



# FOCUS

Vol. 61, No. 5, May 2019

## DELAWARE ASTRONOMICAL SOCIETY

Next Meeting: Tuesday, May 21st—the Annual Dinner Meeting, with social hour starting at 6PM. Venue: Christ Church in Greenville, DE

**See later in this issue for a link with more details!**

### MEETING TOPIC FOR May

- i) *Socialize*
- ii) *Eat*
- iii) *Hear what will be a fantastic presentation by Jack Clemons*
- iv) *Socialize more*

*Food prepared by our own Jeff Lawrence*



*Das Gast Mahl zu Tefflis.*

### In the May Issue

*Some page numbers are approximate and are missing in the newsletter footers for security purposes*

May Meeting Topic	1
From the President	2
Astrophoto Contributions	3
Obituary—Shawn Coyle	5
Eulogy	6
Scientist Birthdays	7
Poetry Corner	8
Physics Corner	9
AP-SIG Report	10
Play House Observatory	14
AP-SIG Announcement	21
Report from SETI Lecture	22
May Dinner Meeting Announcement	25
Dinner Meeting Guest Speaker Announcement	26
Woodside Creamery	
Outreach Dates	27
Call for Volunteers	28
Loaner Equipment	29
Telescope Making SIG	30
Website and Club Membership	31
DAS Contacts	33

# From the President

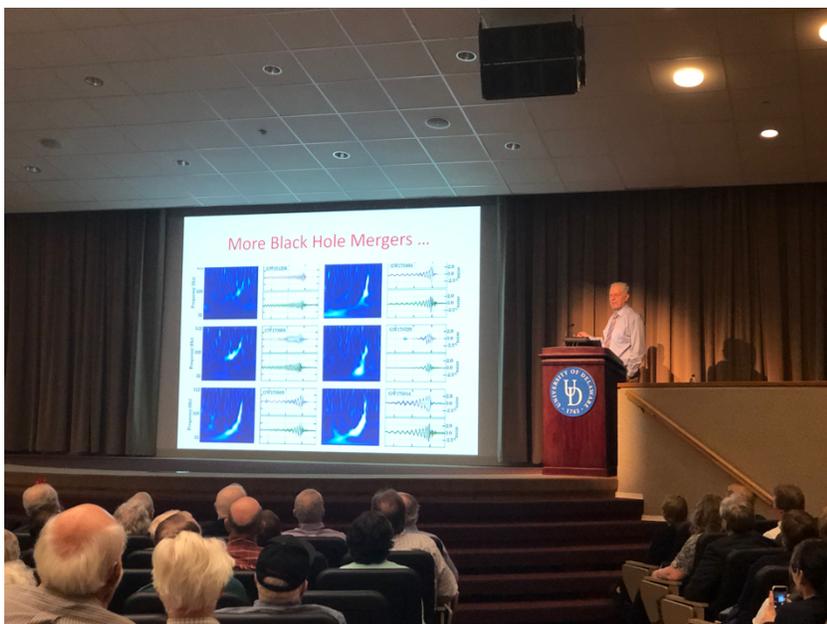
Rob Lancaster

Dear DAS Members,

I hope you were able to get out and enjoy all the great astronomy events we have had recently. Brian Cox was really amazing and the Vernon Lecture was top notch.



**Dr. Joseph Taylor, 1993  
Nobel Laureate,  
delivering the Vernon  
Lecture: *From Einstein's  
Theory to Gravity's Chirp***



Our mini talks last month really went off with a bang. We have had some pretty wet weather recently so we have not had that many clear nights for observing, and several of our outreach events have been cancelled, but on

Tuesday nights, Dana and Tom have been working very hard to get our new pier installed and have had many helpers. Bill Hanagan has been working hard on getting the power supplies and equipment mounting plates ready for our new telescopes. Also, Chris is gearing up to get the electric out to the pods. So, despite the bad weather, we have been doing some exciting things. And hopefully this summer we will have the new equipment up and running for everyone to use.

