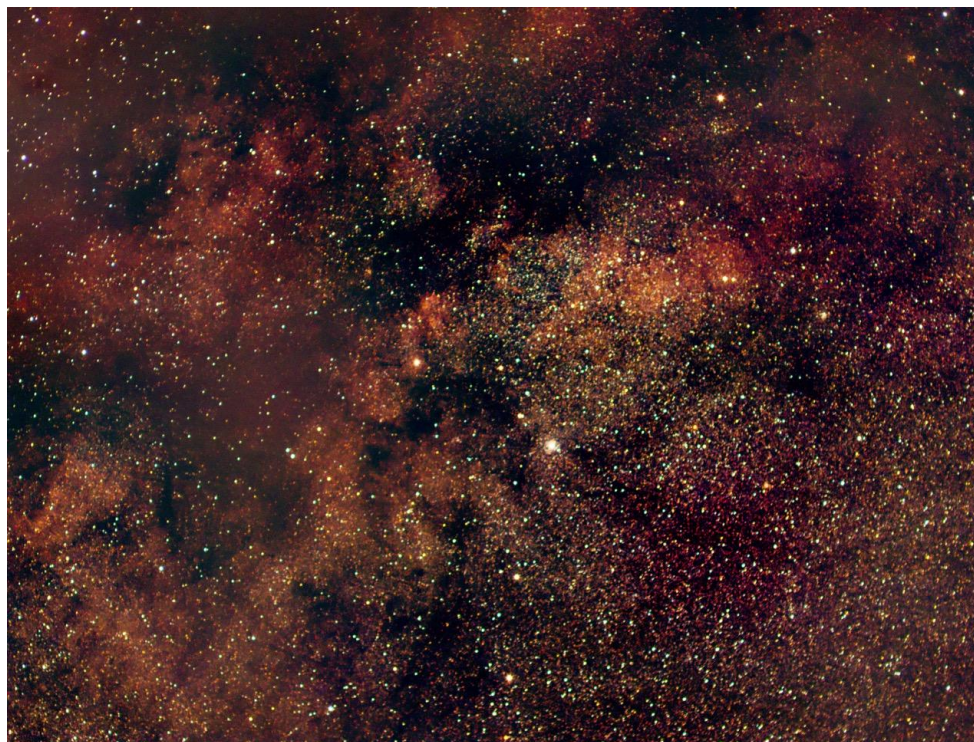


Elephant's Trunk containing Nebula in Cepheus, 3R, 3G, 3B images, 3 minutes each. Imaged with a Rokinon 85 mm lens and my SBIG camera at Mt. Cuba observatory.

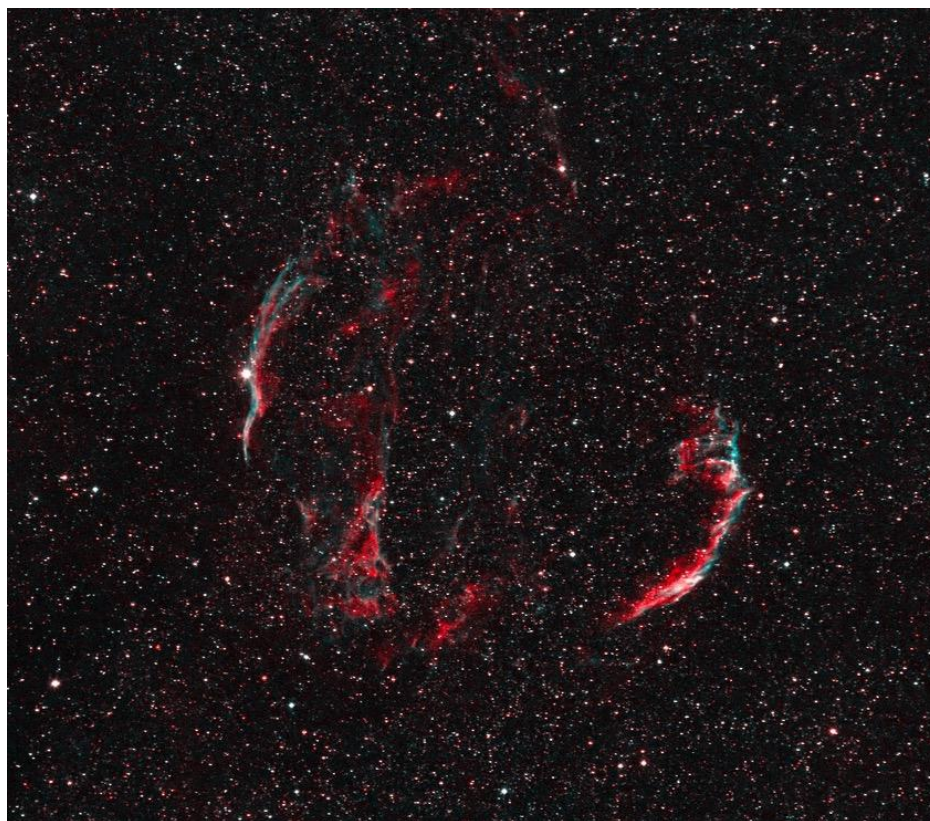




Scutum Star Cloud, 6R, 6G, 5B images, 3 minutes each. Imaged with a Rokinin 85 mm lens and my SBIG camera at Mt. Cuba observatory.



Entire Veil Nebula, 30 Ha, 18 OIII images, 3 minutes each. Imaged with a Rokinin 85 mm lens and my SBIG camera in my driveway.





