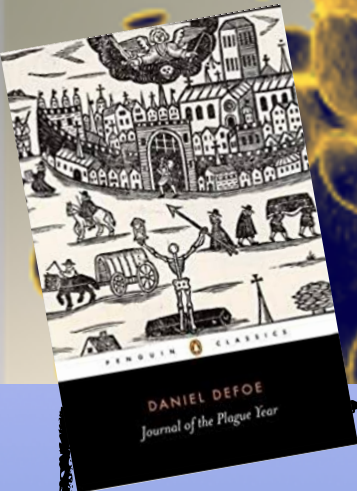


Delaware Astronomical Society



DAS FOCUS

Vol. 62, No. 9, September 2020
“An Astro-journal of the
Plague Year”

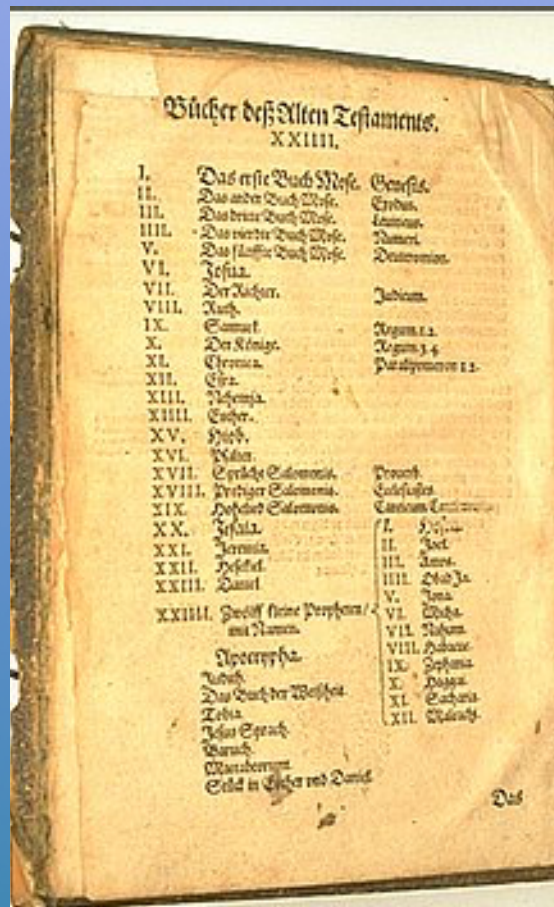
Next General Meeting:

Tuesday, Sept. 15, 2020, 8 PM

Watch your email for a Zoom link, to be sent by Rob Lancaster!

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FOCUS editor:
Richard G. Spencer
Publications Chair, DAS

September Meeting Main Topic

“How I Spent My Summer Vacation”

Multiple Mini Talks by Members of the DAS

This was a special summer of little socializing and even less travel for many of us

Pros: More time for astronomy

Cons: Too numerous to list



From the President

Rob Lancaster

September 2020 President's Column

Dear DAS Members,

As the summer winds to a close, we begin our 2020 -2021 season for the DAS. The last few months have certainly looked different for our club and its members with all of our events cancelled due to the coronavirus and our meetings pushed online to the Zoom platform, but the night sky and all of its wonders is still available for us to seek solace in its beauty and intrigue. I hope that you have been healthy and have had a fairly good summer despite the circumstances and I look forward to seeing you in the near future at our club meetings, even though they may be virtual.



Although the publication of the Focus was suspended during the summer months, our club activities were not. We have been having Astronomy Workshops every Tuesday. During the last few meetings, we have been helping a few beginners get started in their astronomical journey. Remember that all of you are welcome to attend and if you have any questions about astronomy or just want to talk with your DAS friends, the Astronomy Workshops are a great place to do that. We have continued to regularly have the AP SIG meetings every month, which have been well attended and very interesting. We have also had good Monthly Meetings for the last few months. After our great talk from Prof. Denis F. Cioffi in June, we had our first July meeting since 1958 where I talked about getting started in astrophotography. We did not have a Monthly Meeting in August.

During our board meeting last Tuesday, we discussed the upcoming months. We unfortunately need to continue to

suspend our in-person outreach events, however, if anyone would like to do a virtual outreach event for a school, a club, a church group, a museum, or anybody interested in astronomy, we would certainly encourage you to do that. Mount Cuba has done several of these so far, and they have been very successful. Jeff is working hard to plan the next few months of virtual speakers for our monthly meetings. If we do end up having in-person meetings, some of the local speakers could do the presentation live and the others could easily be projected on the big screen at Mount Cuba. But for now, we think it is wise to plan on them being virtual.

