



FOCUS

Vol. 63, No. 7, September 2018

DELAWARE ASTRONOMICAL SOCIETY

**Next Meeting – Tuesday, September 18th, 2018 at 8pm
at the Mt. Cuba Astronomical Observatory**

Meeting Topic: What Did You Do This Summer? Mini-talks by DAS members about their Summer's astronomy activities



Photo by Mark Mitchell

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From the President

Rob Lancaster

DAS Members,

I hope you have all had a relaxing and productive summer! Early this summer, we had some excellent nights for astronomy and some very productive days of work at the Observatory. We had an excellent DAS Star Party at Rick Spencer's house, we couldn't have asked for better weather for the Friday Night Lights event, and we had some great outreach events at places like the Woodside Farm Creamery. We got all the concrete work done at the Observatory as well and we moved the pods down onto the new pad. Unfortunately, however, the weather was not as helpful during the latter part of the summer for both doing Astronomy and for having workdays to make progress on our Observatory. It seemed for a while there as though the weather was alternating between extremely hot, humid days and days of constant rain. Even worse, in the last couple of weeks, it was beautifully clear during the full moon, but then constantly cloudy during the dark window. The weather did not put a damper on all of our club activities, however. We still had extremely successful and well-attended meetings each month this summer of both the Astrophotography SIG and the Book Club. Plus, we have had lots of exciting astronomy happening every Tuesday this summer during our Astronomy Workshops where we had members working on astrophotography, telescope making, discussing astronomy, and helping beginners fix, set up, and use their telescopes. Hopefully

this fall brings some more opportunities for both stargazing and observatory work.

This fall, our club will be doing lots of exciting activities. We have numerous outreach events planned, we have a full lineup of monthly meeting talks in the works, and we hope to get a lot more progress on the observatory upgrades. 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



Photos from Friday Night Lights

July 13, 2018, Photos by Nico Carver and Mark Mitchell



Chesapeake Star Party

Sponsored by Bay Star Telescopes

Oct. 5, 12PM to Oct 8, 1PM 2018

Spend October 5 -8 near the Chesapeake's Eastern Shore for, more or less, a weekend of observing and/or imaging under skies as dark as they get on the east coast. An email with the specific location will follow to respondents who are interested. There will be a brief presentation at the DAS meeting with full details.

Camping on the 5 acre field (that has excellent horizons) is permitted and small cook stoves can be used if constantly attended and kept away from any dry grass or brush. 115Volt AC will be available. Also, there are reasonably priced chain hotels in Exmore, VA a short 15 minute drive from the observing field.

A \$5 donation, or what one feels appropriate, is appreciated to offset costs for porta-potties and grounds care.

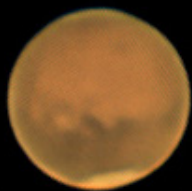
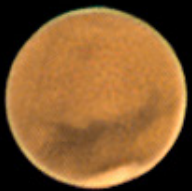
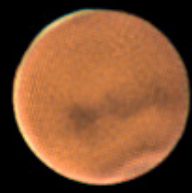
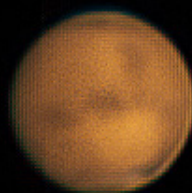
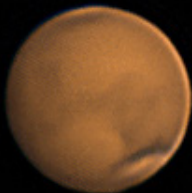
Friday October 5, (cloud date Oct 6) we'll dedicate a few hours to neighbors for them to appreciate their dark skies.

If interested in attending, or if any questions, please, email shacoly@aol.com and fredworld@verizon.net by September 23.

Your email should state:

- if you are intending to attend
- if you intend to camp on the field,
- participate in the public star party,
- number of nights you plan to stay.
- Include your questions

Clear skies to all,
Shawn Coyler, Julie Callahan and Fred De Lucia



Mars. Perihelic opposition. July 2018. Mark L. Mitchell.