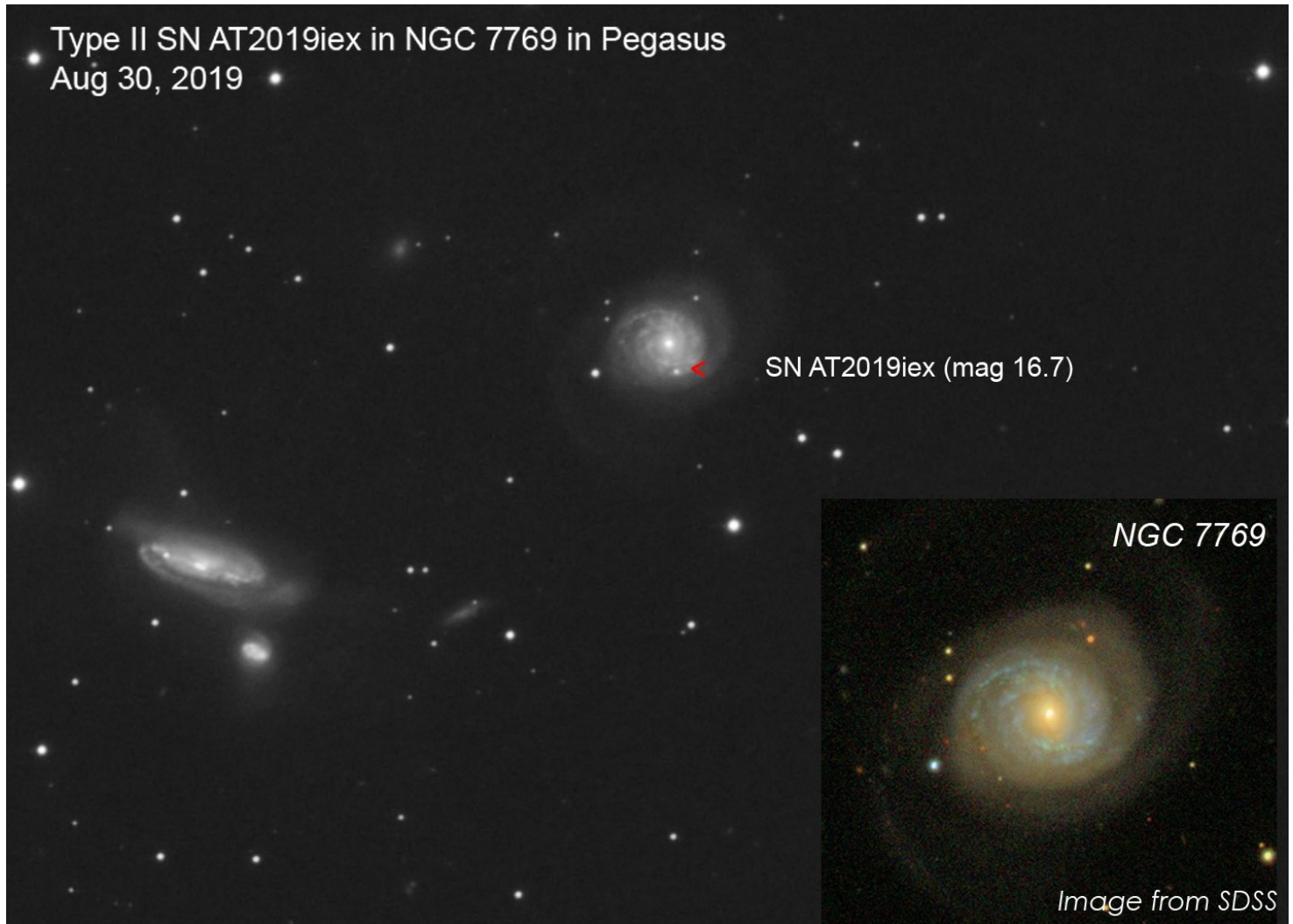
Milky Way Galaxy in Narrowband, 20 Ha, 10 OIII images, 3 minutes each. Imaged with a Rokinon 85 mm lens and my SBIG camera at Cheslen Preserve.



*Editorial comment: This last gorgeous image (minus the colors) reminded me of the Milky Way as seen visually from a truly dark site. That is one of the beauties of astrophotography, esp. with narrowband filters--RGS.*

*"There is no frigate like a [narrowband filter] to take us lands away."  
(with apologies to Emily Dickinson)*

Here's a spectacular contribution from Igor Peshenko.



Type II supernova AT2019iex in NGC7769 in Pegasus. Discovered on June 26, 2019 by David Sand, Wen-fai Fong, Kerry Paterson, Michael Lundquist (SAGUARO).

The supernova was imaged on the night of Aug 29-20, 2019 at BMVO. This is a stack of 18 x 120 sec frames (luminance filter). Processing: stacking and logarithmic stretching in IRIS then additional histogram adjustment in Photoshop. Visual magnitude of SN was calculated using a single 120 sec non-stretched FIT image and "aperture photometry" tool in IRIS version 5.59 (<http://www.astrosurf.com/buil/iris-software.html>). Values of visual magnitude of reference stars were taken from WikiSky server ([www.wikisky.org](http://www.wikisky.org)). Insert (lower right) shows Sloan Digital Sky Survey (SDSS) image of NGC 7769.