Remember that this month the DAS is voting for the three board members at large positions. The three candidates are Bill Hanagan, Dave Groski, and Tom Harding. Be sure to get your ballot in so your voice is heard. Also, this month we will be having the annual May Dinner Meeting, so remember not to go to Mount Cuba that night, since we will be at Christchurch. Hopefully you have already gotten your tickets to eat dinner and hear all the insider Apollo stories from Jack Clemons. Our book club has been reading/discussing his book, which should really complement the talk. At the end of May, the Delmarva Stargazers will be holding their annual Stargaze star party, which should be great as well. And finally remember that we have regular astronomy workshops every Tuesday and we will be holding a number of outreach events this month as well. I hope to see you at some of these events! Happy Spring!

Thank you,

Rob Lancaster  
DAS President

## Astrophotography Contributions

*Editor's note: I received many images of clouds for this issue but elected not to include them*



Target: M97 (NGC3587)  
Constellation: Ursa Major  
Date: 4/1/2019  
Location: Snobie Observatory/Lincoln Control Center. Bear, Delaware W75° 40' 43.04" N39° 34' 39.7"  
Telescope: Meade 10" SCT + Meade 6.3 Focal Reducer 1575mm FL  
Mount: Losmandy G11 Guided w Dithering  
Cameras: SBIG ST4000XCM + ZWO174 autoguider(+/-1arcsec)  
Filters: OneShotColor  
Temperature: 39°F Ambient Cooled to 0°F  
Exposure: 27LF's -300sec subs(2.25hr)  
Software: PixInsight  
Frame: 33' x 33' arcmin  
Calibration with: Master Bias & Master Dark Frames  
Observer: Ron Worden



M87 and its relativistic jet (at ~2 o'clock in the image). This is a stack of 17x2 min luminance frames. The image is up-scaled by 150% from native resolution of the camera to result in 0.57 arcsec/px .

-----  
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.

Contributed by Igor P.

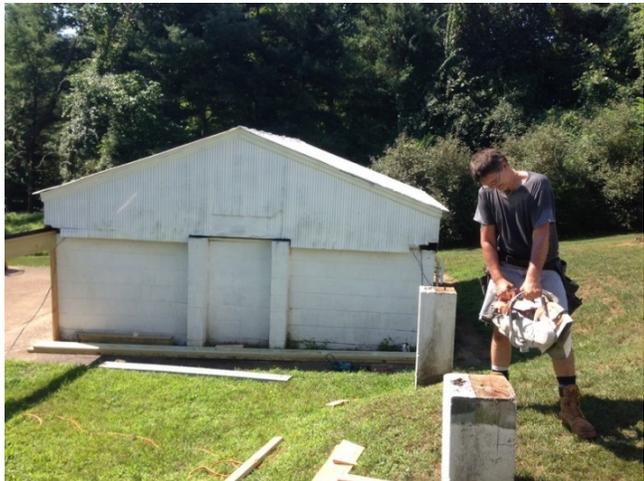
# Obituary

May brought the incredibly sad news of the death of one of our own:

**Shawn Coyler (1964 -2019)**

Friend of DAS, Dedicated Astronomy Enthusiast, Deeply Caring and an  
Extraordinary Craftsman - We Miss You Buddy

*Rest in Peace*



Photos  
and  
words  
provided  
by Fred  
DeLucia

## From Jack Goodwin's eulogy for Shawn

### My Friend Shawn

Shawn was a true friend, something that is extremely difficult to find in life. And to lose something like true friendship is something that is profoundly painful.

Shawn was a selfless person who really put others first. Shawn was a kind person who loved animals – he was a dog guy! But one of the most unique attributes that Shawn possessed, was his mechanical ability. I am a mechanical engineer and work around people with very good mechanical ability every day, but Shawn was on a different level, we were not worthy to carry his tool bag. I have never seen anyone like him, he was truly gifted in this area. His ability to take stuff and turn it into something was truly amazing. He needed a mirror blank for the mirror making seminar, I'll just cast my own he said. Who does this!?!?! The mirror making folks are still talking about this by the way.

I am really going to miss Shawn. From the phone calls, to the camping trips at Cherry Springs, to Phillies games, the calls saying hey lets go to the winter star party, or side trips to the corning museum so that he could get some “ideas”, to hearing his plans for his next creation, I am really going to miss him.

Shawn was a very giving person that really cared about others. For example, his astronomy field. He did all of this work to make it accessible and usable for others, friends like Fred, Josh, Doc and others that could not be here today, acquaintances, and people who he was not friends with yet.