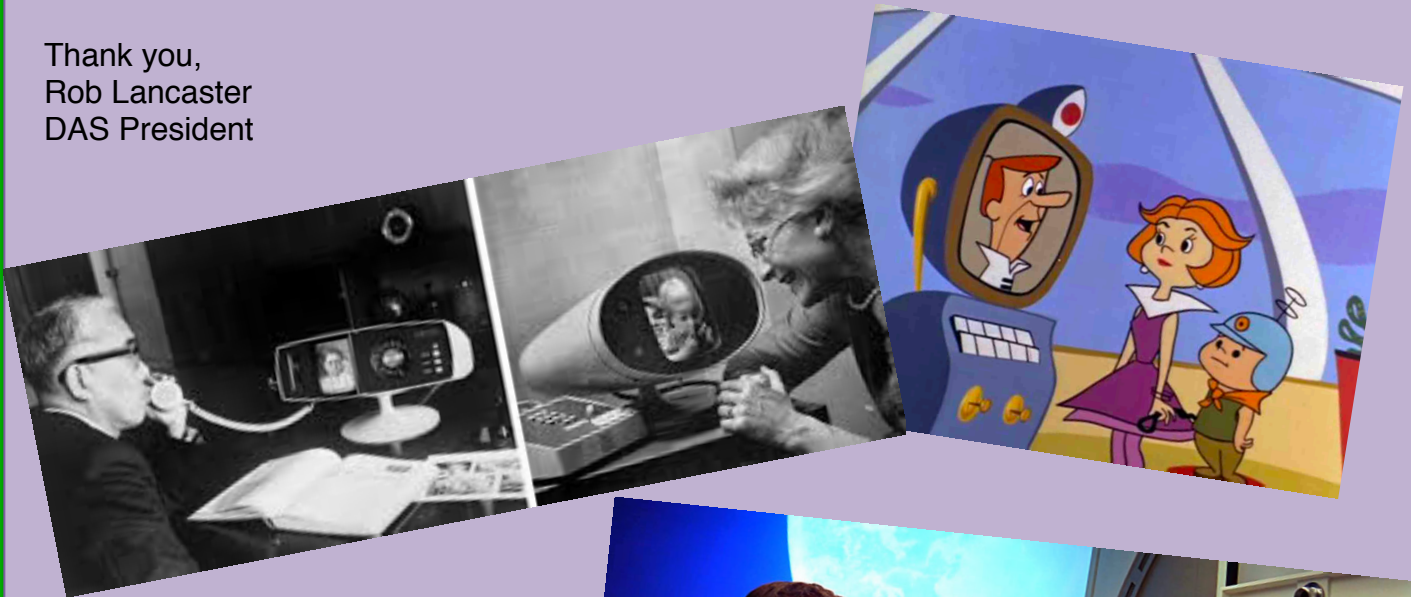


From the President (cont'd)

The AP SIG and Book Club meetings can continue as usual, but the Introduction to Astronomy Course, the Picnic, the Holiday Party, the Dinner Meeting, and other similar events must continue to be on hold. We are considering having some socially distanced Member Star Parties or Deep Sky Sessions, but due to coronavirus, we cannot share equipment and we can't have the events at the Sawin observatory for the same reasons. Remember that the Mount Cuba Observatory is closed to events for the foreseeable future, but that doesn't mean that nothing is happening. The Mount Cuba Observatory is planning to use this time to build the new observatory dome, and that work will be starting very shortly. We likewise hope to work on finishing the improvements to the Sawin Observatory, although the coronavirus has limited our ability to work on it efficiently.

At the September Monthly Meeting, we will be having a series of DAS Members making presentations. Jeff has said he already has several great speakers lined up! If you would like to speak, please make sure you contact him very soon. I hope to see you there. Also, I hope you plan to attend some of our upcoming meetings, such as Astronomy Workshops, AP Sig meetings, and/or Book Club meetings. I hope that you get a chance to also get outside and look up at the night sky to enjoy the beauty that surrounds us. Once the epidemic subsides, I hope to see you at our organized events again soon, and until then, I hope to see you virtually at our upcoming events!

Thank you,
Rob Lancaster
DAS President



*The science fiction version
is so much more fun than
reality.*



Poetry Corner—Contributed by Sheila Vincent

This wry, wistful poem laments the gulfs that can exist between two people with disparate world-views. Even when speaking English we don't always manage to speak the same language...

The poem was written in 2011. In 2020, the last line takes on an unforeseen pandemic poignancy.

- The English Major,
aka Sheila Vincent

The Physics Major Agrees to Take the English Major Stargazing

Andrew Rihn

Triangulation is its own form of peer review,
she says to me absentmindedly.

Except we call it parallax.

In my field, we call it subject position
or point-of-view: as good a reason as
any

to doubt the existence of an objective
reality.

I place the palm of my hand over my
right eye,

then my left. The world steps to the
side,

as if making way. Objects closest to me

adjust the most. The right eye doesn't know
what the left eye is seeing, but somewhere
in this skull of mine the images merge.

In my field we call this *revision*.

The stars don't seem to change at this distance.

She goes on to explain the largest parallax

we have is the earth's orbit. *Imagine
the patience it takes to wait six months*

between measurements. Imagine the differences
between what she sees and what I see.

Imagine the distance between our two bodies.