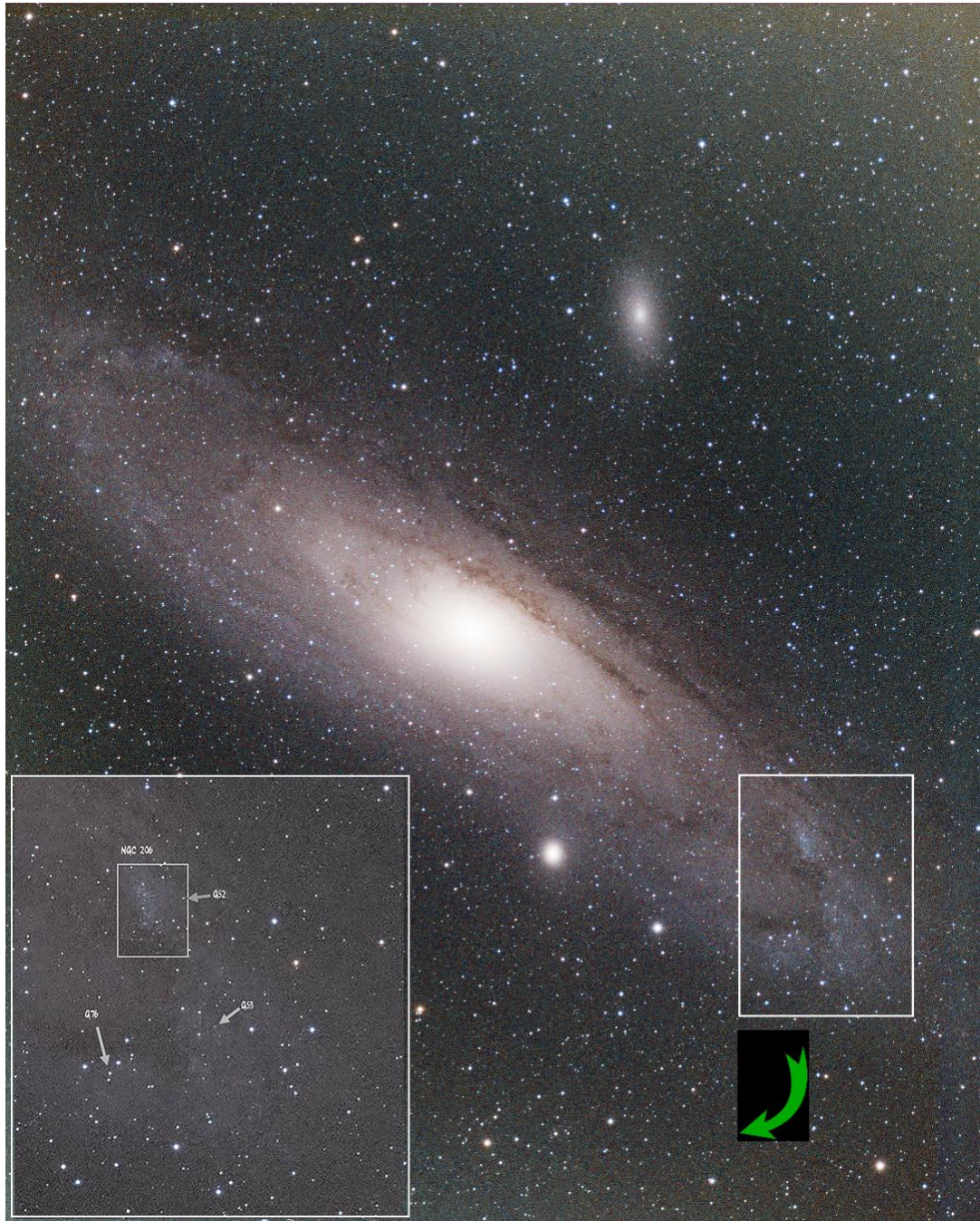
Equipment: Orion Atlas mount, Orion 8" f3.9 Newtonian astrograph, Paracorr 2" coma corrector, 50 mm f3.2 guider/ QHY 5L-II, ASI1600MM PRO camera, ZWO electronic filter wheel and ZWO 31 mm filters. Software: Stellarium, EQMOD, AstroPhotography Tools, PHD2.



And a beauty from Mark "Mark" Mitchell, who says:

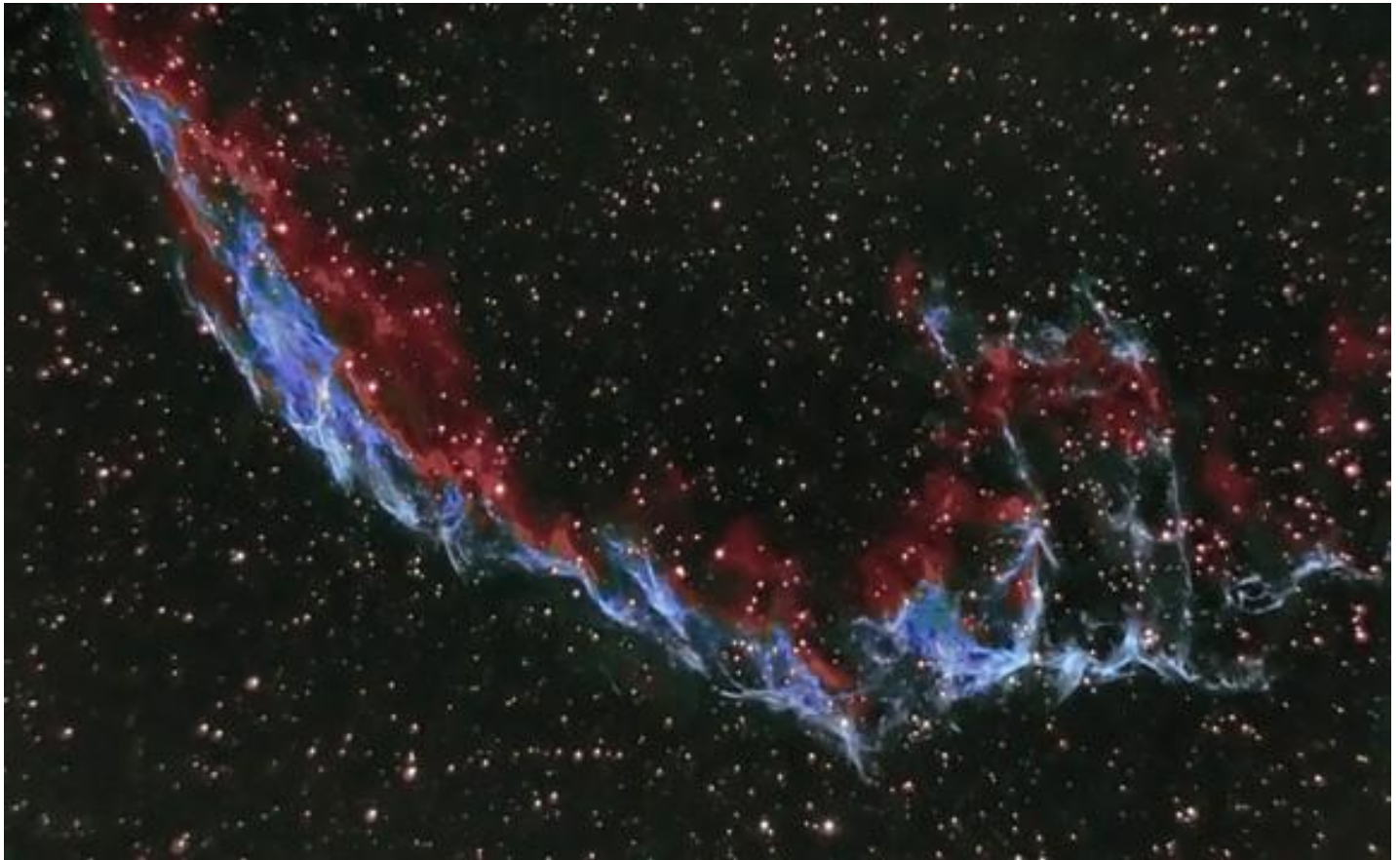
*I'm going to try to fulfill the Astronomical League Globular Cluster observation list this year. Most DAS members have seen globular clusters in our own Milky Way through the telescope or as published images, but there are hundreds of globular clusters visible around other galaxies.*

*This is a short regular color image of our neighbor the Andromeda galaxy with a blown-up insert that shows three globular clusters called G76, G52 and G53. These are all near the star cluster NGC 206 that you can see in both images. In my telescope these globular clusters just look like stars.*





Ron Worden produced this lovely shot of a favorite target, but one not often seen so brilliantly!



NGC 6992(Caldwell 33) Also known as the Eastern Veil Nebula is a cloud of heated and ionized gas and dust in the constellation Cygnus

Date: 07/12/2019

Location: Snobie Observatory/Lincoln Control Center.

Bear, Delaware W75° 40' 43.04" N39° 34' 39.7"

Telescope: ED102CF Refractor + .8x Focal Reducer F/5.6 , FL 571mm, Guide Scope 60mm Prime Luci Labs

Mount: Losmandy G11 Guided with Dithering

Cameras: SBIG ST2000XM + ZWO174 autoguider(+/-1 arcsec)

Temperature: 76°F cooled to -15°C

Filters: Sii,Oiii,Hb

Exposure: 17LFs-300sec subs(85min) (5Sii,6Oiii,6Hb) Red channel was Sii ~680nm, Green channel was Oiii ~510nm, Blue channel was Hb ~475nm

Software: PixInsight

Frame: 54.4 x 71.2 arcmin

Calibration with: Master Dark from 10 dark frames

Observer: Ron Worden



# Summer 2019 AP-SIG Meeting Reports and Upcoming Meetings

Reported by Bill Hanagan, AP-SIG Founder

Elephant Trunk detail by  
Mark Mitchell

## June 2019 AP-SIG Meeting Report by Bill Hanagan

The June 28 AP-SIG meeting was held on site at Mark Mitchell's home in Hockessin. Mark provided sandwiches from Jersey Mike's and a wonderful cheese deep-dish pizza made by Lou Malnati's in Chicago. Mark's wife Karen also made a special version of Brownies for desert.

After dinner, Mark described his imaging rig, including his new Atik 460EX monochrome CCD camera, which is based on the SONY ICX694 sensor, which I'll describe toward the end of this report. Mark also reviewed some of the images that he has sent out to his personal "Astrophotography E-Mail" list and described what he found interesting about each of the objects.

We also had our usual Q&A session and review of astro-photos. The image of M8 that I presented at the meeting appears on the screen in the next photo and later in this issue of the FOCUS.

We stopped after the indoor part of the meeting for the group photo you see here.

Appearing from left to right are Ron Worden, Sidney Ocampo, Ryan Gilbert, Rob Lancaster, Mark Mitchell (our host),



Rick Spencer, and yours truly. My image of M8 (which appears full sized above) happens to be visible on the TV screen in the photo.