He tried to make it a go to destination, and he was extremely successful at that. I was fortunate to experience this wonderful hospitality back in the fall. Josh and I came down for what was going to be a one nighter. But we had so much fun, and the skies were so good, we both called home for “permission” and extended for a second night which was all our work schedules would permit. Shawn was out on the field with us for a while too. With his scope – now there is a story. This shows his ability to make something in no time flat out of nothing. Back to that weekend. Shawn knew it was going to be cold for us, so he set up set up his trailer with heat for us, mowed the field, and even greeted us in the morning with hot coffee. Went out to breakfast at the diner where we bought breakfast for what we thought was a stray dog that almost came home with us. Na just a neighbor's dog. This was typical for him. And this speaks to why I am going to miss him so much.

Shawn was a kind soul, that would do anything for anyone... and I am having trouble processing that he is no longer with us.

---

## May scientist birthdays

### Daniel Gabriel Fahrenheit

Born May 24, 1686; died 1736

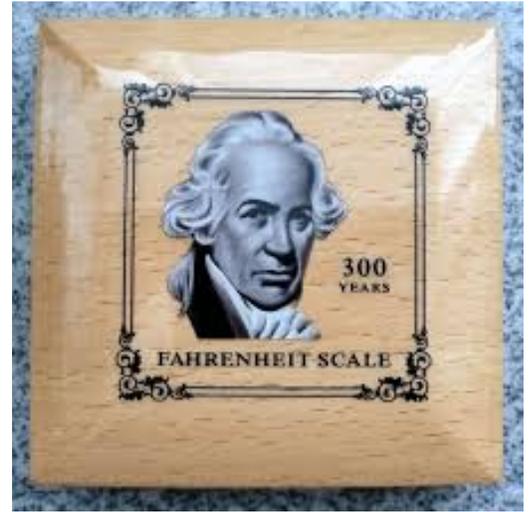
A scientific instrument maker who invented the thermometer. Yes, someone had to actually invent that. Many have tried to convert his birth date to Celsius, but without success.

### Richard Feynman

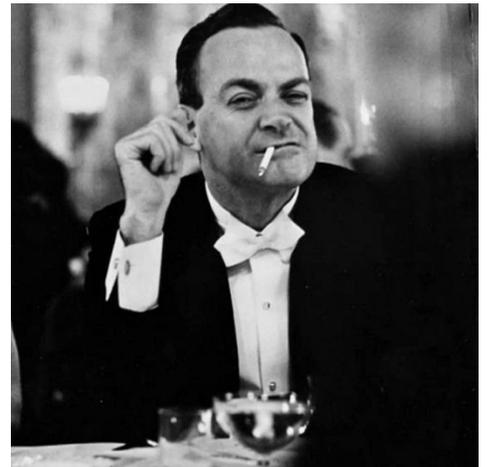
Born May 11, 1928; died 1988

Nobel Prize in Physics, 1965 (Shared with Julian Schwinger and Shinichiro Tomonaga), for the development of quantum electrodynamics.

Many have tried to be "offbeat" in an effort to become more like Feynman. ***However, it is easier to be offbeat if you are a genius than it is to be a genius if you are offbeat.***



Fahrenheit. He was not fond of frivolity.



Feynman. He was fond of frivolity.



## Poetry Corner

### Ode to Young Scientific Love

*Author Unknown*



I want to learn the theory of relativity  
Because I want you to want to make love to me  
You're my scientist fantasy

I can't get enough of your electric touch  
Never ever thought I'd like protons so much  
Even radioactive fallout now makes me blush

Yes, since we met I have a new need  
To read every issue of Science magazine  
And learn everything about laser beams

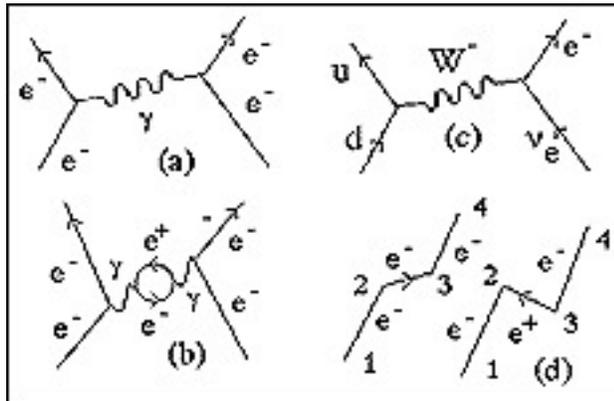
I wear a big calculator on my belt  
Hoping to make your cold heart melt  
And make you feel a resonance you've never felt

