

FOCUS

Vol. 57, No. 5, May, 2012

DELAWARE ASTRONOMICAL SOCIETY

Next Meeting – Tuesday, May 15th, 2012 Beginning at 6:00 PM

The Annual DAS Dinner Meeting

(Details Appear on Pages 8 & 9)

FROM THE PRESIDENT ■ *Bill Hanagan*

First off, I'd like to thank Fred DeLucia for showing us the photos from his and Pat's Aurora watching trip to Chena Hot Springs, Alaska. I'd also like to thank Greg Lee for his presentation of "What's Up," and Bob Mentzer for reviewing the importance of the observations of the Transit of Venus made in 1769. I also discussed our club's plans for observing and photographing the June 5, 2012 Transit of Venus as well as the ATM SIG's Solar Filter Workshop. The details of our club's transit observing plans appear in this issue of the *FOCUS* on page 15.

Our May meeting is the Annual "Dinner" Meeting of the DAS and it will be held on Tuesday, May 15 at the Christiana Hilton, the same location as last year. Social hour begins at 6:00 P.M. with a cash bar, followed by dinner at 7:00 P.M. and award presentations at 8:00 PM. Our speaker, Mr. Ed Rezac from NASA's Goddard Space Flight Center, will begin his talk at 8:30 PM. His talk is titled "Behind the Scenes of Hubble Space Telescope Servicing." Ed will give us an insider's glimpse into the little seen activity and preparation for a Hubble Space Telescope servicing mission, from the unique perspective of a team member that has worked with NASA astronauts to design and build tools, help choreograph "Spacewalks," and support on-orbit operations from the Mission Control Center at the NASA Johnson Space Center. This is sure to be an evening you won't want to miss.

By the time you read this, it may be too late to send in a reservation via U.S. post. However, you can email any last minute reservations to DAS Treasurer Bill McKibben (billmck21921@gmail.com) on or before Sunday, May 13. Be sure to include the number of people in your party and their entrée selections and bring a check to the dinner made out to "DAS" in the appropriate amount.

As always, I'd like to remind you to keep thinking about how YOU can contribute to the DAS and how you can make the DAS a better astronomy club. We've had some volunteers step forward, and we've received a variety of equipment donations, but more volunteers and donations are needed.



**LOOK for your Email for
Online Voting and Cast Your
VOTE in the DAS Elections
between May 1st and 31st!**

Candidate Statements Appear on Pgs. 12 & 13.

**Don't Miss the Annual
DAS Dinner Meeting
Tuesday, May 15th**

**Make Reservations NOW to Hear
Our SPECIAL Guest Speaker,
Edward J. Rezac**



**from NASA's Goddard
Space Flight Center on
"Behind the Scenes
of Hubble Space
Telescope Servicing"**

The full story on this great speaker, the variety of dinner selections, along with reservation form and directions to the Hilton Wilmington/Christiana appear on pages 8 and 9.

A club works best when all of its able-bodied members pitch-in and help out at club functions in whatever way they can. If you want to make the DAS a better astronomy club, give me a call at 302-239-0949. I'm sure we can come up with something that you can do to help the DAS that also suits your particular interests.

**The Moon -
Tone mapped
photo of the
Moon eclipse of
Feb. 20, 2008.**
Photo Credit: by
DAS Member
Bill Hanagan.

Observing with the Delaware Astronomical Society...

NEW

DAS Member Star Party at ChesLen on April 13th

■ Bill Hanagan

Our fourth MSP of 2012 was held at a new dark sky site for the DAS, the ChesLen Preserve in Chester County north of Unionville, PA. For some members, the drive time to ChesLen is comparable or even shorter than the drive time to MCAO. ChesLen is a private facility and only open by prior arrangement through DAS member Fred DeLucia.

The first photo, below, shows Fred and his 18" "Starstructure" truss tube Dob. Unlike most other truss tube Dobs, the structural components of the Starstructure Dobs are crafted out of aluminum instead of wood.



Back in the 70's, when the Dobsonian telescope revolutionized visual observing, "Big Dobs" like our club's 17.5" Coulter were commonly described as "light buckets." The optical quality of those light buckets was often poor, but the large aperture gave them a significant edge over smaller telescopes when searching for faint objects and viewing star clusters. However, those old-time "light buckets" rarely produced good views of the planets. In contrast, today's top-quality, large aperture Dobs like Fred's 18" Starstructure are widely recognized for their ability to give highly detailed planetary views.

While observing Mars through Fred's telescope, there were moments when Syrtis Major and both polar ice caps could be seen with incredibly sharp edges. Even on a night of bad seeing, I had a better view of Mars through Fred's telescope than I have ever seen before. I'm really looking forward to discovering what this telescope has to offer when the seeing is good for more than a small fraction of a second!

The second and third photos at right show DAS member Pete Huesmann in the process of setting up his Losmandy G-11 mount and vintage 5" f/12 Astro-Physics Refractor. At far right is Pete and his scope at twilight
(Continued on page 11)



"PUBLIC NIGHTS" at the Mt. CUBA OBSERVATORY...

MCAO PUBLIC NIGHTS ■ Greg Weaver



The Mt. Cuba Observatory Public Nights continue year round! In addition to learning about many aspects of the heavens, you'll have a chance to visit and view our all-digital full-dome planetarium. You can pick up a schedule when you next come to a meeting or get the latest updated version off the website at: <http://MountCuba.org>. Programs are presented on Monday

nights at 8pm. Please check the website for full details and updates on programs planned. Interested individuals or groups can apply by letter or call 654-6407 (preferably between the hours of 9 and 11 am, Monday through Friday) to the Observatory to obtain reservations for these "Public Nights".

The Public Nights schedule for May-June, 2012 follows:

Date	Speaker	Topic
May 14	Hank Bouchelle	How Fast are We Moving?
Jun 4	Harry Shipman	TBD
Jun 18	Don Wilson	Wonders of the Universe

DAS Special Interest Groups for Photography and Telescope Construction...

DAS ASTROPHOTOGRAPHY SPECIAL INTEREST GROUP ■ Bill Hanagan

The DAS astrophotography special interest group (DAS AP SIG) meets on Friday nights at 7:30pm every other month at Mt. Cuba regardless of weather. The SIG also meets for photo shoots scheduled on 1-2 day notice to synchronize with the weather.

The monthly meetings are informal and typically include the presentation of astrophotos taken by the members along with an extended question and answer period. Objects commonly photographed include constellations, auroras, lunar eclipses, and planetary photos, as well as a wide variety of deep-sky objects such as nebulae, galaxies, star clusters, etc. The topics discussed cover the entire gamut of astrophotography, from how to get started with a minimum of equipment, to polar aligning your telescope, all of the way to the fine points of using auto-guiders and post-processing digital images.

You can get started in astrophotography with just your current camera mounted on a tripod or a motorized telescope by taking wide field photographs of meteor showers, conjunctions, constellations, and star trails. As you move to progressively fainter and smaller subjects, you'll need better equipment. Joining the AP SIG is a great way to learn what equipment you'll need and what works well before you spend your money. If you are interested in joining the AP SIG, just email your name, address, and phone number to me at hanaganw@verizon.net.

NEW The next AP SIG meeting is scheduled for Saturday, May 12 at 7:30 PM at MCAO. Even if you aren't an AP-SIG member, you're welcome to attend the AP-SIG meetings to learn more. Be sure to sign up for the DAS Yahoo Group in order to receive the email announcements that provide the exact date and time of the meeting.

As always, please consider submitting one or more of your favorite astrophotos for publication in the *FOCUS*. A recent photo is not required. You can email your photo(s) as .jpg files to our *FOCUS* editor, Joe Neuberger at his address at jrneuberger@gmail.com. Please include a text file briefly describing how you made each photo (in Microsoft Word format) along with any by-lines or captions you would like Joe to use. If you would like, you can write a more in-depth discussion to go with your photos. Joe can make a masterful layout, but if you would like to suggest a layout of your own you can insert copies of your photos into the Word document to give him an idea what you would like to see. Either way, don't forget to attach a high resolution .jpg file to your email for each photo. Joe has done a great job improving the look of the *FOCUS* and adding relevant links to take advantage of the fact that the *FOCUS* is now on-line, but like all newsletter editors, he needs as much material as he can get from club members.

DAS AMATEUR TELESCOPE MAKING SPECIAL INTEREST GROUP ■ Bill Hanagan

The DAS Amateur Telescope Making (ATM) Special Interest Group (SIG) meets on evenings and weekends according to the availability of the members and the particular projects that are underway. Currently the ATM SIG has a medium Dob building program under way. The general range of activities of the ATM SIG includes all manner of telescope making, mirror making, and the making of accessories for telescopes and observing.

Anyone interested in joining the ATM SIG should email their name, address, and phone number to me at hanaganw@verizon.net.

Meeting dates are announced primarily by email, so if you are interested in telescope making, be sure to let me know!

The refiguring of the club's Coulter 17.5" primary mirror is continuing. Multiple sessions have been held on a few Sundays in the last two months. Let me know soon if you would like to participate in this effort but have not yet advised me of your interest.



LOANER TELESCOPES and SAWIN OBSERVATORY REMINDER ■ Tom Sidowski

One of the best advantages of being a member of the Delaware Astronomical Society is that all members have the privilege of being trained to use and then borrow equipment owned by the club for personal use. Currently, we have two scopes available for loan: a Celestron 8" Schmidt-Cassegrain, and a 6" Orion Sky-Quest XT6 Dobsonian reflector. The loan is for at least a month. If you're interested in checking out either of these scopes, contact Tom Sidowski at 302-239-1844.