Next, we headed out to Mark's garage to see his latest imaging gear, below.

In the photo, the main (imaging) scope is a Stellarvue SV70T triplet apochromatic refractor with a 0.8x reducer / field flattener, giving it an effective focal ratio of f/4.8 and a focal length of only 336 mm.

Mark also uses an Explore Scientific ES127 with a 0.8x reducer / flattener, operating at a focal length of 762 mm and f/6. The two scopes give pixel scales of 2.79 and 1.32 arc-seconds / pixel, respectively. Regardless of which OTA he mounts for taking images, Mark uses a separate guide scope equipped with a QHY5L-II guide camera for auto-guiding. His Atik 460EX imaging camera is paired with an Atik EFW3 filter wheel populated with Ha, OIII, and SII narrowband filters in addition to the usual RGBL filter



set. The mount is a Vixen "Sphinx" SXP. The entire rig is controlled by a Windows computer running Sequence Generator Pro and it uses ASCOM compatible device drivers for the imaging and guide cameras as well as the telescope mount.



The ICX694 is a front illuminated, anti-blooming sensor. Compared to other CCD and CMOS sensors with these features, the ICX694 has an unusually high quantum efficiency (QE) across the visible spectrum. Back-illuminated sensors have even higher quantum efficiencies, but are many times more expensive. The bright red curve in the graph at the link below shows the absolute quantum efficiency (QE) of the SONY ICX694. Compare that to the light blue curve for the widely used KAF8300 CCD.

[http://blog.astrofotky.cz/pavelpech/files/2013/03/QE\\_PBernhard.jpg](http://blog.astrofotky.cz/pavelpech/files/2013/03/QE_PBernhard.jpg)

Across the visible spectrum, the QE for the ICX694 is at least 1/3 higher than that for the KAF8300. As a result, with other things being equal, an ICX694 needs 1/3 less total exposure time to reach the same S/N as a KAF8300 based system, purely because of its higher QE. This holds true regardless of whether sky-background shot noise or read noise is limiting, so it applies regardless of what filters you use.

Unfortunately, the active area of the ICX694 is only half that of the KAF8300. If you're regularly forced to make two-panel mosaics with the ICX694 then you would probably save time by using the larger KAF8300 despite its lower QE.

Mark used his new Atik 460EX to produce the image of M94 (right).

This is known as the "Cat's Eye" galaxy. Note the unusual faint outer halo, which is actually part of a vast, faint spiral structure.



- Total exposure time: 250 minutes, 150 minutes on green, 50 minutes on blue, and 50 minutes on red
- Sub-exposures: 5 minutes each, not dithered
- Site: Hockessin, DE, on multiple dates

- Optics: Explore Scientific ED127 with a 0.8 reducer / flattener, operating at 762 mm and f/6.
- Telescope mount: Vixen SXP
- Imaging camera: Atik 460EX operated at -15C.
- Guiding camera: QHY5LIII mounted in an attached guide-scope.
- Software: Windows 10, ASCOM, Sequence Generator Pro, and PHD2
- Processing: PixInsight 1.8 through stretching, then Photoshop CC 2019 for using “Highlight masks” to further enhance the image

### **July 2019 AP-SIG Meeting Report** by Bill Hanagan

We held the July 27 AP-SIG meeting at MCAO and the Sawin Observatory. I provided subs from Capriotti's for dinner and Bob Trebilcock brought brownies for desert. Thanks Bob!

I gave the special topic presentation for the meeting on the subject of **How to Setup and Use EQMOD under Windows for Imaging with the DAS's "EQ" Style Mounts--the HDX-110 and the EQ6/R**. As part of the presentation, I connected my Windows 7 laptop to the DAS EQ6-R mount in the library at MCAO and demonstrated GOTO operation under the control of the freeware planetarium program Cartes du Ciel 4.0 (aka “SkyChart”).

We also had our usual Q&A session and presentation of astrophotos. Rob showed us a video of clouds moving in front of the North American nebula taken with his new Rokinon lens. I showed my version of M8, which appears elsewhere in this issue of the FOCUS.

After the indoor part of the meeting, we headed outdoors to give those interested a chance to connect their Windows computers to the HDX-110 using EQMOD and Cartes du Ciel. Dave Hockenberry brought along a Windows 10 laptop that had all of the necessary software installed and was eager to make the connection, so we connected his computer to the HDX-110 and used it to demonstrate computer control of the telescope for imaging.

We had a slight problem getting a good star alignment initially because of an improper minus sign in front of the West Longitude value in Cartes du Ciel, but everything worked beautifully once this error was corrected. We then put the system through its paces, slewing from object to object completely under computer control. Ryan Gilbert got out his Nikon DSLR to take some test shots, but unfortunately his new unified T-ring + T-adaptor had an unnecessarily tall shoulder that kept his camera from reaching focus.



Rob Lancaster also brought out a portable imaging rig for use with camera lenses based on an old LXD55 mount that he picked up at the Delmarva Stargaze some years ago. Rob and a few others also pulled out the 17.5" scope and did some visual observing.

In all, a total of 12 people attended, including Aaron Berner, Kathy Coons, Ryan Gilbert, Bill Hanagan, Tom Harding, Dave Hockenberry, Jay Jones, Rob Lancaster, Sidney Ocampo, and Bob Trebilcock. I didn't get the names of two people who came in during the meeting. Unfortunately, I was also too busy giving my presentation and helping people connect to the telescopes to get any photos.