Summer Famous Scientist Birthday

Sir Martin Rees

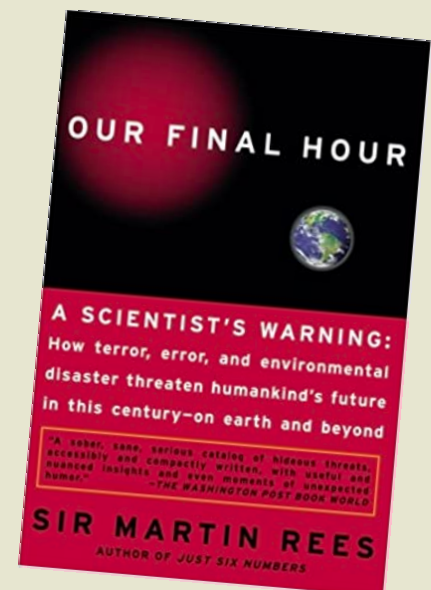
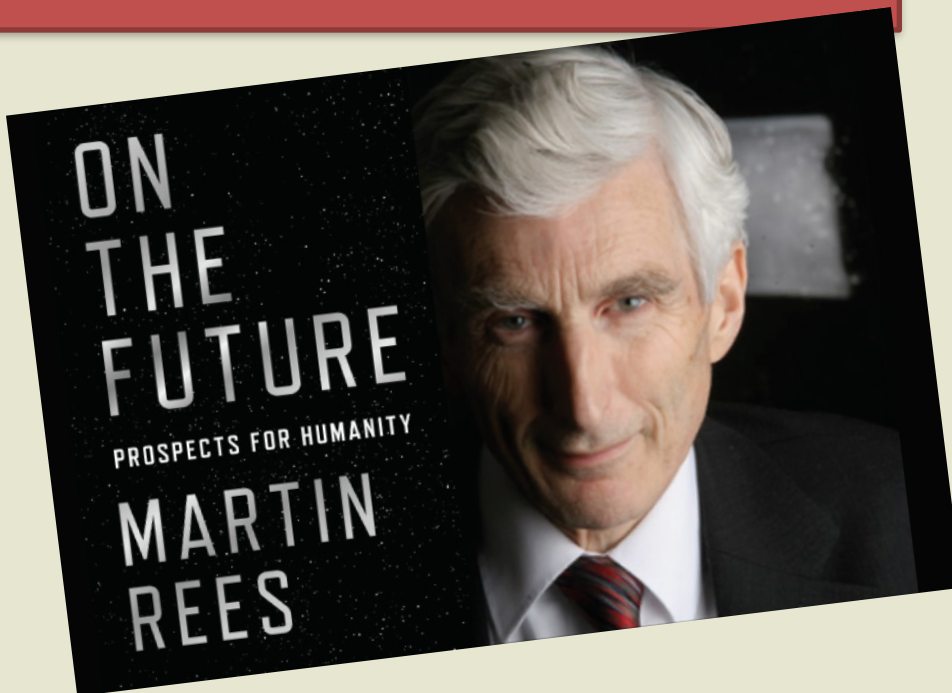
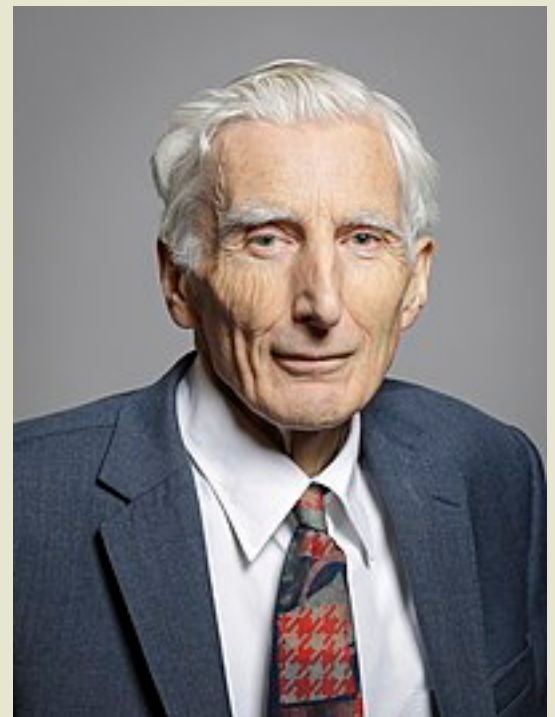
The Lord Rees of Ludlow, OM, FRS, FEng, FMedSci, FRAS
June 23, 1942—

Astronomer Royal of the United Kingdom

Past Director, Institute of Astronomy
University of Cambridge, Cambridge, UK

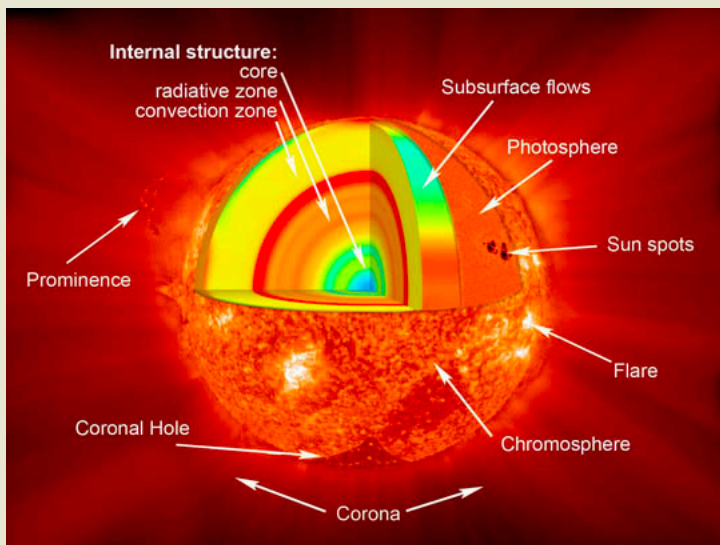
Sir Martin is known primarily for his numerous contributions to cosmology, but is also a leading popularizer of rigorous science.

(Also I met him a bunch of times when I was a graduate student; he was already mega-famous but incredibly nice and down-to-earth.)



The reason I selected him for yet another honor, being the featured scientist in the FOCUS, is because I ran across this very lovely quote from him:

"Cosmologists have, nonetheless, made real progress in recent years. This is because what makes things baffling is their degree of complexity, not their sheer size—and a star is simpler than an insect."