The DAS also maintains a club observatory on the grounds of the Mt. Cuba Astronomical Observatory. The Sawin Observatory houses the club's permanently mounted 12.5" reflecting telescope and a 17.5" Coulter Odyssey 2 Dobsonian telescope. They are for the use of club members once they are trained and checked-out in a simple operating procedure. Members who are interested in becoming key holders of the Sawin Observatory should contact me at 302-239-1844 to arrange for training in the use of the facility.

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Notes on the Member Star Parties (MSPs) ■ Bill Hanagan

MSP cycles are timed for a minimum of intrusion by moonlight during the hours before midnight to maximize opportunities for deep sky observing and imaging. For each MSP cycle there are usually four potential dates designated in advance: the Friday and Saturday nights which immediately precede a new moon, and the Friday and Saturday nights that follow or include the new moon date. Which of the four potential dates is used for an MSP is "flex-scheduled" according to the weather using the DAS Yahoo Group email system.

Please be sure to mark your calendars with the potential MSP dates that appear in the table! Obviously, you need to keep as many of these dates open as possible so when a GO announcement is made you're in a position to attend the DAS Member Star Party regardless of which date the weather favors!

The DAS has a core group of dedicated visual observers and astro-imagers who travel to Tuckahoe, Cherry Springs, West Virginia, and other dark sky sites as opportunities and the weather allow. If you're interested in going along or meeting up on any of the road trips mentioned in the MSP schedule, let me know and I'll fill you in on the details and keep you apprised as plans develop.

Road trips to distant observing sites like Cherry Springs State Park in Pennsylvania require that several DAS members commit to going in advance should the weather prove favorable for both nights. When the weather forecast only looks good for one night, the MSP will often be redirected to a closer site such as the Elk River site or the Sawin observatory.

While DAS members who go on road trips are often involved in both observing and imaging, these road trips are particularly valuable for visual observers because they offer the best opportunity to see deep sky objects through large aperture telescopes under dark skies.

Most of today's big Dobs produce vastly superior visual images compared to older, large aperture observatory telescopes with which you might be familiar, thanks in part to better optics, the use of a "thin" primary mirror which cools faster, and the use of fans to cool the primary mirror and to remove warm air from the optical path. If you are truly interested in visual observing, you owe it to yourself to see first-hand what dark skies and a modern large aperture telescope will allow you to see.

Finally, I'd like to remind you that you need to be signed up for the DAS Yahoo Group to receive the scheduling announcements for the MSPs. A full description of the MSP program appears on the DAS website at <http://delastro.org/> and in the December 2009 issue of the *FOCUS*.

Laser Collimator for Aligning Your Newtonian or Dob Scopes Now Available for Loan to the Membership

If you would like to take advantage of this new tool available for lending to the membership, please contact the O&E Group by calling Tom Sidowski at 302-239-1844. It's a quick and easy procedure and will improve your visual observing experience GREATLY!

CLASSIFIEDS: Genuine ScopeBuggy for Sale.

Paid \$295 new. **LIKE NEW CONDITION!** Has optional equipment tray. **\$150 OR best offer.** Contact Joe Neuberger at JRNeuberger@gmail.com or call 410-398-7394.



2012 Delaware Astronomical Society Member Star Parties

Guests are ALWAYS Welcome at DAS MSP's!

Potential Dates	Events and Observing Highlights	Location
May 18, 19 May 25, 26	<i>Planets:</i> Last chance for Venus low in twilight, Mars and Saturn still prominent <i>Messier objects:</i> 3, 40, 49, 51, 53, 58, 59, 60, 61, 63, 64, 65, 66, 68, 83, 84, 85, 86, 87, 88, 89, 90, 91, 94, 98, 99, 100, 101, 104, 106. <i>Bright NGCs:</i> 4565 (edge on galaxy with dust lane).	DAS Sawin Observatory
June 15, 16 June 22, 23	<i>Planets:</i> Catch Mercury soon after sunset (too low after 8 pm), Mars and Saturn now in SW, by midnight Pluto is near the meridian and Neptune is low in SE <i>Messier objects:</i> 4, 5, 10, 12, 13, 62, 80, 92, 102, 107 <i>Bright NGCs:</i>	DAS Sawin Observatory
July 13, 14 July 20, 21	<i>Planets:</i> Catch Mars and Saturn is W before 10 pm, Uranus joins Neptune low in SE after midnight. <i>Messier objects:</i> 6, 7, 8, 9, 11, 14, 16, 17, 19, 20, 21, 22, 23, 25, 56, 57 <i>Bright NGCs:</i>	DAS Sawin Observatory
Aug. 10, 11 Aug. 17, 18	<i>Planets:</i> Mars and Saturn are close in W during twilight, Neptune and Uranus in SE by 11pm <i>Messier objects:</i> 2, 15, 29, 30, 39, and 75. <i>Bright NGCs:</i> 6946, 6960, 6992, 7000 (N. Am. nebula), 7009 (Saturn nebula), and 7027	DAS Sawin Observatory
Sep. 14, 15 * Sep. 21, 21	<u>Delmarva "No-Frills" Star Party</u> <i>Planets:</i> Saturn and Mars are getting lost in twilight, Neptune and Uranus have reached center stage, Jupiter returns in NE after 11pm <i>Messier objects:</i> 52, 72, and 73. <i>Bright NGCs:</i> 7009 (Saturn nebula), 7293 (helix nebula), 7662 (blue snowball), and 7789.	*Tuckahoe State Park (14,15) DAS Sawin Observ. (21,22)
Oct. 12, 13 Oct. 19, 20	<u>Messier Half-Marathon - Part B</u> <i>Planets:</i> Neptune and Uranus still high in S, Jupiter getting higher in E <i>M objects:</i> 31, 32, 103, 110. <i>Bright NGCs:</i> 253.	Gus Swartout's Elk River site (mud/snow backup site: DAS Sawin Observatory)
Nov. 9, 10 Nov. 16, 17	<i>Planets:</i> Neptune and Uranus in SW, Jupiter high in SE <i>Messier objects:</i> 33, 74, 76. <i>Bright NGCs:</i> 457 (Owl cluster).	DAS Sawin Observatory
Dec. 7, 8 Dec. 14, 15	<i>Planets:</i> Neptune and Uranus getting lower in SW, Jupiter moving to center stage <i>Messier objects:</i> 34, 77 <i>Bright NGCs:</i> 884 and 869 (the double cluster)	DAS Sawin Observatory

Total Solar Eclipse Outer Corona Composite Image - 2008 Yiwu, China -
This image is a composite created in Photoshop by stacking 13 separate exposures exposed from 1/2000 sec to 1/4 sec. This enables the image to capture far greater dynamic range than any one exposure can record. The result is very close to what the eye can see during the eclipse. The outer corona with prominent streamers symmetrically distributed in an east - west direction, extending out nearly 2 solar diameters, can be seen. In addition, there are fainter and much shorter streamers extending out from the solar poles. Camera: Olympus E-500, Olympus Dugital Zuiko 50-200mm f2.8-3.5 @ 200mm, ISO 200.
Photo Credit: by DAS Member Don Shedrick.

DAS FORUM / E-MAIL SITE ON YAHOO

■ Don Shedrick

This is a restricted e-mail service for use by DAS members for DAS purposes. To use this site, go to <http://groups.yahoo.com>; search for Delaware Astronomical Society; and click on the link that comes up. To join, you must have a Yahoo ID and password; if you don't, you can register at this time by following Yahoo's instructions. You will then be allowed 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 as a DAS member so Don Shedrick can approve your application to join the DAS group, and everyone will know to whom they are communicating.

Finally, specify your desired email address for delivery of messages. Note: you may choose to not have your name and email address displayed to anyone other than DAS members who are members of the Yahoo DAS email group.

For more detailed instructions, go to the DAS website under *DAS Resource Links*.

MAGAZINE SUBSCRIPTIONS ■ Bill McKibben

SKY & TELESCOPE will be processed by the club for the first subscription year only. The publisher should then send renewal notices directly to the subscriber at the club rate of \$32.95. The subscriber can then pay the publisher directly.

NOTE: If you receive a renewal notice for an amount other than \$32.95, check to see if there are any special offers included in the rate. Also check the renewal date printed on the magazine address label. These 'special offers' are likely to occur several months prior to the renewal date. However, if you are approaching your renewal date and have not received the correct renewal notice, contact me and I will process the renewal through the club.

ASTRONOMY will continue to be processed by the club for all subscription years.

Please see the renewal form at the end of the *FOCUS* for additional renewal information.

MEMBERSHIP EXPIRATION NOTICES

■ Bill McKibben

If you receive the *FOCUS* by email, you will be notified of your membership renewal by email. If you receive the *FOCUS* in the mail and the mailing label on the envelope containing your *FOCUS* is marked with red marker, your membership is expiring or has expired. Please see the renewal form at the end of the *FOCUS* for additional renewal information. Also see the "Magazine Subscriptions" section in the *FOCUS* for information about subscription renewal.

LIBRARY NEWS ■ Glenn Bentley

NEW Members are invited to drop by the library after the June meeting to peruse our shelves for summer reading materials. Have a great summer.