### **August 2019 AP-SIG Meeting Report** by Bill Hanagan

The August 30 AP-SIG meeting was held on-site at Ron Worden's home and observatory. We started off with a look at Ron's Amish-built observatory and his new wide-field imaging scope, an Explore Scientific ED 102 CF Triplet APO Refractor, which Ron picked up on sale at NEAF back in April. The refractor is mounted piggy-back style on his 10" Meade SCT (right) and both scopes are mounted on a Losmandy G11 German Equatorial Mount. Due South falls near the right edge of the photo.





Ron has the focuser on his new refractor motorized. After he gets everything up and running, he can control the telescope and acquire images from the comfort of his basement control center. Ron's observatory was shown and described in greater detail in past issues of the FOCUS, most

recently the March 2018 issue.

In the photo above, the group discusses Ron's imaging rig. The door in the background leads to a warm room originally used as the computer control center and partly visible in the photo below.

Warm rooms are a very common feature of amateur observatories, offering a chance to operate imaging telescopes close to the action but without being subjected to the cold the entire time. Even if you plan to control your telescope from a more remote location, a warm room can be a great place for interactive problem solving, which is often needed when doing astro-photography.

When doing visual observing, a warm room can be a handy place to keep charts and reference books and take a break to warm-up.







The photo on the left shows Ron starting up the telescope. The small opening in the wall to the left of center is a window between the control center and the open section of the observatory.

On the right, Ron demonstrates the Astrozap heated dew shield that protects his 10" SCT on dewy nights.

Note that the telescope tripod sits directly on the wooden floor of the observatory. This is workable if you aren't in the observatory while images are being acquired, but it's not really ideal. Ron has plans to cut a hole in the floor and install a concrete base onto which he'll bolt a Le Sueur steel pier that he has been modifying to support the Losmandy Gemini mount and ultimately his two imaging scopes.

Everyone paused for the group shot below before heading inside for the indoor part of the meeting. From left to right are Ron Worden, Rob Lancaster, Dana Wright, Bob Trebilcock, Mark Mitchell, and Bill Hanagan.







Once indoors, Ron treated us to a dinner of Pizza and assorted soft drinks. Afterward, we retired to the basement control center where we reviewed everyone's recent astrophotos and saw a demonstration of Ron's autofocus system.

### **Plans for the September 20 / 21 AP-SIG Meeting by Bill Hanagan**

The September meeting will be held on site at Rob Lancaster's home. It has been awhile since we've visited Rob's and he has a number of new lenses and gadgets to tell us about.

The exact date and time of the meeting depends on the weather and will be announced via DAS@groups.io email and by direct email to the AP-SIG members.

As usual, we'll also take a look at everyone's most recent photos. When you come, be sure to bring a USB memory stick with your astrophotos and any related project materials that you would like to show the group. Even if some of your photos have imperfections, it's a good idea to bring them with you to promote the discussion of image acquisition and processing techniques. If you are not an AP-SIG member you can always come to the meeting to see what goes on and sign up later.



## August at the Woodside Creamery: Photo-essay from James Chang



*Jupiter is to the lower right of the moon, portending favorable crop yields.*  
(If you somehow can't see Jupiter, request the original from Jim.)



## Summer scientist birthday

Enrico Fermi

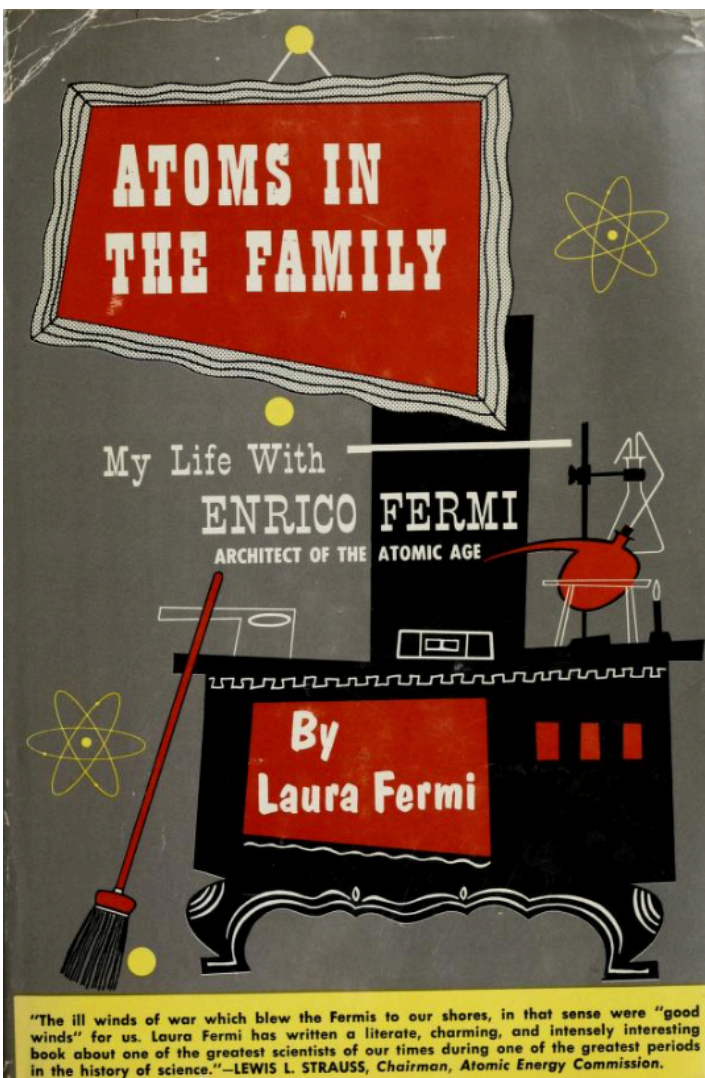
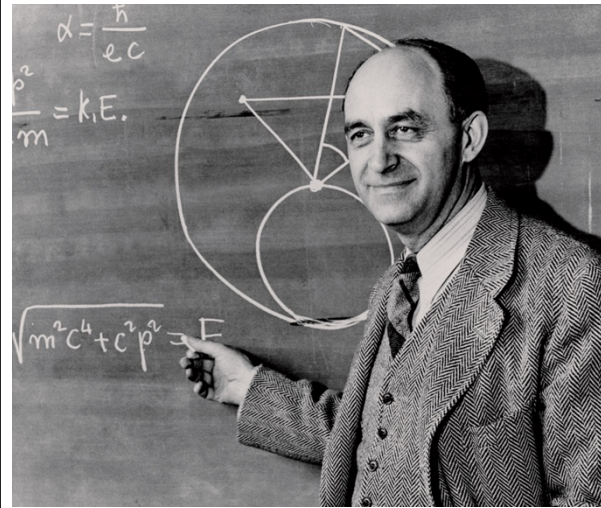
Sept. 1901- Nov. 1954