Damn the Mosquitoes, Observing Session Ahead

Fred De Lucia

Daytime temps that were well into the 90's and high humidity made a clammy time out of the pre-sunset hour while setting up our scopes at the ChesLen Preserve on Tuesday September 4. Couple that with some annoying mosquitoes that seemed to enjoy buzzing around my bare sweaty arms and neck. Along with me enduring those pesky flying leeches were Igor Peshenko of the Bucks-Mont Astronomical Association and Bob Jorgenson of the ChesMont Astronomical Society as we amicably grumbled our way through swatting bugs and hauling equipment out of our vehicles. Soon, new DAS member Zhang Zhigiang showed with a simple set-up of a DSLR and tripod for imaging the Milky Way in Sagittarius. Igor loaded his 8" f/3.8 Newt onto an Atlas mount as he prepared for an imaging session, Bob had his 20" f/5.0 Obsession. I had my newly modified 18" StarStructure f/4.0. This was the first light for these modifications of what was originally f/4.3 and was the primary reason why I wanted to take advantage of the clear sky forecast that night despite the uncomfortable climate which for a moment had me almost regretting that I gave up the DAS Astronomy Workshop session held at the air-conditioned MCAO.



Thankfully the mosquitoes diminished as the night wore on and by 11PM they scattered completely as the temps dropped into the 70's. It was actually one of the best transparent nights at ChesLen I can remember. The Milky Way was high overhead and I was able to follow it, albeit faintly due to the sky glow, into Sagittarius. However, at zenith my SQM-L meter's best reading was 5.72 NELM, almost a full 1/4 mag darker than usual. I attributed that to the absence of visible clouds of any sort which de-emphasized the glow of light from Philly.

Robert Stack and Mary Webb wandered over as they live only a few miles away from ChesLen. They were in awe. Mary never saw the Veil Nebula and was captivated by its delicate architecture and spent quite some time on M13. Saturn was brilliant with a nice display of the Cassini Division and 5 moons.

The View of the Night was the Blue Snowball, NGC 7662, at 841x showing a bright central star surrounded by a dimmer outer layer and a brighter internal layer of nebula. My new optics did just fine!



At 1AM I was observing 21/P Giacobini-Zinner the periodic comet then in Auriga discovered in 1900 that comes around every 6.6 years. Kind of tear-drop shaped it was bright in the eyepiece at 7th magnitude and low in some sky glow. Its best altitude wouldn't occur until almost 5:30 AM but it was still an attractive display, testament to the transparency that night.

Bob encountered power issues so he had to go old school and star hop. Igor's most recently processed images of the Elephant Trunk and Iris nebulae accompany this writing. Happy with the session and my new optics I left the field at 3:30AM.

June 2018 AP-SIG Meeting Report

Bill Hanagan

M38 and NGC1907
Photo by Lewis (Willis) Grenier

The Astro-Photography Special Interest Group (AP-SIG) met on Saturday, June 16 at Mt. Cuba. In anticipation of the upcoming favorable apparition of Mars, I gave the special topic presentation titled Planetary Imaging—Preparing to be Lucky.

Rob Lancaster also briefly presented the results of an experiment in which he successfully aligned and stacked a large number of 10 second exposures of the Snowball nebula using FFT registration. I brought cinnamon coffee cake as the refreshment for the evening.

In addition to myself, An Yu, Matt Bobrowski, Rob Greybill, Rob Lancaster, Bob Trebilcock, Ron Worden, and Dana Wright attended.

I've summarized some of the key aspects of planetary imaging below for those who were unable to make it to the meeting. If you aren't interested in doing or understanding planetary imaging yourself you can skip down to the photos.

Modern planetary imaging relies on a fast-readout CMOS sensor or DSLR that is capable of video output of roughly 15 frames per second or more in order to acquire a large number (500-2000 or more) of very short exposures (~1/10th to 1/500th second) over a period of 1-4 minutes. Taking very short exposures makes it possible to choose and use only those images that correspond to moments in time when the seeing is significantly better than the average. The individual images or "frames" obtained during moments of better than average seeing can be identified, aligned, and then stacked using computer software to produce a single, much sharper image than can be obtained by taking one long exposure. This approach is known as "Lucky Imaging" because you are using only the frames acquired when you were lucky enough to have seeing conditions that were better than average. The stacked image is typically improved using wavelet based noise reduction and sharpening techniques.

The Windows based program SharpCap is the first that comes to mind for capturing planetary image data from CMOS cameras, but other Windows programs like EOSMovieRecord, Backyard EOS, Astro Photography Tool (APT), Images Plus, and the Windows version of FireCapture, are also widely used with Canon DSLRs.

For planetary image processing, Windows based AutoStakkert 3 and Registax 6 can both automatically identify, align, and stack the best individual frames from very large sets of images. If you're an OS X user, try Lynkeos. Both programs AutoStakkert 3 and Registax 6 can re-align the R, G, and B channels of the final image to partially correct for atmospheric dispersion, which otherwise blurs the colors in the image out much like a prism.