ASTRONOMICAL LEAGUE MEMBERSHIP

DAS members have the opportunity to become members in the Astronomical League at the discounted rate of \$7.50 per year. Benefits include the *Reflector* (a quarterly newsletter), observing programs, awards, discounts on books and educational materials. For questions on joining the Astronomical League, contact Lynn King at meetings, call 302-764-8816 or email KLynnKing@verizon.net.

ASTRONOMICAL LEAGUE Dues are Due

NEW For those that are members and for those who are not and would like to join, dues for the Astronomical League are due. Please send your check for \$7.50 to Bill McKibben at 27 Mary Jane Lane, Elkton, MD 21921. If you are not a member, consider joining. The Astronomical League has many observing programs for the very new to the very experienced. In the months to come, I will be introducing the observing programs in the *FOCUS*. For information and questions, contact K. Lynn King at klynnking@verizon.net.

Astronomical League Mission Statement

To promote the science of astronomy

- **By fostering astronomical education**
- **By providing incentives for astronomical observation and research**
- **By assisting communication among amateur astronomical societies**

MT. CUBA LENDING LIBRARY ■ Paul Stratton

May I first extend a hardy thanks to all of those using the Lending Library. Your interest has made this a rewarding effort. Stop by after the meeting and sign a book out for spring reading.



ASTRO-PHOTO of the MONTH

Venus Transits the Sun

*Photo Credit:
DAS Member
Ron Worden*

*Observed at Myrtle Beach,
South Carolina at
33.42N Lat., 78.52W Long.
Photo taken at 6:45 A.M. EDT
on June 8, 2004.
Photo was captured using
10X50 binoculars on a tripod
with someone holding a full
spectrum solar filter. A digital
camera was used set to 2x
zoom held up to the
binocular eyepiece.*

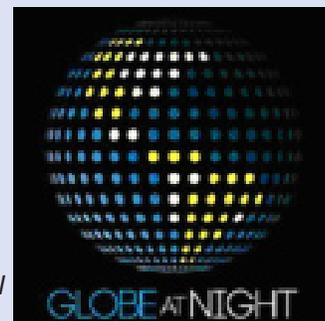


WEBSITE of the MONTH



Less of Our Light for More Star Light
Saving Energy; Saving our Night Skies

<http://www.GlobeAtNight.org>



The GLOBE at Night program is an international citizen-science campaign to raise public awareness of the impact of light pollution by inviting citizen-scientists to measure their night sky brightness and submit their observations to a website from a computer or smart phone. Light pollution threatens not only our "right to starlight," but can affect energy consumption, wildlife and health. People in 115 countries contributed over 76,000 measurements during the campaigns each winter/spring over the last 7 years, making GLOBE at Night the most successful light pollution awareness campaign to date.

Check out the [web application data submission process](#). The GLOBE at Night website is easy to use, comprehensive and holds an abundance of background information. The database is usable for comparisons with a variety of other databases, like how light pollution affects the foraging habits of bats.

Learn more about GLOBE at Night from the 365 Days of Astronomy Podcasts on January 1, February 1 and March 1 at <http://365daysofastronomy.org>. Hear our latest podcast on GLOBE at Night in the [March 30 episode](#).



Join with the **Delaware Astronomical Society**
 for the **Annual Dinner Meeting**
 and an **Exciting Speaking Event**
 on **Tuesday, May 15th, 2012, 6:00 p.m.**,
 at the **Hilton Wilmington/Christiana Hotel**



EMAIL Your Reservations **NOW** for this Special Event Honoring the
DAS Amateur Astronomer & Porter Educator of the Year Awardees



Hear a presentation by
Edward J. Rezac
 from NASA's Goddard Space
 Flight Center.



**Topic: Behind the Scenes of
 Hubble Space Telescope Servicing**

Ed Rezac has enjoyed thirty-six exciting years of active participation in NASA's Space Shuttle, Life & Microgravity Sciences, and Extravehicular Activity (EVA) programs. His career parallels the modern manned-space era, with personal milestones that include spacesuit development and test support for STS-1 - the first Space Shuttle launch, astronaut training and flight support for the first Space Shuttle "EVA" - or "spacewalk", and astronaut training and procedure development for many other NASA "firsts".

Over the past fifteen years Ed has supported four consecutive Hubble Space Telescope (HST) EVA-intensive servicing missions as EVA Point of Contact for critical repair and refurbishment tasks. He contributed to the historical final HST servicing mission in May 2009 in part by developing procedures and training NASA's astronauts to repair the Advanced Camera for Surveys, an extremely delicate and critical task described by the STS-125 Payload Commander, astronaut John M. Grunsfeld (Ph.D.), as "performing brain surgery in space."

Costs: \$38 per person

Dinner will feature:

A Field Greens Salad with Radishes, Cucumbers, Tomatoes, Carrots, and Ranch Dressing; Seasonal Vegetables with the Chef's Selection of Potato or Rice; Coffee or Tea; Triple Chocolate Mousse Cake.

There are three entree choices:

- 1) Chicken Picata in a Lemon, Caper, and Parsley Butter Sauce
- 2) Salmon with Champagne Dill Sauce
- 3) Penne Pasta Primavera with Garlic and Olive Oil.

Please join fellow members of DAS for this annual evening of fellowship and the presentation of our *Porter Educator* and *Amateur Astronomer* awards. Cocktails and Fellowship begins at 6pm. Dinner will be served at 7pm.

At this Late Hour, Please Email any last minute reservations to DAS Treasurer Bill McKibben (billmck21921@gmail.com) on or before Sunday, May 13. Then Bring Your Check to the Dinner.

2012 May Dinner Meeting Entree Order & Reservation Form

NAME: _____

1. Chicken Entree \$38.00 x _____ (number) = Amount \$ _____

2. Salmon Entree \$38.00 x _____ (number) = Amount \$ _____

3. Vegetarian Entree \$38.00 x _____ (number) = Amount \$ _____

Email any last minute reservations to DAS Treasurer Bill McKibben **Total** \$ _____
 (billmck21921@gmail.com) on or before Sunday, May 13. Then Bring Your Check to the Dinner.

Professional Biography for Edward J. Rezac

Ed Rezac has enjoyed thirty-six exciting years of active participation in NASA's Space Shuttle, Life & Microgravity Sciences, and Extravehicular Activity (EVA) programs. His career parallels the modern manned-space era, with personal milestones that include spacesuit development and test support for STS-1 - the first Space Shuttle launch, astronaut training and flight support for the first Space Shuttle "EVA" – or "spacewalk", and astronaut training and procedure development for many other NASA "firsts". He contributed systems engineering support to the first flights of the Manned Maneuverability Unit (MMU), repair and deployment of the Solar Maximum Mission satellite, NASA's first satellite salvaging mission, and multiple space lab flights designed to explore and understand the effects on the human body when exposed to long duration stays in space. Mr. Rezac's journey has taken him from early design for Space Station utilization systems, to on-site support at NASA Headquarters for Life and Microgravity Sciences payload selection and development.

Through his membership in the NASA Specialized Center of Research and Training for Space Environmental Health, Mr. Rezac provided technical support to assess the state of development of EVA related technologies and operations against future mission plans, and helped define and implement the process by which NASA develops technologies to support human presence near the Earth and into the Solar System. NASA management recognized Mr. Rezac for his contributions to the research and technology study, "Strategic Considerations for Support of Humans in Space and Moon/Mars Exploration Missions", and solicited his participation to assure agency compliance with the White House investigation into human radiation studies. Mr. Rezac's contributions to America's Manned Space Program have been acknowledged through NASA Manned Space Flight Awareness awards, NASA Group Achievement awards, and presentation of NASA's prestigious Silver Snoopy Award.

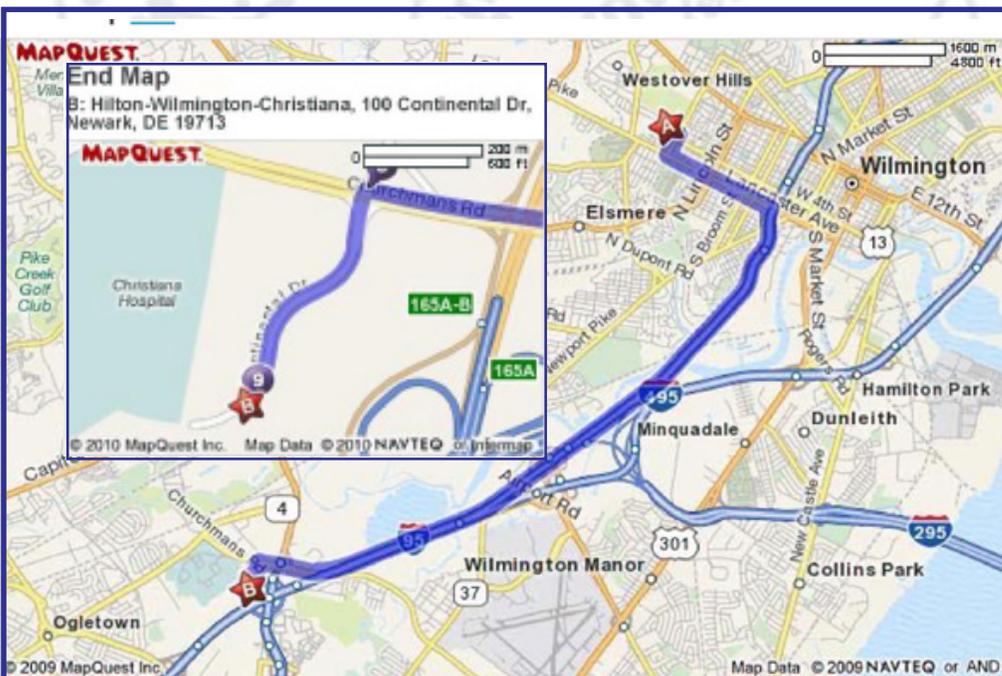
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Mr. Rezac currently manages the Satellite Servicing Center Facility for the Satellite Servicing Capabilities Office at the NASA Goddard Space Flight Center in Greenbelt, MD.