*Italian physicist par excellence*

**Nobel Laureate, 1938**

*"For his demonstrations of the existence of new radioactive elements produced by neutron irradiation, and for his related discovery of nuclear reactions brought about by slow neutrons."*

Fermi's theoretical contributions or his experimental contributions would be more than enough to assure immortality. But he thought of himself foremost as an experimentalist.



Fermi's wife, Laura Fermi, produced a fascinating and famous biography of her husband—revealing much about her human side, and a bit less about her husband's.



"You should write your husband's biography," I was told. "I cannot," I answered. "My husband is the man I cook for and iron shirts for. How can I take him *that* seriously?" Yet the seed was sown and it produced this book.

From *Atoms in the Family* by Laura Fermi.



My favorite anecdote from "Atoms in the Family", read when I was in graduate school, is Laura Fermi's report from when she first met Enrico:

**"A group of friends...[introduced me to] a short-legged young man...with rounded shoulders and neck craned forward...my friends tried to impress me: "He is a promising physicist, already teaching at the university, although he is only twenty-two." To me this explained the young man's posture and queer appearance; but twenty-two seemed pretty old and time enough for achievement: I was sixteen."**



Fermilab, in Batavia, Illinois, one of the leading high-energy accelerator labs in the world

What does this have to do with astrophysics, making it suitable for the FOCUS? The principles of the cyclotron and synchrotron radiation are revealed in many high-energy astrophysical phenomena, including cosmic rays.

*We may discuss the physics behind this at a future DAS meeting.*

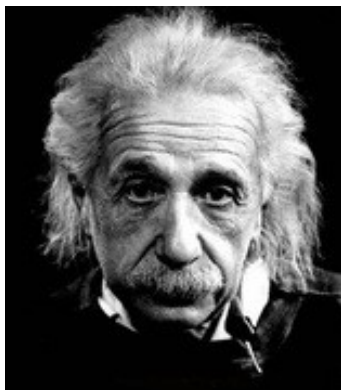
## MCAO Volunteers Needed

Kim Green, secretary at the Mount Cuba Astronomical Observatory, is seeking volunteers. We have increased our field trip activity, we have added many additional Public and Family Nights and we added children's programs to our calendar. The community has requested these programs and we are doing our best to accommodate. With that being said, we are looking for volunteers to help out. We are desperately in need of people who are available to help during our day time led trips. But we would also love to have some evening help as well. So keep an eye out for future emails from me. If you are interested in helping out please contact me at 302-654-6407 or email me at [KimGreenMCAO@gmail.com](mailto:KimGreenMCAO@gmail.com)





# DAS Loaner Equipment



“Be a loner. That gives you time to wonder, to search for the truth. Have holy curiosity. Make your life worth living.”

**The DAS has several telescopes that are designated for loan to members. Our advice to new members is to take any of these telescopes out on loan so you can learn the advantages and disadvantages of the various designs.**

- 80mm Celestron Refractor with a NexStar GOTO mount. (On loan from Bill McKibben)
- Meade ETX 90mm Special Edition
- Bushnell Voyager 4” tabletop scope (AstroScan clone)
- Three Dobsonian scopes: two with 6” aperture, one with 8” aperture. This style scope is very easy for beginners.
- Meade 8” LX-10 Telescope: This 8” Meade LX-10 Schmidt Cassegrain Telescope (SCT) is a good loaner if you have any thoughts about buying an SCT telescope on a GoTo fork mount.

## **Procedure for DAS Members to Sign Out Loaner Equipment Jack Goodwin**

1. **Inform:** Please inform DAS Observatory Chair via e-mail -- this is currently how all loaner equipment is being logged/tracked. (email below)

### **2. Borrower email to include:**

- a. Your name and contact information (cell #, email, home number, etc.)
- b. Date equipment borrowed
- c. Description of all equipment being borrowed
- d. Estimated return date for each component borrowed
- e. List any damaged/missing components (if applicable)

3. **Damage:** If the equipment is damaged while you are borrowing the equipment, please notify the DAS Observatory Chair in a timely manner.