Computer communication is all you know  
Reading through your science books oh so alone  
With a launching pad as your only home

Oh, please let me know the probability  
I've written an equation which says it can be  
I want to be your scientist fantasy

## Physics Corner

What is this "quantum electrodynamics" that Feynman won the Nobel Prize for?



There was **electrodynamics**, developed throughout the late 1700's and 1800, by names such as Ampere, Faraday, and, of course, Maxwell

There was **quantum mechanics**, developed in the early 1900's by names such as Schroedinger and Heisenberg

There was **special relativity**, developed in the early 1900's by Einstein; this incorporated electrodynamics as well as Newtonian mechanics (if it hadn't, nobody would have paid much attention to the new theory).

There was **relativistic quantum mechanics**, developed in the later early 1900's by Dirac

Combining all these theories turned out to be very elusive—but that's what Feynman and his co-Nobelists did; they called it

### **Quantum Electrodynamics**

Note that work is ongoing to fold in the other fundamental theories of physics—general relativity and nuclear forces—this will be the so-called

### **Theory of Everything**

# April 2019 AP-SIG Meeting Report and Upcoming Meetings

Reported by Bill Hanagan

The April 13 AP-SIG meeting was held on site at Bob Trebilcock's home. We started out in Bob's backyard with a demonstration of his "Play House" rolling-structure observatory, which I've described below in this issue of the FOCUS.

A few minutes into the meeting, we stopped to take the group photo below with Bob's new observatory as the backdrop.



From left to right are Jarrod Bieber, Bob Trebilcock, Bill Hanagan, Rob

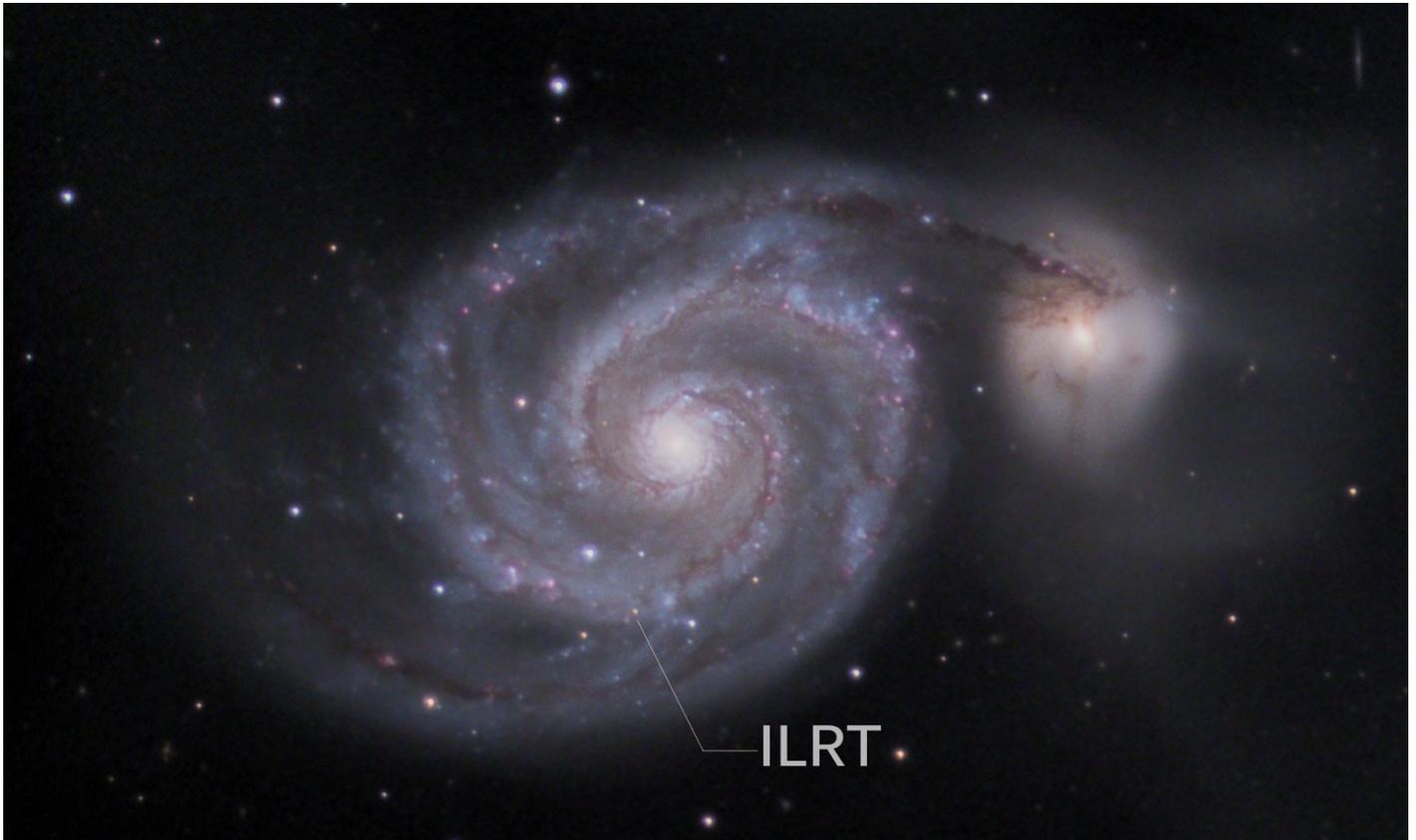
Lancaster, Ron Worden, Dana Wright, and Dave Hockenberry (front). Sidney Ocampo joined the meeting shortly afterward.