Abstract: Behind the Scenes of HST Servicing with Ed Rezac

One would be hard pressed to find someone today who is not familiar with at least one Hubble Space Telescope image. For the past 21 years HST has been providing the worldwide science community, astrophysicists and amateur astronomers, educators, poets and rock stars with glimpses into our universe that challenge imagination and feed our desire to know more. Arguably one of the greatest machines built by man, Hubble continues to force-feed us with discovery and amazement... twelve years after her expected life cycle end has come and gone.

Ed Rezac provides an insider's glimpse into the little seen activity and preparation for a Hubble Space Telescope servicing mission. From the unique perspective of a team member that has worked with NASA astronauts to design and build tools, helped choreograph Extravehicular Activity ("Spacewalks"), and supported on-orbit operations from the Mission Control Center at the NASA Johnson Space Center, Ed will share the excitement, concern and pride of working with the amazing team "family" that has kept the Hubble heart beating!



Directions to the May Dinner Meeting at the Hilton Wilmington/Christiana Hotel

From the North: Follow I-95 South. Take Delaware exit #4B (Churchman's Road/Route 58). Bear right at the top of the exit ramp and proceed on Churchman's Road to the fourth traffic light. Make a left onto Continental Drive. The Hotel will be the first driveway on the left.

From the South: Follow I-95 North. Take Delaware exit #4B (Route 7 North). Stay in the right-hand lane

and proceed to exit #166 (Churchman's Road/Churchman's Crossing/Route 58). Turn right at the bottom of the exit ramp, yielding onto Churchman's Road. Follow to the second traffic light, and make a left onto Continental Drive. The Hotel is the first driveway on the left.

Delmarva Stargazers Star Gaze XVIII / MSP

April 19th and 20th, 2012 ■ Bill Hanagan

We held our 5th MSP of 2012 at Tuckahoe State Park in Maryland in conjunction with the Delmarva Stargazer's "Spring Stargaze" on the nights of Thursday, April 19 and Friday, April 20. Although we weren't certain about the weather for either night until mid-day, both nights turned out very well, with good transparency and seeing for all but a few minutes on each night.

The first two photos, below, show views of the observing field during the event at Tuckahoe. Attendance seemed down slightly from last year, but was very good considering the uncertain weather forecast. The field was crowded in certain areas, but there was enough open space remaining on the observing field to accommodate 80 or more additional participants.



The third photo, at right, shows a view of the DAS encampment on Thursday evening. Awnings like the one Greg Lee is standing under in the center of this photo serve double duty: they provide shade during the day and a place where charts and other items can be kept dew free at night. Normally, the DAS contingent will have one or two awnings for use by the entire group at regional star parties like the Delmarva Stargaze.



The fourth photo, below left, shows Greg observing Venus with binoculars as he waits for sunset. Venus was less than 40% illuminated and displayed an obvious crescent shape reminiscent of the moon.



Greg also brought out his Hardin 10" Dob and we gave it a thorough workout on Thursday night as we searched for and identified several of the galaxies in Leo, including both galaxy trio's. We also star-hopped to and observed many of the showpiece Messier objects. We finally called it quits for the night at about 2 AM on Friday morning.

Late on Friday afternoon, Bill McKibben arrived with his 18" Obsession truss tube Dob. The seventh photo, below, shows a partial view of the DAS encampment on Friday evening. Whenever we hold an MSP in conjunction with the spring or fall Star Gaze, we encourage attending DAS member's to setup their telescopes in close proximity to each other to maximize the interaction within the group and to make it easy for everyone to share the views through the different telescopes as well as to share eyepieces, collimation aids, and other astro equipment.

Rob Lancaster arrived after the photo below was taken and set up his 10" Newtonian on a Losmandy G-11 German Equatorial Mount (GEM) in the open space in the foreground on the left.



(Continued on following page)

Star Gaze XVIII / MSP *(continued from preceeding page)*

The sixth photo, below, shows Rich LeMay's guest Scott Ellis seated at the eyepiece of Greg's 10" Dob with Greg Lee (standing to the left) teaching him the sky.



For most of us, Friday night's observing and imaging concluded about 2 AM on Saturday morning. Rob kept going, taking advantage of the dark sky for imaging before retiring at 4 A.M.

This year, the Stargaze organizers provided a blueberry pancake and bacon breakfast on Saturday morning for those who were up in time.

Before breaking camp and heading home on Saturday morning, the DAS contingent paused for the following group photo, below. Appearing from left to right are DAS President Bill Hanagan, Scott Ellis, DAS Treasurer Bill McKibben, Rob Lancaster, Greg Lee, and Rich LeMay.



THE SUN



MERCURY



JUPITER

DAS MSP at ChesLen April 13th

(Continued from Page 2)

painted with the faint light of a red flashlight.

The fourth photo, at right, shows DAS member Lionel Sandell at the focuser of his 5.1" Stellarvue SVT-130ED as he waits for dark.

The fifth photo, below, shows Greg Lee preparing his 15" Discovery split-tube Dob for a night of observing. Unfortunately, Greg's "classic" station wagon had to be retired after many years and well over 200,000 miles of service, so transporting this bulky telescope to DAS star parties has become problematic for Greg.

The sixth and final photo, below, shows Randy Dextra and his 11" Celestron Schmidt-



Cassegrain Telescope (SCT). Randy reports that this telescope easily centers any object he chooses, though he says that his 14" Celestron Starhopper Dob still has a definite edge in image quality.



Statements to the Membership from Candidates for the 2012 DAS Election

As announced in the March Focus, this May the DAS will hold the 2012 election for President, Vice-President, Treasurer, and Secretary. The ballots will be sent out on May 1st and must be completed/returned by May 31st. If you wish to vote in the election, please verify that the email address and mailing address that the club has on file for you are correct prior to May 1st. In order to better inform the membership, statements from the candidates for the different positions are presented below. If anyone is interested in running for a position or knows somebody who should run who is not listed below, at the April DAS meeting, I will open the floor for additional nominations. Thank you!

Robert Lancaster

2012 DAS Election Chair

Candidates for President

William D. Hanagan, Jr., Ph.D.

DAS President

When I travel, I often meet with local astronomy clubs, whose members are active in three primary areas: visual observing, imaging, and telescope making.

I have attended, supported and run DAS star parties for many years. I created the "Member Star Party" (MSP) program for scheduling star parties around the weather. My accounts of several of our MSPs have appeared in the *FOCUS*. I've worked with the public at numerous outreach star parties and hosted many youth groups both at MCAO and in our club's Sawin Observatory.

I founded the Astro-Photography and the Amateur Telescope Making Special Interest Groups 10 years ago and I still run both SIGs. The AP-SIG is quite active, with on-site imaging sessions as well as educational lectures and hands-on demonstrations.

In the ATM arena, I've helped others build and modify telescopes as well as making telescope mirrors. I also teach Mirror Making at the Delmarva Stargazer's Mid-Atlantic Mirror Making Seminar.

I have given numerous talks at DAS meetings on observing, imaging, optics, and other topics. I host and co-host MCAO Public nights and I am a MCAO Technical Associate. I've also contributed to the DAS course on Astronomy as a lecturer.

An astronomy club should help its members satisfy their astronomy interests by providing high quality equipment and facilities which they can't afford themselves. The DAS did that for visual observing when it built the Sawin observatory and installed the 12.5" telescope in 1962.

50 years later, the 12.5" is seriously outmoded and the Sawin observing site has been substantially impaired by light pollution and light trespass. The best visual observing experience available to our members is no longer had at the Sawin, but by using 18" and larger truss tube Dobs which are transportable to dark sky observing sites. We lack a large aperture truss tube Dob of our own and I hope to one day lead the DAS to build or acquire one.

Our 12.5" telescope has never been adequately equipped for astronomical imaging. Currently, a DAS member with an interest in deep sky imaging must either buy expensive equipment or give up. I hope that one day we can acquire a telescope and mount that will truly be useful for deep sky and planetary imaging as well as visual observing.

From 1962 until 2008, nearly all club income was spent on intangible "expense" items rather than on items of lasting value. No significant amount was spent on new equipment during this 46 year period or saved for replacement equipment. Since 2008, I have lead the DAS in making large cuts in non-essential expenses by moving the *FOCUS* online and discontinuing club-sponsored individual memberships in the Astronomical League.

We need to continue saving for equipment and facility improvements by minimizing spending on non-capital items. In either case, DAS resources should only be used to provide astronomy benefits for our club members. With your help, we can continue to make the DAS a better astronomy club.