Registax 6, PixInsight, Photoshop, and many other programs can be used for image enhancement.

For Lucky Imaging to work to full effect, there must be a significant number of individual frames that show more detail than the average frame. That usually happens to a much greater degree when the seeing is very good or better, so I usually don't

go out to do planetary imaging unless the seeing is forecasted to be “very good” or better.

The large number of images that need to be acquired to produce a single image are nearly always captured as AVI or other “video” type files and stored immediately on a computer during capture, but in this application video files are nothing more than a convenient way to store the very large number of images needed. If you have a camera that can acquire and store images at the high frame rate needed, both AutoStakkert 3 and Registax 6 can work large numbers of individual files as well as video files. Some of the programs that capture video data do so in a fashion or using a video format that prevents the data from being loaded directly into your choice of image processing program. If that happens, you can usually load the video into “VirtualDub” and then save it as a clean AVI or SER file.

Because of the large number of images that need to be captured, planetary imaging data can take up a lot of space, so you will want a lot of free space on your computer’s hard drive if you plan to capture very many videos. For example, the 67 second video file used to produce the image of Jupiter below occupies 1.7 Giga-bytes of drive space. The span of time over which you can acquire images and still stack them to produce a single sharp image is limited by the rotational speed of the planet you’re imaging and its angular size at the time you acquire the images. If you want to be very cautious in this regard, limit your Jupiter videos to 45 seconds. If your optics, heat control system, and the seeing are not all exceptional you can probably double the length of your Jupiter videos to 1.5 minutes without causing a detectable loss in sharpness. Similarly, you should limit your Saturn videos to 2 minutes and your Mars videos to 4 minutes.

If you want to figure out the maximum capture duration for yourself, here’s a link that discusses how to do it.

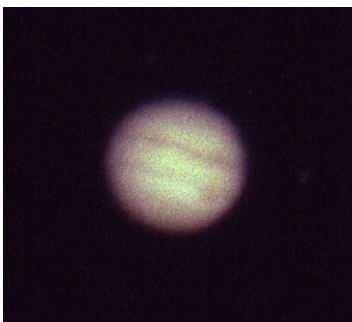
<http://www.bloomingstars.com/maximum-movie-length-for-planetary-imaging/>

If you use a Canon DSLR, make sure to record your video with 5x magnification in “Live View” mode to insure that there is 1 pixel in each video frame for each sensor pixel being recorded. A few older DSLRs (the Canon EOS 60D, 60Da, and Rebel T2i) have a 640x480 movie-crop mode that also insures a 1:1 relationship between picture and sensor pixels, with the resulting video being saved directly to the camera’s memory card.

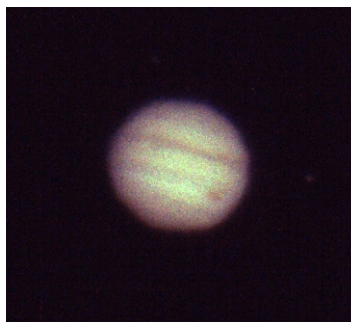
If you use a reflecting telescope, it’s especially important to deal with the thermal issues that affect your telescope, which typically requires having a fan blowing air over the face of your primary mirror. Most primary mirrors used in telescopes cannot track the ambient air temperature without the aid of a fan and the thermal boundary layer must be destroyed to obtain the best image quality from your telescope.

If you venture into planetary imaging yourself, limit your video files to 1 to 2 minutes, use a 2x or 3x Barlow or Televue Powermate so that every pixel in your camera covers < 1/2 of the limiting resolution of your scope in arc-seconds, do everything you can to make sure your scope and observatory are cooled off, and most importantly, get out and image when the seeing conditions are above average. Heroic image processing cannot make up for poor seeing.

The first two images below are individual frames taken from a 67 second video containing 2010 frames. The first is from the mid-point in the quality level of all of the images. The second is the best image from the entire video. Notice that the best individual frame is a little sharper than the median. The third image shows the final result.



The median (mid-quality) frame



The single “best” frame



The final result of aligning and stacking the best 500 frames followed by image processing. Note the moon on the right side of Jupiter and the Great Red Spot, which is once again red.

The raw video data for this image was acquired using the club's GSO 12" f/4 Imaging Newtonian equipped with the newly upgraded Feathertouch True 3" motorized focuser, and the HDX-110 mount in the Sawin Observatory. A considerable amount of extra equipment was used to supplement the club's telescope, including my own 12VDC power supply, a Celestron Neximage Burst Color CMOS camera, a 2x Televue Big Barlow, and a Windows laptop.