Kinda simple, in a way



*Kinda complicated,
according to Sir Martin*

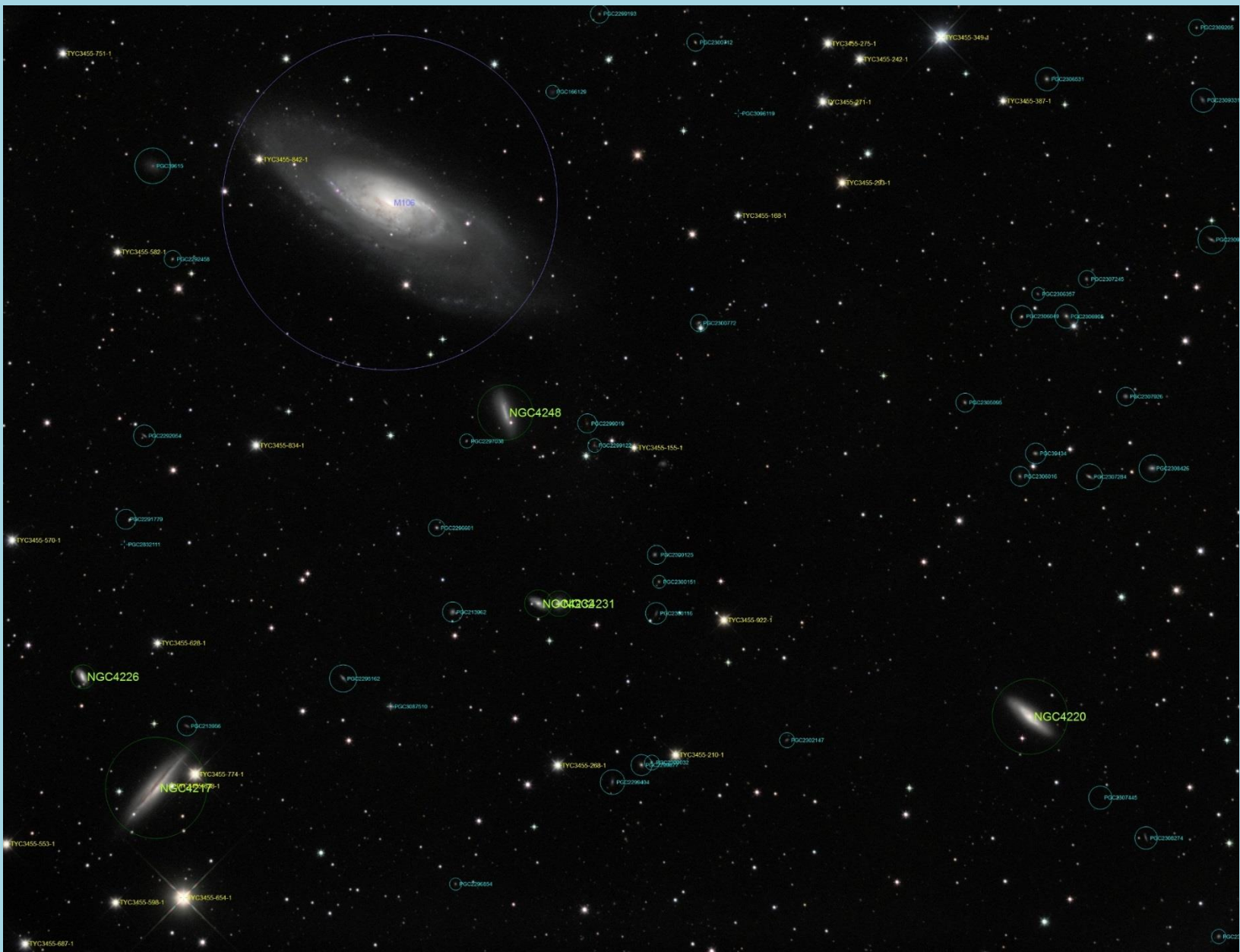
Astrophotos by AP-SIG & DAS Members

M106 and Neighboring Galaxies (LRGB)—by Bill Hanagan

M106 is a spiral galaxy in the constellation of Canes Venatici and is one of the more prominent of the many closely spaced galaxies there and in the lower regions of Leo. It is usually seen and photographed in the early summer. Also prominent in this image are NGC galaxies 4226, 4217, 4332, 4231, 4248, and 4220. There are also 42 less prominent galaxies which you can find in the image if you zoom in and pan around.



Those less prominent galaxies are identified in the annotated image below. Further below, I've included two crops of M106 (left) and NGC 4217 (right) with the saturation boosted 50% to make subtle color variations in these two galaxies easier to see.



Data Acquisition Summary for M106 and Neighboring Galaxies

- My images were produced from data acquired jointly with Rick Spencer.
- Total exposure time: 5 hours 35 minutes.
- Sub-exposures: Luminance: 31 x 5 minutes binned 1x1; RGB: 12 x 5 minutes (each) binned 1x1.
- Optics: 10" Takahashi CCA-250 with an 0.72 focal reducer, operating at 890 mm and f/3.6 (f/4.4 based on the amount of light blocked by the central obstruction)
- Telescope mount: Astro-Physics AP1100GTO with CP4 controller
- Imaging Camera: QSI-683wsg8, with off-axis guider (OAG), operated at -10C
- Guiding camera: Starlight Xpress Ultrastar, mounted in the OAG
- Software: Windows 10 Pro, ASCOM, Astro-Physics Command Center (APCC), Cartes du Ciel (SkyChart), Sequence Generator Pro, and PHD2

Image Processing Summary for M106

PixInsight 1.8 was used for all image processing. Combined words like "ImageCalibration" and "StarAlignment" are not typos—they denote specific PixInsight Processes and Scripts that were used during image processing.

ImageCalibration was performed using master dark, master bias, and master flat frames. This was followed by CosmeticCorrection to remove a column defect as well as hot pixels that survived calibration. Blink was used to identify and remove any sub-standard frames and to determine how many pixels to trim away around the edges. StarAlignment and ImageIntegration were used to align and stack the individual frames to create Master images for each filter type.

MultiscaleLinearTransform was applied to the luminance Master for noise reduction in the 1-2 pixel size range. MultiscaleMedianTransform was applied to the luminance Master to enhance the contrast of features in the 4-6 pixel size range.

ChannelCombination was used with the red, green, and blue Masters to produce a Chrominance Master. HistogramTransformation was then used on both the Chrominance and Luminance masters for an initial basic stretch. LRGBCombination was used to merge the Luminance and Chrominance masters. DBE was used to eliminate background gradients and neutralize the background. CurvesTransformation was used for the final stretch.

M51 with NGC 5195 on its Left (LH α RGB)—by Bill Hanagan



Copyright 2020 Wm. D. Hanagan, Jr., Ph.D.

The visibility of the H α emitting regions of M51 has been selectively enhanced by blending H-alpha (H α) data into the red channel. This is preferred to broadly boosting the saturation of the red channel, which would alter the color balance of the entire image.

Small galaxies including this one are difficult targets for deep-sky imaging because you have to wait for a clear night with above average seeing and little moonlight in order to capture fine detail. Further, you often need to acquire a lot of data to get a good image, which often requires more than one good night, as in this case.

A crop of the central area appears enlarged below in case you can't zoom in.

11
Curiously, the center of NGC 5195 is a little brighter than the center of M51.



Copyright 2020 Wm. D. Hanagan, Jr., Ph.D.