Hank Bouchelle, Ed.D

During my 35 years in the DAS, I created the Society's By-Laws and founded the Luther J. Porter Award. I served as At-Large Board member, vice-President, and eventually became the longest-serving President. Illness interrupted my recent term.

My recovery required hundreds of thousands of dollars and countless hours of skilled and thoughtful care. I carry the organ of an accident victim, a man who had plans and a family of his own. My responsibility is to make good use of time I now have, and that he doesn't have. My choice is to serve the DAS membership.

In the fall 2011 DAS membership, in two years, had fallen from 120 to 90, and in January 2012 was still lower. Also in the fall 2011 dues were increased 50%, with \$5,000 in the treasury, on course to reach \$10,000 in 2013 drawn from this declining membership. Meanwhile, there were no outlays for the Education, Observing, Library, or Publications Committees. There has been no astronomy course for DAS members. I now host such a course for the Mt. Cuba Observatory, and two Public Night programs.

What the DAS did best was astronomy, astronomy education and collegiality. We need a club with an expanding membership, opportunities to engage all members and provide resources for the curious public. An astronomy club should have many elements: educational programs, beginner observing, telescope awareness, and challenges for the accomplished. I propose meeting these goals with a practical budget for Society activities, enabling the Board to project Society expenses and halt the oscillating dues cycle and accumulation of ready cash serving no member purpose.

If you are a former member, please consider returning. I will work to make all voices heard. To everyone, I ask for a congenial organization, supportive of all astronomical endeavors and responsive to its membership.

Candidate for Vice-President

John Case

DAS Vice President

My name is John Case, and I've been the DAS Vice President for several years. This is an office for which I see the duties as:

1. Substitute for the President at meetings when the President is unavailable and
2. Take part in DAS Board meeting discussions and decisions.

In the now somewhat distant past I've substituted for an ill President for many months in a row. Professionally I'm a theoretician/mathematician and Professor in the University of Delaware's Computer and Information Sciences Department. I strongly favor what I see as the two main thrusts of DAS:

1. Astronomical observing and associated activities including providing (making, buying) equipment for/through the club and photography and
2. Its wonderfully educational public outreach activities.

Of course some of the club's activities such as Star Parties nicely involve both observing and educational outreach. I value too the DAS tradition of providing awards to both members and non-members. I frankly enjoy the excitement of our various talk series both monthly and at the Annual DAS Dinner. I like to work with all kinds of people, and, perhaps, my related strong suits are diplomacy and humor. I'm happy to serve again as DAS VP.

Candidate for Treasurer

Bill McKibben

DAS Treasurer

I have been a member of the DAS since 2004 and served as Treasurer since September 2008. As a member, I have been involved in a variety of club activities including mirror making, telescope building, astrophotography, Messier marathons and star parties.

As Treasurer, I have built upon the tremendous foundation of my predecessor Bob Mentzer. I have leveraged my computer skills to automate significant parts of the Treasurer's job. This has resulted in a detailed electronic record (that I regularly backup offsite) and neatly printed paper records to complement the digital data.

In 2011, I led the effort to move the membership renewal to a single date each year. This eliminates the ongoing confusion around everyone's individual renewal dates.

As a voting member of the board, I support initiatives that bring value to active members. I believe in learning and enjoying the hobby by doing. And, there is no better way to participate in the hobby than to spend time under the night sky. ~~~ "I hear and I forget. I see and I remember. I do and I understand." ~~~ I support the effort to provide observing and imaging equipment to club members that they may not be able to afford individually. Compared to most Astronomy clubs, we are well behind the curve in doing so.

While I lean towards the observing and imaging side of the hobby, I truly appreciate and support the learning experience provided by a good speaker or presentation.

Candidates for Secretary

Richard LeMay

I'm running for D.A.S. secretary to provide accurate minutes of the board meetings. Also to help the club with the following but not exclusively these items.

1. Find interesting topics and educational experiences at the meetings.
2. Improve the quality of D.A.S. instruments.
3. Find out what members really want from their club.

K. LYNN KING

DAS Secretary

Current Secretary and member since 1980's.

Keep accurate minutes of Board of Directors' meetings.

Contact for Astronomical League observing programs.

Chair of Astronomical League observing programs for the DAS.

Contact for Brandywine Creek State Park star events.

Host and co-host Mt. Cuba public nights.

Presenter of Caroline Herschel



Dr. Stephanie Wright is Winner of the 2012 Luther Porter Educator Award



Gus Swartout, chair of the Awards Committee of the Delaware Astronomical Society, has announced the winner for the 2012 Luther Porter Educator Award which will be presented at the May 15 DAS Annual Dinner. She is Dr. Stephanie Wright, founder, President and CEO of the Delaware AeroSpace Education Foundation (DASEF).

The DASEF is a 501(c)(3) non-profit organization dedicated to promoting aerospace education in the State of Delaware. The organization educates students of all ages in the areas of math, science, technology, and aerospace through the use of academies, presentations, symposia, professional development, and the Innovation Technology Exploration Center (ITEC).

The DASEF was founded in 1989 by Dr. Wright and began with Destination Orbit, and quickly expanded to its current 8 academies. Originally, Destination Orbit, Moon, and Mars were named as Level I, II, and III respectively. In addition, Destinations Sky & Beyond and Space were half day academies.

The DASEF's mission is to inspire and educate the people of the Delaware Valley in learning about the Earth's environment, space science, mathematics and technology through its programs, events and activities and the resources of the Environmental Outpost. Its programs are supported by many partners that include Delaware's institutions of higher learning, Delaware Space Grant Consortium, Delaware Air National Guard, Dover Air Force Base. Depart-

ment of Transportation, Delaware Parks and Recreation, corporate sponsors, and the Civil Air Patrol.

The 40-acre ITEC site in northern Kent County is located in Smyrna, Delaware, shared with Big Oak County Park. Construction began in 2003 in four phases. The Environmental Outpost was completed first. It hosts Mountjoy Observatory, the second-largest telescope in the State of Delaware. Currently, the rest of ITEC is still under construction. The building is LEED certified through its implementation of solar panels and other energy efficient technologies. ITEC hosts the bi-annual Family Days for the public to enjoy.

The Delaware AeroSpace Education Foundation functions to raise the visibility and value of K-12 STEM (Science, Technology, Engineering and Mathematics) education to meet intellectual and workplace needs of the future. DASEF implements successful programs using proven instructional strategies to motivate, engage, educate and inspire people from diverse backgrounds and communities.

The DASEF's vision is driven by the belief that "Wisdom Begins with Wonder.." Capitalizing on natural curiosity through activities that include a problem solving component enriches the learning process for its participants.

The DASEF has established itself as an innovative and progressive organization with the vision and resources required to link contemporary aeronautic, space, and engineering themes with traditional school subjects to increase student interest in science and technology.

The organization's core values are: Integrity and Compassion; Responsible Decision Making; Environmental Stewardship; and Innovation and Exploration.

Luther Porter was a DAS member and esteemed educator and the DAS is honored to bestow this Award on Dr. Wright.

Upcoming Potential MSP Dates ■ Bill Hanagan

The upcoming potential dates for regular MSPs include May 18, 19, 25, and 26. Current plans are to use the Sawin Observatory for at least one MSP on one of these dates.

We'll also be holding a special MSP for observing the Transit of Venus on June 5 from 5:30 PM – 8:30 PM on the grounds of the New Garden Township Building at 299 Starr Road in Landenberg, PA. More about the "Transit of Venus MSP" appears on the following page.

As always, the upcoming MSPs will be "flex-scheduled" according to the weather using the DAS Yahoo Group. Announcements specifying exactly when and where the MSP will be held will go out via DAS Yahoo Group email. The mechanics of the MSP program are described separately under "Notes on the Member Star Parties (MSPs)" on page 4.

As we enter the idyllic observing weather of spring and early summer, our core group of observers will be heading off to primordially dark sites like Cherry Springs, PA as well as observing sites in West Virginia. Let either myself or Greg Lee know if you're interested in going along on one of these road trips.

Call for DAS Astroimages for Display in Mt. Cuba Lobby

■ Greg Weaver

MCAO is asking for any DAS members to submit their astroimages for display in the Observatory. It would like to display the club member's talents and update some of the images currently on display.

Images will be displayed for up to a year and replaced as new images are submitted. Full credits to the imager will be included. Please include all technical information with the image (date, telescope and camera used, exposure time, image processing software, etc.). You may email digital images to the Mt. Cuba website. Photos may be sent to the Observatory or brought to a DAS meeting. The Observatory looks forward to displaying your beautiful images!

The “Transit of Venus MSP” on June 5, 2012

■ Bill Hanagan

We'll be holding a special MSP for observing the Transit of Venus on June 5 from 5:30 PM – 8:45 PM on the grounds of the New Garden Township Building at 299 Starr Road in Landenberg, PA. Admission is free. This event will proceed even under significant cloud cover to maximize the chances of seeing the last Transit of Venus in our lifetimes.