Indoors, Bob and his wife Beth provided dinner for the group, including an assortment of barbecue and a dessert buffet. Bob presented a series of photos and videos from the construction of his observatory and described the process as he went through the photos.

I followed up some questions I received at the end of my March presentation on Maximizing S/N by working through an example of how to calculate the minimum sub-exposure time needed to prevent read noise from contributing significantly to the total noise in an image. To make this more approachable for beginners, I wrote and distributed a handout at the April meeting with detailed instructions on how to take the measurements and do the calculation. I'm happy to explain the process to any member who missed the meeting.

We also had our usual Q&A session and presentation of astro-photos, with several AP-SIG members presenting photos.

Dave Hockenberry showed an image of the galaxy duo M51a and M51b that's noteworthy and appears below (with permission). Dave captured more fine detail than you normally see in most images of M51, especially near the core and in the spiral arms, thanks in part to his use of a Starlight Xpress Large Format Active Optics unit (SXV-AO-LF). You may not be able to see that detail unless you have some way to zoom in and take a close up look. Within this image, Dave also captured a transient event known as an "Intermediate Luminosity Red Transient" (ILRT) which is identified in the image.



M51 with ILRT, by AP-SIG member Dave Hockenberry (North is to the right)

When first detected, ILRTs have a range of luminosities intermediate between novae and supernovae, but they last longer (several months) and typically turn redder as they age. Here are some interesting links on ILRTs.

<http://www.stsci.edu/institute/conference/redtransients>

<https://arxiv.org/abs/1904.07857>

<http://forum.orpington-astronomy.org.uk/index.php?topic=11667.0>

<http://www.abc.net.au/science/articles/2013/01/25/3675856.htm>

Dave also showed the image of M100 below. There are no less than 7 other galaxies that can be seen in this image, more if you look closely.



M100 Image by AP-SIG Member Dave Hockenberry (North is to the lower left)

[Image Acquisition and Processing Details for Dave's Images of M51 and M100 \(from data collected in January - March 2019\)](#)

Light frames (sub-exposures) were acquired with a Hyperion 12.5" f/8 telescope on an Astro-Physics 1200 GTO mount. A QSI 583wsg cooled CCD camera was used for image acquisition with an AstroDon Generation 2 LRGB filter set. Auto-guiding was performed using a Starlight Xpress (SX) Lodestar X2 guide camera mounted in the built-in off-axis guider (OAG) port of the QSI camera. An SX large-format Active Optics unit was employed to reduce seeing blur to maximize the sharpness of individual exposures. The mount, imaging camera, guide camera, active optics unit, and filter wheel were all controlled using MaxIm DL running on a stock Windows laptop located near the telescope. The data were later transferred via Ethernet LAN to another Windows PC inside

Dave's home.