Data Acquisition Summary for M51 with NGC 5195

- My images were produced from data acquired jointly with Rick Spencer.
- Total exposure time: 8 hours over two nights.
- 5 Minute sub-exposures used in this image: 67 Luminance; 8 H α ; 6 Red; 8 Green; and 7 Blue, all binned 1x1. 1 blue, 2 red, and 3 Luminance frames were rejected.
- Optics: 10" Takahashi CCA-250 in Native mode, operating at 1250 mm and f/5 (equivalent to f/6.4 when allowing for light blockage by the central obstruction)
- Telescope mount: Astro-Physics AP1100GTO with CP4 controller
- Imaging Camera: QSI-683wsg8, with off-axis guider (OAG), operated at -10C
- Guiding camera: Starlight Xpress Ultrastar, mounted in the OAG
- Software: Windows 10 Pro, ASCOM, Astro-Physics Command Center (APCC), Cartes du Ciel (SkyChart), Sequence Generator Pro, and PHD2

Image Processing Summary for M51with NGC 5195

PixInsight 1.8 was used for all image processing. Combined words like “ImageCalibration” and “StarAlignment” are not typos—they denote specific PixInsight Processes and Scripts that were used during image processing.

ImageCalibration was performed using master dark, master bias, and master flat frames. This was followed by CosmeticCorrection to remove a column defect as well as hot pixels that survived calibration. Blink was used to identify and remove any sub-standard frames and to determine how many pixels to trim away around the edges. StarAlignment and ImageIntegration were used to align and stack the individual frames to create Master images for each filter type: L, H α , R, G, and B. DBE was used to eliminate background gradients and neutralize the background on each master.

MultiscaleLinearTransform was applied to the luminance Master for noise reduction in the 1-2 pixel size range. MultiscaleMedianTransform was applied to the luminance Master to enhance the contrast of features in the 4-6 pixel size range.

The H α and red master frames were combined into a single red master using PixelMath.

ChannelCombination was used with the red, green, and blue Masters to produce a Chrominance Master. HistogramTransformation was then used on both the Chrominance and Luminance masters for an initial basic stretch. LRGBCombination was used to merge the Luminance and Chrominance masters. CurvesTransformation was used for the final stretch. —Bill Hanagan

NGC 4565 Cropped—Photo Only (LRGB)—by Bill Hanagan





NGC 4725 can be seen just below the center of the image, with the much smaller NGC 4712 low and to the right. The irregular galaxy NGC 4747 (aka ARP 159) can be seen near the top edge to the left of center.

Data Acquisition Summary for NGC 4725

- Total exposure time: 2 hours 55 minutes, with 5 minute sub-exposures, including 16 Luminance binned 1x1, plus 6 Red; 6 Green, and 7 Blue, binned 2x2.
- The remaining data acquisition details match M51 (above).

Image Processing Summary for NGC 4725

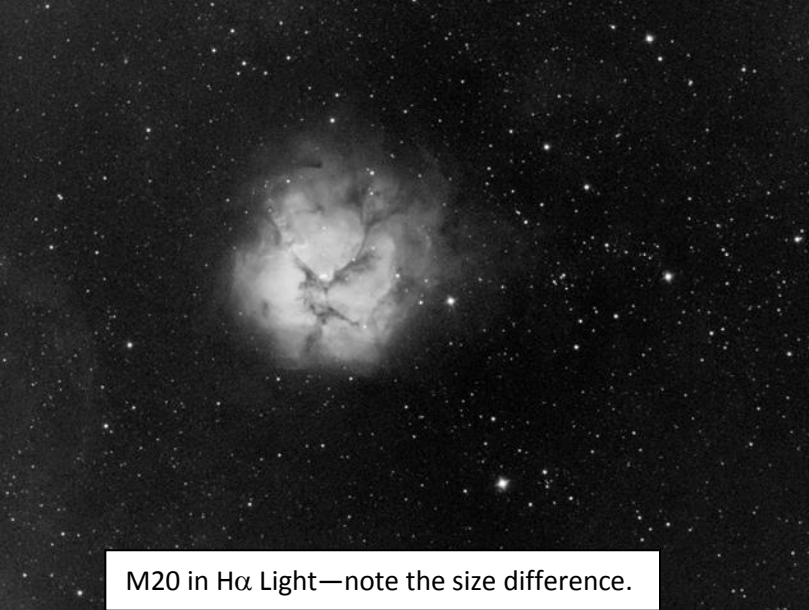
See the image processing summary for M106 (above).

M20—the Trifid Nebula ($H\alpha$ RGB)—A Hydrogen Emission Nebula with a Mostly Blue Reflection Nebula—by Bill Hanagan

My version of M20 appears below. You might be wondering why that red emission nebula on the left has hues of purple. The reason is that it's not just a Hydrogen emission nebula, it's an emission nebula combined with a predominantly blue reflection nebula! At the top of the red area you can see the blue reflection nebula winning out over the red emission nebula. In fact, the very brightest part of the blue reflection nebula in this image



is at the center of the Hydrogen emission nebula, as you can see on the next page by examining the H-alpha ($H\alpha$) master on the left and comparing it to the blue master on the right. If you look closely you can also see that the $H\alpha$ emission extends down and to the left a little farther than the blue reflection nebula, which explains the shift to a deeper red at this edge in the color image of the nebula.



M20 in H α Light—note the size difference.



M20 in Blue Light—note the brighter area on the left.

The color balance of the first image was shifted towards the blue slightly to enhance the visibility of the predominantly blue area of the nebula. The version below was color balanced photometrically using G2V stars in the image to make all of the stars look more realistic. This also increased the saturation a little and shifted the balance in favor of the red part of the nebula while making the blue part darker and smaller.



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Data Acquisition Summary for M20—the Trifid Nebula

- My images were produced from data acquired jointly with Rick Spencer.
- Total exposure time: 1 hour 35 minutes.
- 5 Minute sub-frames used: 5 H α , 4 red, 4 green, and 6 blue, all binned 1x1. Several additional frames were rejected due to transient seeing problems.
- Optics: 10" Takahashi CCA-250 in Native Mode, operating at 1250 mm and f/5.0 (f/6.4 based on the amount of light blocked by the central obstruction)
- Telescope mount: Astro-Physics AP1100GTO with CP4 controller
- Imaging Camera: QSI-683wsg8, with off-axis guider (OAG), operated at -10C
- Guiding camera: Starlight Xpress Ultrastar, mounted in the OAG
- Software: Windows 10 Pro, ASCOM, Astro-Physics Command Center (APCC), Cartes du Ciel (SkyChart), Sequence Generator Pro, and PHD2

Image Processing Summary for M20

PixInsight 1.8 was used for all image processing. Combined words like "ImageCalibration" and "StarAlignment" are not typos—they denote specific PixInsight Processes and Scripts that were used during image processing.