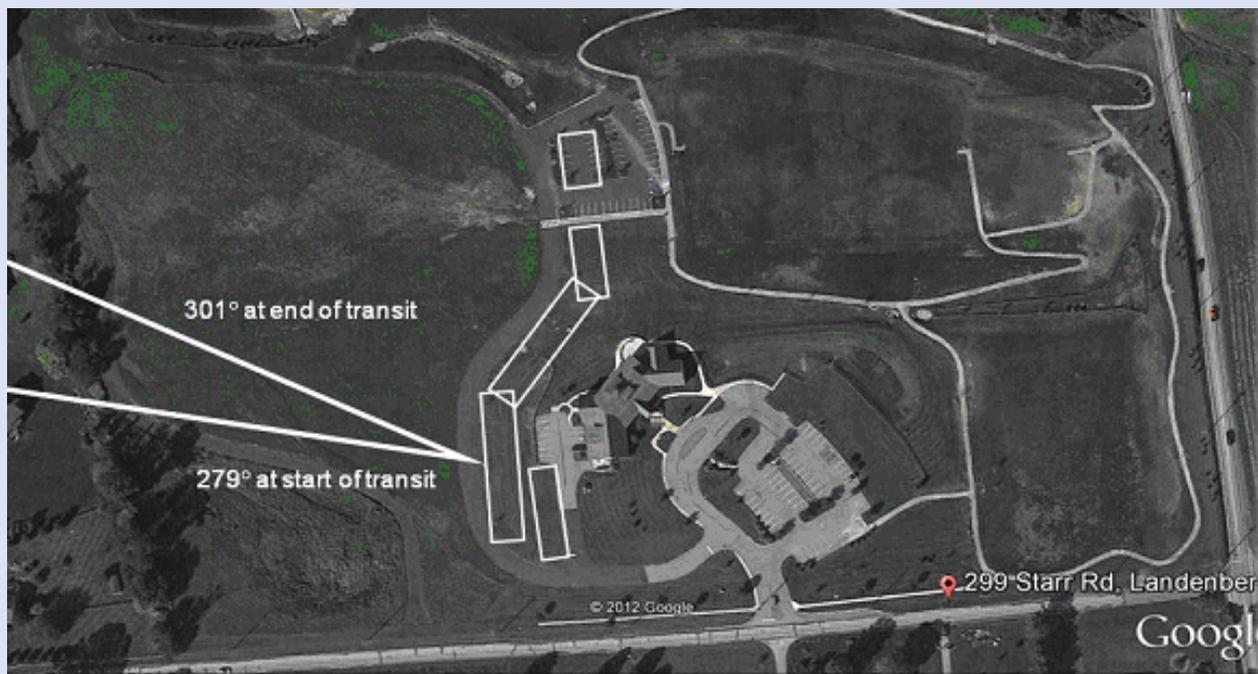
When viewed from our area, the transit will start at 6:03 PM EDT on June 5, 2012 and it will end with the sunset at about 8:22 PM. To see the start of the transit from a local site of your own choosing, your view must be clear below 25 degrees above the horizon at an azimuth angle of 279 degrees when the transit starts. As the transit proceeds, the altitude angle decreases to 0 and the azimuth angle increases to 301 degrees at sunset.

TO OBSERVE THE TRANSIT SAFELY THROUGH A TELESCOPE OR BINOCULARS, YOUR TELESCOPE OR BINOCULARS SHOULD BE EQUIPPED WITH A “FULL-APERTURE” SOLAR FILTER MADE FOR SOLAR VIEWING.

Photo 1, below, shows a satellite view of the New Garden site. North is straight up. The main observing areas are outlined in white rectangles and have an unimpeded view of the transit down to about 2 degrees above the horizon. The last rectangle at the bottom right outlines the area reserved for late arrivals.

The observing area has space for about 25 vehicles along with telescopes set up behind those vehicles. The small parking lot attached to the west side of the building has a 3' high fence on the west side and it can be used for observing IF you have a telescope or binocular mount whose optical center line is at least 3' above ground level. This may be useful if you have a tall mount or will be using binoculars.

You should plan to arrive at around 5:30 PM, but no later than 5:45 PM. Drive as far in toward the north parking lot as possible so that vehicles which arrive later don't need to drive past you to get to an open position. Set up in the observing areas marked with white rectangles. Vehicle traffic on the driveway will not be allowed to pass observers once the transit is in progress. The rectangle at the bottom right outlines the area reserved for late arrivals. The adjacent park to the north has restroom facilities.



Driving directions:

From the east, take route 41 (Lancaster Pike) west through Hockessin into Pennsylvania. Proceed about 2.5 miles to the traffic light at Newark Road. Turn left (south) onto Newark Road and go to the first stop sign, which is at the intersection with Starr Road. Turn right onto Starr Road heading west and take the next right turn into the driveway for the New Garden Township Building. Turn left onto the driveway that leads behind the building. Drive as far in toward the north parking lot (behind the building) as possible before parking in one of the white rectangular areas shown on the map.

From the south, take Delaware Route 7 north and turn left (west) onto Little Baltimore Road (at a traffic light). To the northeast, this road is known as Brackenville Road. Proceed on Little Baltimore Road, which later becomes Newark Road, travelling roughly 5.5 miles to the intersection with Starr Road. Turn left onto Starr Road and take the first right into the driveway for the New Garden Township Building. Turn left onto the driveway that leads behind the building. Drive as far in toward the north parking lot (behind the building) as possible before parking in one of the white rectangular areas shown on the map.

Brandywine Creek State Park will also be running its own transit observing event. Telescopes and cameras can be carried up to that park's version of "Hawk Watch Hill". Admission is \$2 per vehicle. Cloudy or clear, Lynn and Wayne King will be helping Brandywine Creek State Park with this event. Outside viewing at the top of Hawk Hill and inside via the web in the lecture room.

An Afternoon with Mirror Maker Extraordinaire Carl Zambuto ■ Fred DeLucia



When my wife and I planned our Northern Lights Tour to Alaska with Bob Berman Tours we had a flight connection in Seattle. Having never been to Seattle or Tacoma, a few days more to visit these cities was in order. After realizing that Zambuto Optical Company (<http://zambutomirrors.com/>) is only an 80 minute drive south from Seattle, I couldn't resist the temptation to ask Carl Zambuto if he gives tours of ZOC. On the phone, after telling me that there isn't much to see, that I might be disappointed with the operation and that he could probably show me everything in about an hour, we agreed to meet. Also, he said that he could use the diversion.

As the legend goes, Carl Zambuto, arguably, makes the best telescope mirrors for the amateur astronomy market in the world. People who own Zambuto mirrors are never disappointed. He makes nothing faster than f/4 focal ratios nor larger than 24" diameter mirrors and, at the time of this writing, there is up to 8 months wait for delivery on orders. For the past 15 years Carl Zambuto has been a professional mirror maker. In that time he's established a legendary reputation and sold close to 2000 mirrors of various sizes and focal ratios. Zambuto Optical makes no conciliations with the end results. If the mirror does not test to specific standards, it

does not go out to the customer until it meets the Zambuto criteria.

I can attest to Carl Zambuto's statement on his website, "Contrast is not everything. Outside of aperture, contrast is the *only* thing." In the Double Cluster, through my 18" f/4.3 Zambuto equipped StarStructure telescope, red giants are beacons among their white pinpoint stellar companions fixed within an infinitely rich blackness. As barges trail behind the Great Red Spot, orange Io floats in stark relief against well delineated zonal cloud bands and given good seeing conditions details emerge in Jupiter's festoons. The subtle wrinkled floors of Luna's mare fade into the shadows of the terminator and dark lanes abound in the exploding star burst region of M82. Consequently, it was with some trepidation that I sought out this legend of a mirror maker, whose product conveys such extraordinary images to my eyes.

The bright red Mazda 3 that we rented while in SeaTac served us well, especially, for near hairpin turns when we realized we missed a street. Guided by a few written directions obtained from Google, we managed to find our way to The Museum of Glass and The Art Museum in Tacoma; the Music and Science Fiction Museum and Pike Place Market in Seattle without too many "I think we missed a turn" remarks. But overshooting our destinations occurred often enough that our plan was to leave about one hour early for our visit to Carl Zambuto's shop in Ranier, WA.

Except for some exceptional Washington state scenery along the way, the drive was totally uneventful, so we arrived one hour early. Zambuto Optical Company is situated in a very rural area, away from lit up cities and sprawling malls, yet still under the all too often cloudy, misty, rainy skies of Washington state. Since we just couldn't sit unnoticed in a brighter than fire engine red car in the gravel driveway, we decide to risk knocking but plan to offer to wait in the car if our early intrusion was inconvenient.

At the front door of the house Chuck Smith, Carl's assistant, greets us. He asks if we would like to move our car inside the garage because the turkeys might like to sit on it. Having no desire to explain turkey scratches to the rental company, I take Chuck up on his offer. He then ushers us around behind the house to the shop buildings. As we follow Chuck into a workshop, Carl Zambuto is standing at a polishing machine routinely squeezing Cerium Oxide onto a 20" f/5 mirror. After he glances at a digital timer he manually adjusts the hypnotically silent rotating lap. He looks up from the mirror to greet us. I am stunned speechless for several instants. I just didn't expect to barge right into Carl Zambuto's shop, especially while he was figuring a mirror. But he is a most gracious host. He good humoredly explains that he can give us some time but is expecting the De Lucia's in about an hour. I offer to come back in an hour but he explains that he's doing a rote figuring procedure, so he can visit with us until the end of the session. And thus begins our tour of ZOC.