The R, G, B, and Luminance (L) images were calibrated in CCDStack, Luminance images were de-convoluted in CCDStack, and the resulting images were finally aligned and stacked in CCDStack. L-RGB color combination and other adjustments were done in Photoshop CC.

For M51 total exposure times were 5.5 hours Luminance and 1.5 hours each for Red, Green and Blue. All sub-exposures were 10 minutes.

For M100 total exposure times were 3.5 hours Luminance, 4 hours Blue, 5 hours Green, and 4.75 hours Red. All sub-exposures were 10 minutes.

---

### **Bob Trebilcock's Rolling "Play House" Observatory**

by Bill Hanagan

During the April 13 AP-SIG meeting, Bob treated us to a tour of his new observatory, seen in the photo below. This photo shows the "Play House" theme, which is carried all of the way around the outside of the rolling structure. There are no actual windows. Bob built this observatory to look like a child's play house because his home-owners association discourages sheds, but not play houses.

The deck is about 2.5 times as long as the rolling structure, allowing the rolling structure to get well away from the scope in order to reveal nearly all of the sky not otherwise blocked by nearby homes and trees.



The main advantage of a rolling observatory like Bob's is that the size of the structure needed to house any particular telescope and mount can be significantly smaller than required with other types of observatories. That's because other observatories, which have walls in fixed positions, must be made larger to encompass space for people to use the telescope and get around inside the observatory.

The disadvantages of a rolling observatory are that it provides much less useful storage space and both the deck mounted rails and the sides of the deck tend to be tripping hazards. These disadvantages don't pose serious challenges for Bob because his primary use is imaging. After opening up the observatory, he controls everything from a remote computer inside his home.

The blue spot at the top center of the roof is a vent cutout that will soon be covered by the cupola seen in the photo below. The cupola includes a fan for ventilating the observatory.



The next photo gives a better view of the interior of Bob's observatory as well as his imaging rig.



Bob has an Astro-Physics 1100GTO mount, two different OTA's, and assorted camera gear for imaging. All of his imaging equipment is controlled directly from a Windows PC in his home using an Icron Ranger 4 port USB extender, which operates over Ethernet cabling, allowing the computer and telescope equipment to be separated by as much as 330' of cable.

A small shelf in the back of the rolling structure near floor level provides some storage space. Note the diagonal bracing of the walls below the shelf. In the foreground on the extreme left and right edges of the deck you can see the aluminum track on which the structure rolls.

The above-ground metal pier is a surplus Hastalloy fitting which is far beyond "rust-proof". The above-ground metal section of the pier is bolted to a steel reinforced concrete footer that starts a few inches below ground level and goes down 3' below ground level to prevent frost heave from moving the pier.

The observatory structure is considered “temporary” by local authorities, though the actual longevity of such a structure is primarily dependent on maintenance. If Bob and his wife decide to relocate, the metal pier can be removed along with the structure, leaving only a below grade concrete footer that can easily be covered with dirt and grass.

Below is a close-up view of the rails. This V-track railing is sold by Amazon as “Gate V Track Aluminum” and is normally used on sliding driveway gates. Matching V groove rollers are mounted in the base of the rolling structure. In principle, the tracks could be recessed into the deck, but recessed tracks are more prone to catching debris and getting jammed with ice.



The next two photos show some of the construction details of the roll-off structure. Bob chose to insulate the observatory by fitting 2” foam-board between the studs as well as the rafters.



In the photo below, Bob gives a run-down on the off-axis guider built into his QSI camera and describes the remote control of the telescope.



In the last photo, below, Dana Wright examines the observatory in a half-closed state.



----- Upcoming AP-SIG Meetings -----

Plans for the June 28 / 29 AP-SIG Meeting by Bill Hanagan

The June meeting will be held on site at Mark Mitchell's home in Hockessin. Among other activities, we'll get a look at Mark's new cooled CCD camera, which is based on the SONY ICX-694 CCD. This particular sensor is well known for having exceptional quantum efficiency (among front-illuminated CCDs) and very few sensor defects. If the weather allows, Mark will roll his imaging rig out for a demonstration.