The final result image was produced by aligning and stacking the best 500 frames in AutoStakkert 3 (including RGB color alignment), followed by wavelet sharpening and noise reduction in Registax 6, followed by color balancing, histogram stretching, and cropping in PixInsight. The result you see is not the sharpest planetary image this telescope can produce—the scope and observatory were not fully cooled and the seeing conditions were only marginally above average.

In fact, I barely managed to catch Jupiter as it popped into a space between the trees south of the observatory during the June 15 DAS Member Star Party. Unfortunately, the growing tree line to the south of the Sawin is even more problematic when it comes to imaging Saturn and Mars. Both of those planets are currently rising to lower altitudes as they transit the meridian than Jupiter did back in June and they don't appear in the same narrow openings between the trees through which I was able to image Jupiter.

July 2018 AP-SIG Meeting Report

Bill Hanagan

The Astro-Photography Special Interest Group (AP-SIG) met on Saturday, July 14 on-site at Dave Hockenberry's home. Dave kicked things off by showing us his observatory, which appears in the photo below with the structure already rolled back.



In most roll-off observatories, only the roof rolls off, potentially leaving the walls to block the view of objects that are not far enough above the horizon. In Dave Hockenberry's observatory, the roof and walls roll away as a unit, giving the telescope a view down to the local horizon (except in the north). This also helps with the cooling of the scope, other equipment, and the observatory base both because it exposes all of that to the prevailing breezes and because it exposes all of that to a larger "solid angle" of the night sky, which increases radiation cooling.

In the next photo, Dave can be seen opening up his 12" f/8 Hyperion scope which is mounted on an Astro-Physics AP-1200GTO mount. A Windows computer, placed on a table under the roof of the observatory off-camera to the right, runs MaximDL, TeamViewer, APCC Pro, and FocusMax, all of which controls Dave's QSI583wsg imaging camera, his Lodestar guide camera, the AP1200GTO mount, the Starlight Instruments Feathertouch motorized focuser, and the camera rotator built into the Hyperion OTA. This control computer is itself "remotely" accessed over an Ethernet LAN via TeamViewer from another Windows computer in the house, allowing Dave to stay in the house while his imaging system collects his data.

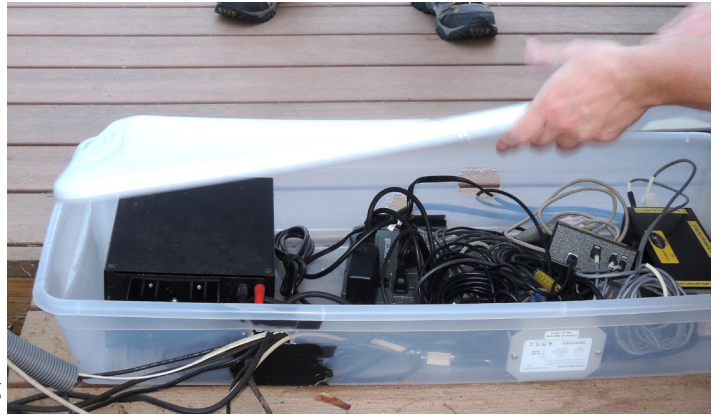


The plastic box houses a surge-suppressing power strip, a 12 VDC linear regulated power supply, a SeaLevel low-temperature powered USB “industrial” hub, the power supply for a QSI583 camera, and indexer/drivers for the focuser and camera rotator. All cables going up to the OTA go into the large gray flexible wrap-around tube seen at the lower left of the photo.

After touring the observatory, we went indoors where Dave treated us to a sumptuous buffet dinner of Indian take-out food! Thanks Dave!

Following dinner, Dave gave a demonstration of the “Aladdin Sky Atlas”. I followed up with the special topic presentation for the evening, titled “Understanding, Identifying, and Correcting Optical Problems in Telescopes”. This was part 1 of a two-part talk. In Part 1, I focused on the optical aberrations themselves and the damage they do to the image in both visual and imaging scopes.

In all, 10 people attended the July AP-SIG meeting, including (in reverse alphabetical order) An Yu, Dana Wright, Ron Worden, Bob Trebilcock, Rob Lancaster, Dave Hockenberry and his wife Ann, Bill and Mary Ann Hanagan, and Nico Carver. The next photo, courtesy of my wife Mary Ann, shows most of the attendees who stopped for a quick group shot as the meeting was breaking up. From left to right in back can be seen Bob Trebilcock, Ron Worden, Nico Carver, Rob Lancaster, and Dana Wright. Seated in front are our illustrious host Dave Hockenberry and Bill Hanagan.