His shop is orderly, yet bears evidence of substantial use. There are two other machines quietly polishing 12" mirrors, set to wet the mirrors automatically. He does this for the smaller mirrors. The larger ones require much closer attention to prevent drying. Nothing looks new, yet everything looks well cared for and in excellent (Continued on the following page)

Afternoon with Carl Zambuto *(Continued from Preceding Page)*

condition. On the shop wall a Hulan Flemings painting hangs of Carl that captures his stance and studious gaze as he works a mirror. Two cats recline well out of the way. They seem to know their place. Back in a corner stands a fully assembled Newtonian Dobsonian telescope. Its metallic exterior looks familiar. I ask, "Is that a StarStructure?" "Yes, that's Chuck's which he doesn't get to use very much now," Carl explains, "It's the first prototype 18 inch f/4.3." Stunned again, I cannot withhold excitedly asking, "Can I get a closer look?" Treading carefully along a narrow aisle, I move alongside the scope which is very similar to mine, a comforting reminder of the closeness of the amateur astronomy community. Where this one has sky blue framing, mine is dark grey and Chuck's altitude bearings are 1/3 to maybe 1/2 the width of mine, an indication of how the model progressed.

Carl Zambuto's demeanor is a mirror (pun intended) of his craftsmanship. He has very subtle body language as he speaks, likewise as he so fluently works away at his mirrors. He hoists a heavy mirror, waiter style, from the figuring machine up onto his shoulder and walks it straight into a cleansing room. All indications are that this man's mind and body are in sync with his work. His manner of speech is measured but quite informal. His sentences flow seamlessly, speaking directly on a point with no halfthoughts or digressing interruptions. The teacher in him is evident. He answers all questions completely and each answer betrays an underlying encyclopedic knowledge of his craft. He explains the home-built polishing machines (their corners and joints are all smooth and look perfectly fitted) and how his costs are held down to remain competitive with the market, such as self-insuring his shipping risks and charging for shipping at cost. All this allows a large degree of cost control over his product from manufacture to delivery. By the end of our first hour, he has finished the rough parabolizing session with the 20" mirror and for now that's enough for some testing.

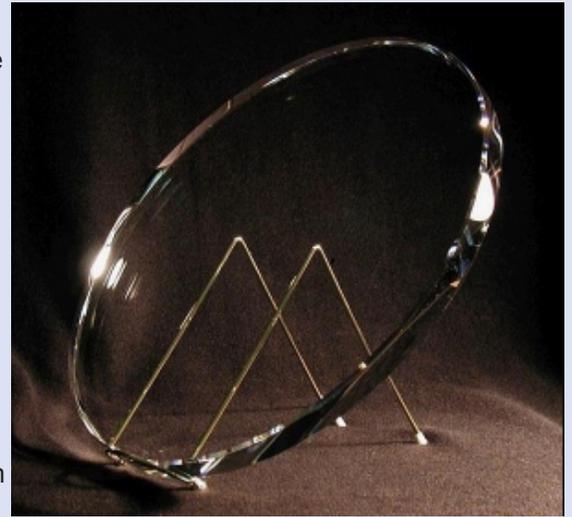
Except for coating, ZOC is a full service mirror shop. A Zambuto mirror begins with delivery of 475 pound sheets of Supremax glass in 47" wide by 60" long by 2 1/4" thick sheets. He confidently states, "We can handle that weight." These are then cut to size according to order with a 4" diamond blade. The glass is cast and annealed in kilns that are in an unheated but well ventilated building separate from the beveling, grinding and polishing operations. A large back-up generator guarantees uninterrupted work during power outages. Depending on the mirrors' sizes, he might stack the glass blanks three to a kiln. On occasion he performs this process for other mirror makers. He shows us several blanks on his shelves, one is an old pre-owned United Lens that is 12" in diameter, at least 2" thick and weighs 22 pounds. It looks old and abused with a number of nicks but it will become a Zambuto mirror, after he takes out the nicks and recasts it. I can tell he is looking forward to working with it. His favorite size is the 12.5" f/5. He says he can do them easily and they always come out excellent. (No wonder Mike Zammit chose that size Zambuto Mirror to kick off his TL Series of StarStructure telescopes).

Testing is done ever so painstakingly. All of the mirrors will eventually hit a standard that would make proud any mirror maker with its excellent performance, but ZOC will work them for many hours further if the turned edge or P-V isn't to the ZOC standard. This takes more work, more hours, more testing. It's all done as a deliberately repetitious exercise until it's a Zambuto Mirror. He shows me one on the bench for a Ronchi test. The pattern looks perfect. Wide straight lines from edge to edge. I'm envious as I wonder to myself if my 18" f/4.3 sitting home looked that good on the bench. I remark, "That looks damned good." Carl says, without any hesitation, "It has some turned edge. It will perform very well, but it's not a Zambuto Mirror. I'll put it back on the polishing machine for about another hour and then check it again."

He shows us his testing tools and then walks us to a computer, pulls up dozens of spreadsheets of tests on numerous mirrors. All demonstrate the attentive care for testing and reworking. The progression of the P-V as it slowly meets the desired slope is evident in graph after graph. Eventually, he scrolls to the final surface maps, and for all intents and purposes, I'm seeing the results of perfect mirrors despite differences of little more than a millionth of an inch deviation from a perfect parabola. It's readily apparent why he does not enclose test reports with his mirrors. Let the view through the eyepiece tell the owner about the mirror's performance.

His planning for our visit becomes more evident as the afternoon wears on. Carl walks us around his property. Throughout the area strong winds are quite common, as are the resulting power outages. He apologizes for the property's appearance because fallen branches and tree limbs are strewn randomly but these are from a recent ice storm. He gives his large generator some exercise. It's loud but sounds healthy. Not surprising, considering the skies, there is no observatory. We meet another one of his cats, "the wild one," who is shy and quickly retreats to its cathouse.

Chuck drives us to an excellent lunch at Kinja Japanese Restaurant in Yelm, WA and along the way we stop for Carl to drop off a mirror for shipping. Over lunch we learn that Chuck met Carl at a mirror making session and so impressed Carl that he was invited to begin a second career since he enjoys working with his hands. Speaking of hands, Carl's dexterity is again in evidence as he efficiently eats his soup with chopsticks as I fumble with my knife and fork over my Teriyaki Chicken Special. I take the opportunity to ask questions about making larger than 24" mirrors and why not secondary mirrors or sub-f/4 mirrors or why not do your own coatings? His market is established and he gets few calls for greater than 24" and even 24 inchers are not ordered all that frequently. He says a really good 22" will give a 25" from many *(Continued on the following page)*



Afternoon with Carl Zambuto (Continued from Preceding Page)

other manufacturers “a run for its money.” As for sub-f/4, he feels f/4 is the limit for a Zambuto Mirror. Below f/4 the Zambuto performance begins to breakdown. Getting his standards to f/4 is more labor intensive and is reflected in his pricing for f/4 mirrors. He says he’s been told by a sub-f/4 mirror maker, who makes them for a living, that if he were to make one he would not like the results because of his close adherence to his criteria. As for secondaries, the industry doesn’t need Zambuto secondaries. Excellent ones are made easily enough in large quantities by a number of manufacturers. And coatings? He’s fired about a half-dozen coaters due to unsatisfactory performance, finally settling exclusively on Nova Optical, whom he’s used for the past 10 years with excellent results, for up through 20” diameter and Galaxy Optics for 22’s and 24’s.

Other revelations come to light. Some about the early years of Zambuto mirror making. He was encouraged to make his own mirror by Earl Watts after he was told the mirror he owned could be improved. It took some time for Watts to convince him to pursue making his own mirror, but once he committed to it there was no turning back. That was in 1989 and after grinding mirrors by hand for quite some time, Carl was astonished to learn that there were machines that could do that. Aside from my wife and me, he’s had maybe a handful of customers visit him. Also, he loves to read about his mirrors’ performance from his buyers because he so rarely gets to look through the telescopes in which they are installed. I promise that I will send him my observing reports and try to pay closer attention to my mirror’s performance.

Back in Ranier we stop at Main Street Cookies (www.mainstreetcookies.com), a small bakery owned by Joycelyn, Carl’s wife. Pastry ingredients are all fresh. Nothing artificial. The products are to die for. The entire bakery was set up and the equipment installed by Carl and Chuck. They are all pleased because the operation is now breaking even.

Upon return from lunch Carl couldn’t resist calling for his neighborhood turkeys so we could meet them. He seemed genuinely disappointed when none responded. Later he emailed me a picture of them stating, “The turkeys did return. Today they were standing in the middle of Vail Road, stopping traffic. I know for certain why they are ‘food’ animals.”