ImageCalibration was performed using master dark, master bias, and master flat frames. This was followed by CosmeticCorrection to remove a column defect as well as hot pixels that survived calibration. Blink was used to identify and remove any sub-standard frames and to determine how many pixels to trim away around the edges. StarAlignment and ImageIntegration were used to align and stack the individual frames to create Master images for each filter type.

Due to atmospheric refraction at M20's low altitude, regular luminance frames weren't used. Instead, the red, green, and blue masters were integrated to produce a synthetic luminance master (S-LUM) for noise reduction and feature enhancement. DBE was used on the individual masters to eliminate background gradients.

MultiscaleLinearTransform was used on the S-LUM for noise reduction in the 1-2 pixel size range. MultiscaleMedianTransform was applied to the S-LUM to enhance the contrast of features in the 4-6 pixel size range. ChannelCombination was used with the red, green, and blue Masters to produce a Chrominance Master.

HistogramTransformation was then used on both the Chrominance and S-LUM for an initial basic stretch. LRGBCombination was used to merge the S-LUM and Chrominance masters. CurvesTransformation was used for the final non-linear stretch. –Bill Hanagan

Contributions from Ron Worden



From the Snobie Observatory at the Lincoln Control Center in Bear, DE
NGC7380 (Wizard Nebula) is a open cluster in the constellation Cepheus.



Comet C/2020 F3 Comet Neowise is a long period comet with a near parabolic orbit discovered on March 27, 2020. Brightest comet since Comet Hale-Bopp in 1997

Contribution from Mark Mitchell

The Shark Nebula (following page) in the constellation Cepheus is usually catalogued as LBN 535. LBN stands for Lynds Bright Nebulae published in 1965 by Beverly Lynds.

The shark's eye is LDN 1235. There is a blue reflection nebula VdB 150 on his back, and another one VdB 149 near a ventral fin.

The Shark Nebula is a dark nebula, but at least one observer thinks that it is an extended red emission (ERE) nebula, and some have commented that dark nebula are not that different from other patches of space except that they are not being energized by any nearby O type star. It is 650 light years away and 15 ly long. The whole shark nebula is said to be 2° across in the sky (four times the size of the full moon) so this is just his head. The bright white star to the right of the shark's eye is a double star,

HD 211300 (G8) and HD 211300B (G5). The red star below VdB 149 is HD 210615 an M3 dwarf. There is some music to accompany this image at: <https://www.youtube.com/watch?v=E-sX2Y0W8l0>

I might also suggest:

<https://www.youtube.com/watch?v=SElHMWkXEU>

—RGS



Mark L. Mitchell ©2020

LBN 535 | The Shark Nebula in Cepheus
SV70T + Atik 460ex + LRGB 9.5h

AP-SIG Meeting Reports for June, July, and August

By Bill Hanagan, AP-SIG Founder

Elephant Trunk detail by
Mark Mitchell

June AP-SIG Meeting

On June 20, the AP-SIG met on-line via Zoom. Most of those who attended were present when we took the group photo below, but one or two people may have joined us later. After welcoming everyone, I started the meeting off with the presentation of astrophotos. Rick Spencer and I both showed versions of M106 which we processed separately from data that we acquired jointly. We also had our usual Q&A session. Several others also showed astrophotos, including Jarrod Bieber, Igor Peshenko, and Ron Worden.



Igor Peshenko also gave us an excellent talk on his construction of the “MyFocuserPro 2” style focus controller created by Robert Brown. The system is built around an Arduino micro-controller which drives a stepper motor driver chip which in turn powers the windings of a bipolar stepper motor. A gear train is used for speed reduction between the motor and focuser shaft. See the following links.

<https://sourceforge.net/projects/arduinoascomfocuserpro2diy/>

<https://hackaday.com/2016/08/29/how-accurate-is-microstepping-really/>

July AP-SIG Meeting

I started our July 25th meeting by giving the special topic presentation on Meteor Photography. I'm not going to repeat the substance of the talk here but I thought you might like to see a "blast from the past", a film photo from the 2001 Leonid Meteor Shower, which I recently "remastered" using PixInsight. I chose Kodachrome 100 for meteor photography in those days because it had a very high "reciprocity failure", which meant that light pollution would be recorded with a lower quantum efficiency than the short-lived meteors. Of course, the quantum efficiency of film is generously estimated at 1/100th that of modern CCD and CMOs sensors. But, this was still the film age and film worked well enough to capture this meteor image.

The cluster of bluish stars to the right of center is M44, also known as the "Bee Hive". The color saturation is boosted slightly for visibility but the color transitions in the meteor are real. The radiant for the Leonid shower falls roughly between the two



brightest stars on the left side and lies exactly on the line of the meteor trail. There is actually a second (very faint) Leonid meteor that's barely visible in the center of the image which also points back to the radiant.

The original image had a strong purple color cast in the background and an epic light-pollution gradient as well as significant vignetting. Fortunately, modern image processing programs like PixInsight, along with some experience using them, make it possible to greatly reduce those effects.

After the special topic presentation, we proceeded with our usual review of astrophotos. I showed an "in progress" version of M51, the finished version of which appears elsewhere in this issue of the FOCUS. Aaron Berner, Joe Morris, and Ron Worden also showed astrophotos, with Joe showing the first version of Comet Neowise that I've seen which has a readily visible ion tail as well as a dust tail. Joe photographed Neowise from the Observatory he built at the Mountain Institute in West Virginia. Afterward, we took a moment to capture the group photo below.