August 2018 AP-SIG Meeting Report

Bill Hanagan

The Astro-Photography Special Interest Group (AP-SIG) met on Saturday, August 11 at Mt. Cuba. Nico Carver gave the special topic presentation on Choosing a Deep-Sky Object and Planning an Imaging Session. Nico discussed a number of websites, applications, and books that are useful when planning imaging sessions, as well as how to choose objects that are well matched to your equipment and sky conditions. He also discussed the choice of sub-exposure times and the total exposure time you should plan for as well as issues to consider when combining data from multiple nights into one image. Nico also provided refreshments for the evening, including some excellent brownies and an assortment of sodas. Following Nico’s presentation, we had our usual Q&A session and looked at photos brought in by several members, including a number of fine photos brought in by one of our newest members, Jarrod Bieber.

September 2018 AP-SIG Meeting Report

Bill Hanagan

The Astro-Photography Special Interest Group (AP-SIG) meeting for the month of September was held on Friday, August 31 at Mt. Cuba—another rainy weekend. I gave the special topic presentation on Optical Problems in Telescope and brought apple cake as the refreshment for the evening. This was Part 2 of the talk and focused on testing complete telescopes using The Ronchi Eyepiece Test and the Star Test. Part 1 was presented at the July AP-SIG meeting as reported above.

Several examples were given of test results from real-world telescopes, including two Newtonian reflectors, two Schmidt-Cassegrains, and one Jones-Byrd Newtonian.

In all, 10 AP-SIG members attended the meeting. The group stopped for a moment for Nico Carver to take the group photo shown below (Thanks, Nico!). Seated from left to right are Aaron Berner, a new member, Bill Hanagan, and Jarrod Bieber, another new member. Standing from left to right are Nico Carver, Zhiqiang Zhang, also a new member, Mark Mitchell, Rob Greybill, Rob Lancaster, Ron Worden, and Bob Trebilcock.



Woodside Farm Creamery Outreach Event

Jeff Lawrence



**Friday, October 12:
6:00 - 8:00 (rain date Saturday)**

09/18/18 DAS Board Meeting Agenda

1. Review of Minutes from Last Meeting—Bill McKibben
2. Treasurer's Report—Bob Trebilcock
3. Approval of Several Donations—Rob Lancaster
4. Budget Planning for the 2018-19 Fiscal Year—Bob Trebilcock
5. Report on the rekey of the Sawin—Dave Groski
6. Mount Cuba Work Days and Pods Project—Dave Groski

Photos by new AP-SIG Member Jarrod Bieber



Technical Information:

Target: M16 "Eagle Nebula"
Constellation: Serpens
Right ascension: 18h 19m 48s
Declination: -13° 45' 14"
Distance: 7000 ly
Angular size: 45 arcminutes
Acquisition date: June 24th & 25th, 2017
Location: Middletown, Delaware
W75° 42' 14.9", N39° 31' 3.1"
Telescope: Celestron 8" Newtonian 1000mm f/5
+ Orion 50mm guide scope
Astronomics Coma Corrector
Mount: Celestron Advanced VX
Cameras: Canon EOS Rebel T5
+ Orion Starshoot Autoguider
ISO: 800
Exposure: 25x150s + 42x165s subs (2 hrs. 58min)
Acquisition Software: BackyardEOS, PHD2
Processing Software: PixInsight 1.8
Calibration with: 16 darks, 50 bias, 22 flats



Target: M65/M66/NGC3628 "Leo Triplet"
Constellation: Leo
Right ascension: 11h 19m 54s
Declination: 12° 59' 42"
Distance: ~35m ly
Frame: ~51x76 arcminutes
Acquisition date: 04/20/2018
Location: Middletown, Delaware
W75° 42' 14.9", N39° 31' 3.1"
Telescope: Celestron 8" Newtonian 1000mm f/5
+ Orion 50mm guide scope
Mount: Celestron Advanced VX
Cameras: Canon EOS Rebel T5
+ Orion Starshoot Autoguider
ISO: 1600
Exposure: 42x100s subs (1 hr. 10min)
Acquisition Software: BackyardEOS, PHD2
Processing Software: PixInsight 1.8
Calibration with: 20 darks, 100 bias, 20 flats