4. **A sign out log** will be posted in the near term to compliment the email notification.

**NOTE:** Currently DAS Loaner equipment is **only available for loan to current DAS members.** (Which is a great excuse to join DAS)

Thank you, Jack  
Goodwin,

DAS Observatory Chair [Jack\\_Goodwin@yahoo.com](mailto:Jack_Goodwin@yahoo.com) 610-457-2945 (cell)

## DAS AMATEUR TELESCOPE MAKING SPECIAL INTEREST GROUP

Bill Hanagan

The DAS Amateur Telescope Making (ATM) Special Interest Group (SIG) is made up of DAS members who get together to work on their own as well as club related telescope making projects. We get together at times and locations appropriate for whatever projects are currently underway.



The general range of activities of the ATM SIG includes all manner of telescope making including Newtonian mirror making, the testing of complete telescopes as well as individual optics, and the making of telescope accessories. In the past, we have made several Newtonian telescope mirrors from scratch and completed some mirrors that members brought in as works in progress, including one that was started in the mid-1960's! We've also made new telescope tubes, made secondary mirror holders, tested numerous telescope objectives, made wire spiders for Newtonian secondaries, and made many solar filters for telescopes and binoculars. We also completed the refiguring of the DAS 17.5" Newtonian mirror used in the Big Dob currently housed in the Sawin Observatory.

If you're interested in telescope making, feel free to email me and let me know what you're interested in doing at [hanaganw@verizon.net](mailto:hanaganw@verizon.net) and include your name, address, and phone number. I'm always glad to provide some guidance and information to other telescope makers.



Images taken before and after adjustment of the Hubble Space Telescope *using methods fully endorsed by the ATM SIG.*



# How to Join the DAS Groups.io Group

## DAS FORUM / E-MAIL SITE ON GROUPS.IO

This is an e-mail service, online forum, and information sharing service for use by DAS members and our astronomy enthusiast friends. To Subscribe to the service, just send an email to: DAS+subscribe <at> groups.io. Then we will compare your name/ email to our lists to make sure that we know you, and if so, we will approve your subscription. If you are not currently a member of the DAS, we strongly encourage you to join.

That is all that you need to do to get into the system. You don't even need to setup an account. But if you want to have more control over how you receive messages from the group or if you want to use the more advanced features, then head over to the website <https://groups.io/login> after you are approved for the DAS Group and you can log in to make any changes you like.

For more information about our group click this link:

<https://groups.io/g/DAS>

# New Members Form

Please make checks payable to DAS, print out the following form and mail to:

Robert Trebilcock, DAS Treasurer, 3823 Rotherfield Lane, Chadds Ford, PA 19317

DAS Membership costs \$30 per year, which renews November 1st. We pro-rate membership based on when you join, as follows:

Month Joined	Cost	Renewal Due
Jan-Feb	\$30	This November
March-May	\$20	This November
June-Aug	\$10	This November
Sept-Dec.	\$30	Next November

## NEW MEMBERSHIP FORM

Item	Cost	Sub-total
Membership	\$30/20/1	
Astronomy Magazine	\$34	
	total:	



Name \_\_\_\_\_  
Email Address \_\_\_\_\_  
Street Address \_\_\_\_\_  
Phone Number \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
Zip \_\_\_\_\_  
How did you hear about  
DAS? \_\_\_\_\_  
\_\_\_\_\_

For questions, contact Robert Trebilcock, DAS Treasurer at (610) 558-1637 (leave message) or by email New Members

Please see the [How to Join page](#) on our website for methods to become a dues-paying member. If you have any questions call any of the member representatives listed.

If you're just joining us for the first time, THANK YOU VERY MUCH, and WELCOME to the DAS! It's GREAT to have you with us!—Rob L.

to Trebilcock@aol.com



# DAS Contacts

Please call or email us with any questions or for more information!

## Officers:

President: Rob Lancaster, rlancaste AT gmail DOT com

Vice-President: Jeff Lawrence, (302) 668-8277, jeff AT delastro DOT org

Secretary: Bill McKibben, billmck21921 AT gmail DOT com

Treasurer: Bob Trebilcock, trebilcock AT aol DOT com

## Board Members at Large:

Bill Hanagan, (302) 239-0949, hanaganw AT verizon DOT net

Tom Harding, hardintw AT aol DOT com

Dave Groski, groski AT udel DOT edu

## Standing Committee Chairs:

Observatory: Chris Horrocks

Education: Ted Trevorow, (302) 593-7949, edt750 AT verizon DOT com

Library: Maria Lavallo and Sue Bebon

Observing: Greg Lee, (302)252-7806, greglee288 AT gmail DOT com

Publications: Rick Spencer, rgspencer AT ymail DOT com

## Other Positions:

Amateur Telescope Making Special Interest Group: Bill Hanagan, hanaganw AT verizon DOT net

Astronomical League Coordinator: K Lynn King, klynking AT verizon DOT net

Astro-Photography Special Interest Group (AP-SIG): Bill Hanagan, hanaganw AT verizon DOT net

Awards Chair: Amy Hornberger, aehornberger AT gmail DOT com

DAS Book Club Leader: Amy Hornberger, aehornberger AT gmail DOT com

Elections Chair: Sidney Ocampo, gegocampo AT yahoo DOT com

Programs Chair: Jeff Lawrence, jeff AT delastro DOT org

Webmaster: Rob Lancaster, rlancaste AT gmail DOT com