Joe Morris also gave a very informative presentation on using a "rent-a-scope" service <https://telescope.live/> to image the galaxy "Centaurus A", which has too southerly of a Declination (RA: 13h 25m 27.6s, DEC $-43^{\circ} 01' 09''$) to image well from this area. The service handles the scheduling and operation of the telescope and calibration of the resulting image frames. All you have to do is tell them what you want to aim at and what exposures you want and pay for the instrument time. We ended with our usual Q&A and problem solving session.

August AP-SIG Meeting

After welcoming everyone, I kicked off the August 22 meeting with the review of astrophotos. I showed photos of NGC 4725 and NGC 4565. These appear elsewhere in this issue of the FOCUS. Rick Spencer also showed an “in progress” version of M20 which was produced from data that we acquired as part of a joint effort. Ryan Gilbert continued, showing us some SPECTACULAR Milky Way images that he took by positioning his camera to place the rock arches of Arches National Park <https://www.nps.gov/arch/index.htm> in the foreground. Ryan and Ron Worden both showed us images of Comet Neowise. Rob Lancaster, who has been busy with other pursuits in recent months, brought in several new photos. Rob showed us one of the sharpest images of Saturn that I’ve ever seen from our area.

During our August meeting, Rob advised everyone to try to image Mars during its upcoming opposition in October. Take a look at the link below for some of the reasons why. Hint: Mars will be farther away at its closest approach during all of the upcoming oppositions for the following 10 years.

<http://www.nakedeyepixels.com/mars-oppositions.htm>

When we were done talking about all of the photos and how they were produced, Igor Peshenko gave us a presentation on another construction project of his, a camera rotator driven by a stepper motor much like the MyFocuserPro2 focus motor he spoke about at the June AP-SIG meeting. Somewhere along the way I captured the following group photo, and then we ended the meeting with our usual Q&A and problem solving session.





DAS Members Can Join the Astronomical League

Astronomical League Membership

As a member of the Delaware Astronomical Society (DAS), you are eligible to join the Astronomical League. Membership in the league costs \$7.50 per year with an annual July 1 renewal date. Lynn King is the Astronomical League coordinator for DAS. You can email Lynn at klynnking AT Verizon DOT net if you have additional questions about the Astronomical League.

What is the Astronomical League?

The Astronomical League is an umbrella organization of amateur astronomy societies. Currently their membership consists of over 240 local amateur societies across the United States of which DAS is a member.

The objective of the Astronomical League is to promote the science of astronomy by:

- 1) fostering astronomical education
- 2) providing incentives for astronomical observation and research
- 3) assisting communication among amateur astronomical societies.

The League's basic goal is to encourage an interest in astronomy (especially amateur astronomy) throughout America. They want people to receive access to telescopes, whether through their local astronomical society, school, or use of their own instruments, and then use them to view the beauty in the heavens.

The Astronomical League provides a number of observing programs for members that require locating and describing certain specified astronomical objects or events. The league also produces a publication for the members, *The Reflector*.

Observing Programs

One of the important programs of the Astronomical League is the Observing Programs. The Astronomical League provides many different Observing Programs. These Observing Programs are designed to provide both a direction for your observations and a goal. The Observing Programs have certificates and pins to both recognize the observers' accomplishments and their demonstration of observing skills with a variety of instruments and objects.

The first observing program was the Messier Observing Award, which was created in 1967. There are currently 65 observing programs, many of which have more than one level. The observing programs are designed for both beginner and advanced astronomers. A list of the observing programs and requirements can be found at astroleague.org.

The most popular program is the Outreach Award, which exists in three levels: Outreach, Stellar, and Master. The Outreach Award is designed to recognize the work of those astronomers who are involved in programs designed to introduce astronomy to the general public.

How to join the Astronomical League

If you are interested in joining the Astronomical League there are several payment options. P

- 1) You can use your PayPal account to send payment of \$7.50 to DASmtcuba@gmail.com Mention in the comments section that payment is for Astronomical League annual membership.
- 2) You can pay with PayPal using the link below; you don't need to have an account with PayPal, just a credit card.

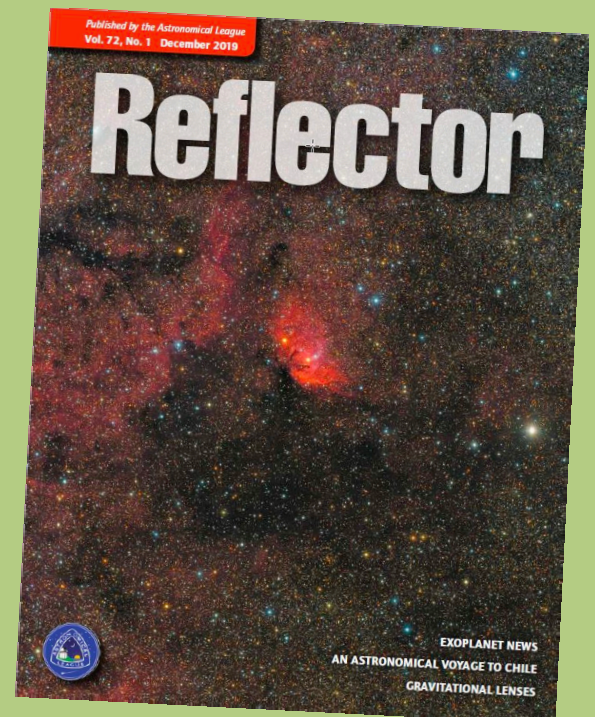
https://www.paypal.com/cgi-bin/webscr?cmd=s-xclick&hosted_button_id=BH7T5RSDXKHMJ

- 3) You can mail payment of \$7.50 to:

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

If you have any questions you can contact me at trebilcock@aol.com.

Robert Trebilcock
DAS Treasurer



Woodside Creamery Outreach Schedule

All cancelled

All outreach events at the Woodside Farm Creamery have been cancelled! But fear not, we will resume when the time is right!