Photos by AP-SIG Member Ron Worden



Technical Information:

Target : M27 (NGC 6853)
Constellation: Vulpecula
Right Ascension: 19h 59m 36.34s
Declination: +22° 43' 16.09"
Distance: ~1360ly
Apparent magnitude: +7.5
Apparent size: 8.0' x 5.6'
Size: 2.8 Ly
Date: 07/14/2018
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 with Dithering
Cameras: SBIG ST4000XCM + ZWO174 autoguider(+/-2 arcsec)
Temperature: 75°F cooled to 0°C
Filters: OneShotColor
Exposure: 12LFs-300sec subs(1hr)
Software: PixInsight
Frame: 33 x 33 arcmin
Calibration with: 10 dark frames
Observer: Ron Worden



Target : M106 (NGC 4258)
Constellation: Canes Venatica
Right Ascension: 12h 18m 57.5s
Declination: +47° 18' 14"
Distance: ~23.7 Mly
Apparent magnitude: +8.4
Apparent size: 18.6'x7.2'
Size: 135,000 Ly
Date: 05/23/2018
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 with Dithering
Cameras: SBIG ST2000 + ZWO174 autoguider(+/-2 arcsec)
Temperature: 55°F cooled to -20°C
Filters: L,Sii,Ha,Oiii
Exposure: 22LFs-22x300sec subs(1.8hrs)
Software: PixInsight
Frame: 19.4x25.8 arcmin
Calibration with: 10 dark frames
Observer: Ron Worden

DAS Loaner Equipment

The DAS has several telescopes that are designated for loan to members. Our advice to new members is to take any of these telescope 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
610-457-2945 (cell)

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 interesting in helping out please contact me at 302-654-6407 or email me at KimGreenMCAO@gmail.com.

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.

How to Join the DAS Yahoo Group

DAS FORUM / E-MAIL SITE ON YAHOO

This is an e-mail service for use by DAS members and our astronomy enthusiast friends. To use this site, go to <http://groups.yahoo.com>. To join, you must have a Yahoo ID and password; if you don't, you can register on the DAS Yahoo Group site by following Yahoo's instructions. You can then begin the short process to "Join the group" upon clicking in that box. You must then register for the DAS group and add your profile by clicking on "add new profile" and completing the form.

When adding or editing your profile, you will need to enter your actual name in the "Real Name" box so you can be identified for approval of your application to join the DAS Yahoo Group, so other members will know to whom they are communicating (Note: you can elect to have your name and email address hidden from anyone other than members of the DAS Yahoo Group).

Finally, specify your desired email address for delivery of messages.

WELCOME NEW MEMBERS!

Aaron Berner

Jarrold Bieber

Tony Fanning

Christopher Flannery

Jesus Gonzalez

Ron Gouge

Michael Oboryshko

Warren Sandberg

Zhiqiang Zhang



DAS CONTACTS

Please Call or Email Us with any Questions or for More Information about the DAS

Officers:

President: Rob Lancaster, RLancaste@gmail.com

Vice-President: Jeff Lawrence, (302) 668-8277, Jeff@DelAstro.org

Secretary: Bill McKibben, BillMcK21921@gmail.com

Treasurer: Bob Trebilcock, trebilcock@aol.com

Board Members at Large:

Bill Hanagan, (302) 239-0949, hanaganw@verizon.net

Amy Hornberger, aehornberger@gmail.com

Dave Groski, groski@udel.edu

Standing Committee Chairs:

Observatory: Jack Goodwin, (610) 457-2945, Jack_Goodwin@yahoo.com

Education: Ted Trevorow, (302) 593-7949, edt750@verizon.net

Library: Maria Lavallo and Sue Bebon

Observing: Greg Lee, (302)252-7806, greglee288@gmail.com

Publications: Nico Carver, (302)353-2448, nicocarver@gmail.com

Other Positions:

Amateur Telescope Making Special Interest Group: Bill Hanagan, hanaganw@verizon.net

Astronomical League Coordinator: K Lynn King, klynnking@verizon.net

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

Awards Chair: Amy Hornberger, aehornberger@gmail.com

DAS Book Club Leader: Amy Hornberger, aehornberger@gmail.com

Elections Chair: Nico Carver, nicocarver@gmail.com

Programs Chair: Jeff Lawrence, Jeff@DelAstro.org

Webmaster: Rob Lancaster, RLancaste@gmail.com

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!