Anyone interested in astrophotography, from curious beginner to expert, is welcome to attend!

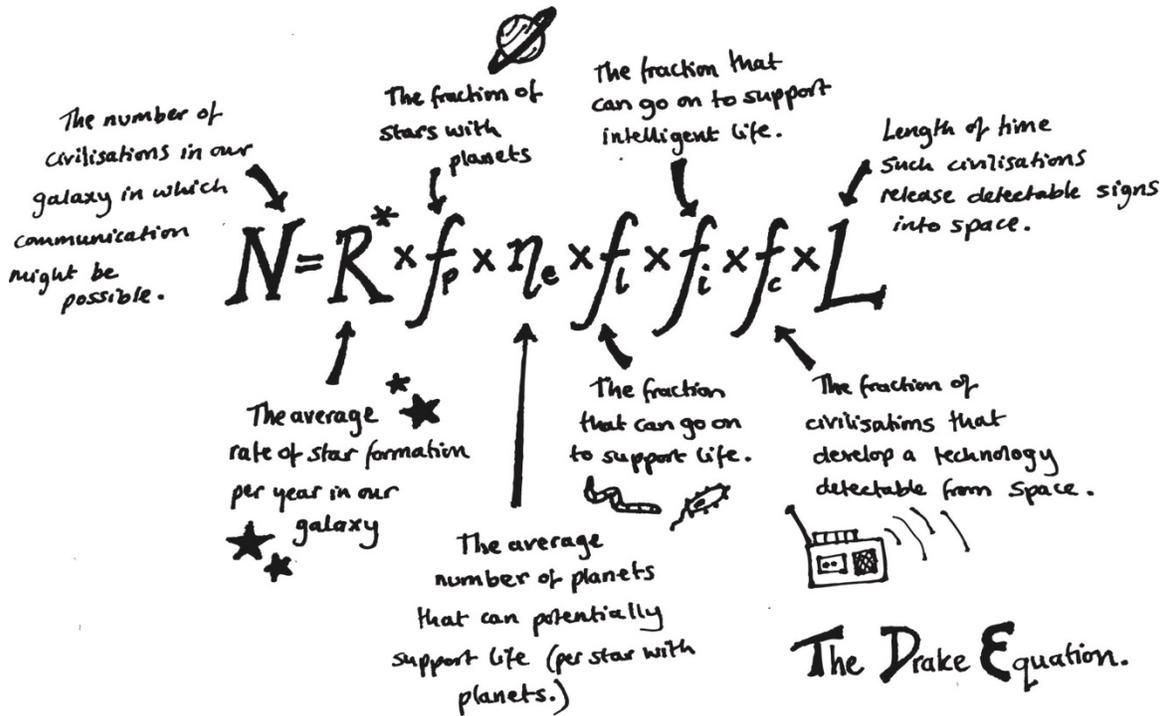
The exact date and time of the meeting depends on the weather and will be announced via DAS@groups.io email and by direct email to the AP-SIG members.

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.

The AP-SIG is very good at helping beginners improve their images, so don't be shy about bringing imperfect images along to get some advice on how to take even better images. If you are not an AP-SIG member you can always come to the meeting to see what goes on and sign up later.

---

# DAS Contingent Attends SETI Talk



by Bill Hanagan

On May 6, several DAS members attended a talk at the DuPont Country Club by Dr. Seth Shostak, the Senior Astronomer for the SETI Institute in California and the former Director of the Center for SETI Research. Thanks go out to Diana Metzger, who alerted us that Dr. Shostak would be giving the talk and also made arrangements for DAS members to attend.

Dr. Shostak obliged the DAS contingent by posing under his title slide for the group photo below. In front, from left to right are Jeff Lawrence, Diana Metzger, Seth Shostak, and Bill Hanagan. In back are Ted Trevorow, Keith Given, and Bob Trebilcock. My wife Mary Ann also attended and took this photo.