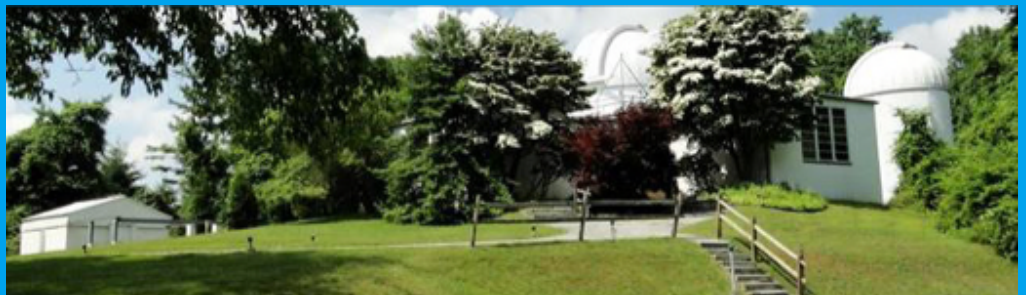


The cows are sad.

MCAO Volunteers Needed

My name is Kim Green and I am the secretary at the Mount Cuba Astronomical Observatory. This year we have increased our field trip activity, we have added many additional Public and Family Nights and we have added additional 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 in need of people who are available to help during the day time with our field trips and tours. But we would also love to have some



evening help as well. If you are interesting in helping out please contact me at 302-654-6407 or email me at KimGreenMCAO@gmail.com and I can add you to our volunteer email list so you know when we will need help.

Did you know?...*another way to contribute to the DAS*

The Delaware Astronomical Society is a registered charity under AmazonSmile. Amazon donates 0.5% of the price of eligible smile.amazon.com purchases to the charities selected by customers. If you are making Amazon purchases and want to see a portion of your purchase price donated to DAS please use the link below

Delaware Astronomical Society's unique AmazonSmile charity link: <https://smile.amazon.com/ch/23-7281900>

Do you believe 0.5% couldn't matter?
Think again!

From: Mary Poppins;
extolling the virtues of small
investments



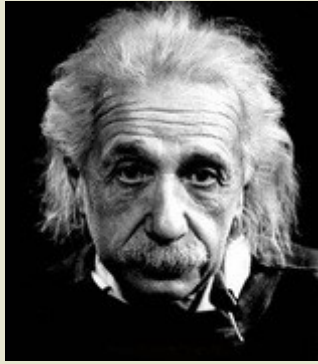
Fidelity Fiduciary Bank

If you invest your tuppence
Wisely in the bank
Safe and sound
Soon that tuppence safely invested in the bank
Will compound
And you'll achieve that sense of conquest
As your affluence expands
In the hands
Of the directors
Who invest as propriety demands

You see, Michael, you'll be part of...
Railways through Africa
Dams across the Nile
Fleets of ocean greyhounds
Majestic self-amortizing canals
Plantations of ripening tea

All from
Tuppence prudently, thriftily, frugally
Invested in the...
To be specific
In the Dawes, Tomes, Mousley, Grubbs
Fidelity Fiduciary Bank

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

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,
Chris Horrocks
DAS Observatory Chair

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 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.*

Think of the many benefits of being a member of the Delaware Astronomical Society!

We have telescopes including eyepieces and collimating equipment for your use. You will have access to an array of telescopes for loan or for use in the Sawin Observatory at Mt. Cuba. The most recent purchases are a solar scope, and the Orion HDX110, which can be used for observing or for astrophotography, depending on your interests. If you know nothing about astrophotography, no problem, we have people eager to teach you how to do it. There is a special interest group in astrophotography that meets monthly.

If you want to build a telescope of your own, we have members who are expert and who are willing to show you how to do it. We have books in our library that explain the concepts.

If you are a beginner, you will have help in Greg Lee's "What's Up in the Sky", so that you will know where to look for interesting objects that month and we have added mini talks to the monthly meetings on basic astronomy concepts geared to beginner astronomers.

If you want help with finding objects in the sky, come to our star parties, formal and informal, to get some help with using your telescope. You can also borrow a club loaner scope or just come and enjoy the sharing of views through several scopes.

If you have a problem with your equipment, we meet informally every Tuesday night to share discoveries of new equipment, solve problems, chat and observe. Come out on Tuesday nights to find members who can help you problem solve. Let us know in advance what you would like to work on or which problems need solved, or what interesting things you would like to try.

If you want to be more involved, let one of the Board Members know!
We need people with diverse interests!

There is something for everyone in the DAS, so be sure to send in \$30 for dues soon to help improve the amenities of the club even more.



Medieval astronomers favored clubs!

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

How to Join the DAS Groups.io Group

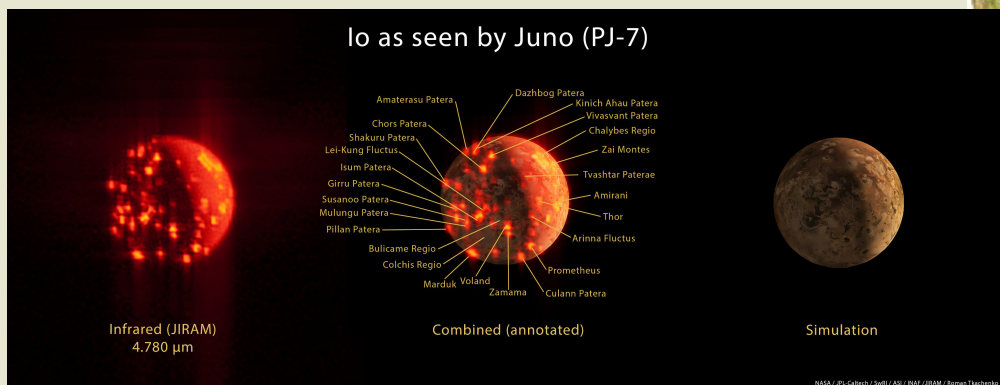
DAS FORUM / E-MAIL SITE ON GROUPS.IO

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>



**Io, the highly volcanic innermost moon of Jupiter, after which the .io groups were named (I presume)
—RGS**

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, jef.law76 AT gmail.com

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: bettysmithers AT verizon.net

Education: Vacant--*are you interested?*

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, jef.law76 AT gmail.com

Webmaster: Rob Lancaster, rlancaste AT gmail DOT com