Photo by Mary Ann Hanagan

I saw Seth speak on SETI several years ago at the SkyQuest V star party at Green Bank, WV, and I was impressed by his eloquence, humor, and encyclopedic knowledge of SETI research. The presentation he did on this occasion was less science oriented and leaned more toward popular themes. The version of his presentation that he gave on May 6 has an interesting new twist: biological intelligence in the universe may be primarily “a precursor to machine beings, enormously advanced artificial sentients whose capabilities and accomplishments may have developed

over billions of years and far exceed our own.” When we encounter an intelligent extra-terrestrial for the first time, it may well be a sentient AI left behind by a short-lived and less durable biological intelligence.





The May Dinner Meeting will take place on May 21st, 2019. It will be held again at [Christ Church](#) in Greenville, DE. You can find more information about the dinner meeting and pay/select meal preferences on the DAS website:

<http://delastro.org/16-event-reports/175-das-2019-dinner-meeting>

**The Menu is:**

Bread & butter

Salad

Meat or vegetarian main course served with potatoes and a vegetable:

- Meatloaf
- Roasted Vegetable Terrine

Dessert

Water & soda

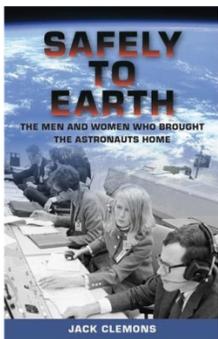
Beer & wine by free will donation

**\*\*Note -please contact Jeff (jeff@delastro.org) for any allergy concerns**

***Food prepared by our own Jeff Lawrence!***

## Guest Speaker for the Dinner Meeting

Jack Clemons is a professional writer and consultant as well as a speaker and presenter on NASA's space programs. He has bachelor's and master's degrees in aerospace engineering and was formerly a Senior Vice President of Engineering for Lockheed Martin. Earlier in his career he was an engineering team leader for NASA's Apollo Program and senior engineering software manager for the NASA Space Shuttle Program. He appeared in the "Command Module" segment of Moon Machines, the Discovery Science Channel's six-part documentary about the Apollo Program.



Jack's works of fiction earned him a 2018 Established Artist Fellowship for Literary Fiction by the Delaware Division of the Arts and membership in the Science Fiction and Fantasy Writers of America. He also writes a space and science column for the new Amazing Stories Magazine print edition.

Jack's book *Safely to Earth: The Men and Women Who Brought the Astronauts Home*, a memoir of his time on NASA's Apollo and Space Shuttle programs, was published by University Press of Florida in September 2018. It was awarded first place for autobiography or memoir by the Delaware Press Association, and it was selected as one of the top twelve books for Christmas 2018 by BBC Sky at Night Magazine.

Jack Clemons will present: **CATCHING APOLLO**

Drawing from Jack's time on Apollo, is an insider's view of NASA's Apollo Moon Program, an account of Jack's responsibilities as one of the young engineers working on the greatest adventure of our times. Jack will include vintage photographs and anecdotes drawn from his time as a lead engineer supporting the Apollo astronauts during their return flight from the Moon. He'll also share some little-known stories about the technologies and teamwork that made Apollo 11 a success and saved the Apollo 13 mission from near disaster.

## Upcoming Woodside Creamery Outreach dates



Friday, April 12:	6:30 – 8:00 (rain date Saturday)
Friday, May 10:	7:00- 8:00 (rain date Saturday)
Friday, June 7:	7:30 – 9:00 (rain date Saturday)
Saturday, July 13:	2:00 – 4:00 solar (no rain date)
Friday, August 9:	7:00 – 9:00 (rain date Saturday)
Friday, September 6:	6:30 – 8:00 (rain date Saturday)
Friday, October 4:	6:00 - 8:00 (rain date Saturday)

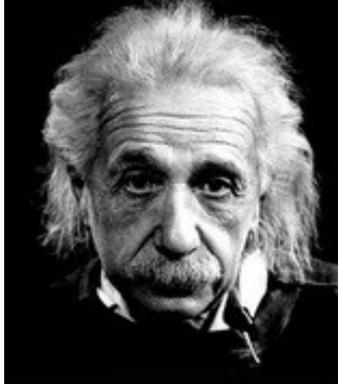


## MCAO Volunteers Needed

Hello. I would like to introduce myself. 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 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 a typical 2.4 meter space-borne 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	\$30/20/10	
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

Amy Hornberger, aehornberger AT gmail 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, klynnking 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