Spending 4 hours with Carl Zambuto and Chuck Smith were among the most enjoyable hours I’ve had in this hobby. Although occasionally referring to our visit as a “diversion,” they both made us feel like old friends rather than strangers from the opposite coast. Their good humor, passion for their work with mirrors, love of astronomy and dedication to their customers

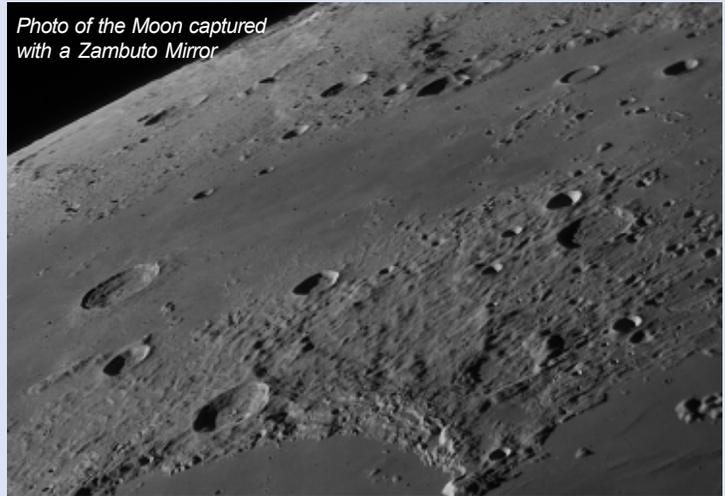


Photo of the Moon captured with a Zambuto Mirror

were consistently evident throughout our stay. When I made the arrangements with Carl Zambuto to tour his shop I expected to come away with a better understanding of how my mirror was produced. I got much more. I saw a lifestyle, a work ethic, a family, a home-stead. I believe that the long arduous hours of devotion by a man to his craft and to his reputation are the main ingredients in creating that Zambuto mirror performance. I think driving those results is the pride that’s taken in fabricating a world class product. Surely, some of that pride is transferred to owners of Zambuto mirrors in the form of pride of ownership. But it’s not bragging rights that brings customers to Zambuto Optical. It’s those eyebrow-raising views through the eyepiece that make objects pop with such incredibly high contrast.

Next day we boarded the plane bound for Fairbanks to meet up with Berman Tours. While in flight my thoughts drift to a clear dark sky on a field with good horizons and I become

anxious to see the Coma Cluster of Galaxies through my scope as I experience a new-found appreciation of my Zambuto mirror.

Rubber Chicken Flies into Solar Radiation Storm

April 19, 2012: Last month, when the sun unleashed the most intense radiation storm since 2003, peppering satellites with charged particles and igniting strong auroras around both poles, a group of high school students in Bishop, California, knew just what to do.

They launched a rubber chicken.

The students inflated a helium balloon and used it to send the fowl, named “Camilla,” to an altitude of 120,000 ft where she was exposed to high-energy solar protons at point blank range.



Camilla at ~124,800 feet on March 3, 2012. Credit: Earth to Sky-Bishop CA. [Click for mpeg4 movies of the: launch, apex, chaos, landing]

“We equipped Camilla with sensors to measure the radiation,” says Sam Johnson (age 16) of Bishop Union High School’s [Earth to Sky](#) student group¹. “At the apex of our flight, the payload was above 99% of Earth’s atmosphere.”

Launching a rubber chicken into a solar storm might sound strange, but the students had good reason: They’re doing an astrobiology project.

“Later this year, we plan to launch a species of microbes to find out if they can live at the edge of space,” explains team member Rachel Molina (age 17). “This was a reconnaissance flight.”

Many space enthusiasts are already familiar with Camilla. She’s the mascot of NASA’s Solar Dynamics Observatory. With help from her keeper, Romeo Durscher of Stanford University, Camilla corresponds with more than 20,000 followers on Twitter, Facebook, and Google+, filling them in on the latest results from NASA’s heliophysics missions.“

Camilla’s trip to the stratosphere² gave us a chance to talk to thousands of people about the (Continued on Page 20)

Winterthur Hosts “Chasing Venus” Lecture



New York Times Best-Selling and award-winning author, Andrea Wulf, at left, will discuss her new book *Chasing Venus: the Race to Measure the Heavens* and tell the extraordinary 18th century story of the first global scientific collabora-

tion to calculate the distance between the planets in our solar system for the first time.

The lecture, free and open to the public, will be held at 5:30pm on May, 22nd at Winterthur’s Copeland Lecture Hall and is sponsored by The National Society of the Colonial Dames of America in the State of Delaware, and The Society of Colonial Wars in the State of Delaware.

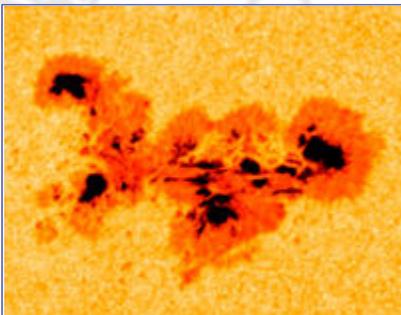
Ms. Wulf is a London based historian and her book tells the story of the 1760’s transit of Venus which was set amid warring armies, hurricanes, scientific endeavor and personal tragedy. At the time the world’s scientific community was electrified because the transit, when Venus passes between the Earth and sun, would allow a first time calculation of distances between the planets. Hundreds of astronomers from Europe and the North American colonies were dispatched across the world to observe the rare celestial encounter.

The book will be published in May in conjunction with the 2012 transit of Venus this June, DAS plans for viewing which are discussed on page 15 of this issue of the *FOCUS*. The lecture will be followed by a book signing.

Ms. Wulf is the author of three books and has written for the *Sunday Times*, *Wall Street Journal*, *Financial Times* and *Los Angeles Times*.

Rubber Chicken Flies (continued from page 19)

the radiation storm,” says Durscher.



Sunspot AR1429, the source of the solar storms of March 2012.



Bishop CA students launch Camilla on March 3, 2012.

On the outside of her space suit (knitted by Cynthia Coer Butcher from Blue Springs, Missouri), Camilla wore a pair of radiation badges, the same kind medical technicians and nuclear workers wear to assess their dosages.

Camilla actually flew twice—once on March 3rd before the radiation storm and again on March 10th while the storm was in full swing. This would give the students a basis for comparison.

On March 3rd, during the calm before the storm, the *Earth to Sky* team assisted by a local class of 5th graders attached Camilla to the payload, inflated the balloon, and released the “stack” (balloon, parachute and payload) into a cloudless blue sky just before local noon.

“It was a beautiful lift-off,” says Amelia Koske-Phillips (age 15), the team’s payload manager and “launch boss.”

During the two and a half hour flight, Camilla spent approximately 90 minutes in the stratosphere where temperatures (-40 to -60 C) and air pressures (1% sea level) are akin to those on the planet Mars. The balloon popped, as planned, at an altitude of about 40 km and Camilla parachuted safely back to Earth. The entire payload was recovered intact from a landing site in the Inyo Mountains.

The payload, a modified department store lunchbox, carried four cameras, a cryogenic thermometer, and two GPS trackers. Seven insects and two dozen sunflower seeds also rode along to test their response to near-space travel. The seeds were a variety known to gardeners as “Sunspot” (*Helianthus annuus*).

One week later, on March 10th, the storm was underway, and the students repeated the experiment.

Camilla flew into one of the strongest proton storms in years. The source of the radiation was sunspot AR1429, which unleashed more than 50 solar flares during the first two weeks of March. At the peak of the storm, from March 7th through 10th, charged particles hitting Earth’s upper atmosphere deposited enough heat in only three days to power every residence in New York City for two years. At the moment of Camilla’s launch on March 10th, Earth-orbiting satellites reported proton counts ~30,000 times normal.

“The profile of the second flight was almost identical to the first—perfect for our experiment,” adds Johnson. “We recovered the payload from a landing site near Deep Springs, California.”

The 5th grade assistants are now planting the sun flower seeds to see if radiated seeds produce flowers any different from seeds that stayed behind on Earth.

They’re also pinning the corpses of the insects—none survived—to a black “Foamboard of Death,” a rare collection of bugs that have been to the edge of space.

Meanwhile, Camilla’s radiation badges have been sent to a commercial laboratory for analysis.

The students say they are looking forward to the data and maybe—just maybe—sending Camilla back for more.

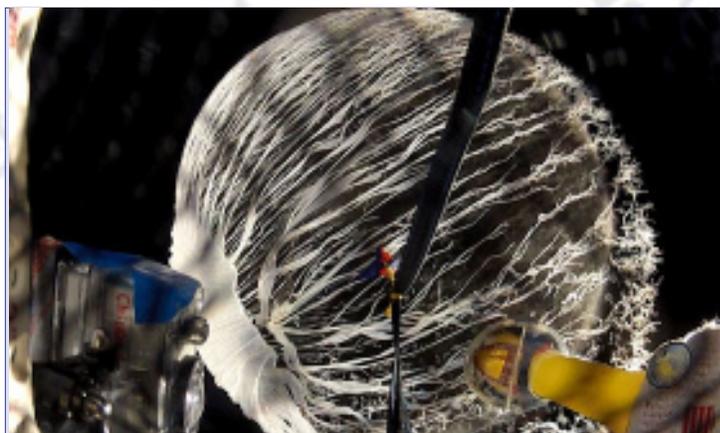
Educators are encouraged to follow Camilla on [Twitter](#), [Facebook](#), and [Google+](#).

Author: Dr. Tony Phillips | Production Editor: Dr. Tony Phillips
| Credit: Science@NASA

For More Information:

¹[Earth to Sky](#) is group of high school and middle school students in Bishop, California, mentored by Science@NASA’s Dr. Tony Phillips. In addition to [launching balloons](#) to explore the stratosphere, they are also building a small satellite (a CubeSat) to fly through and photograph auroras over Earth’s pole. They hope to launch the satellite in late 2012.

²This isn’t Camilla’s first adventure. The chicken has also flown on a NASA T-38 training jet, traveled onboard a helium balloon to the stratosphere over Louisiana, visited the Yuri Gagarin Cosmonaut Training Center in Star City, Russia, and visited hundreds of elementary students in classrooms around the country.



The helium balloon pops at the apex of the flight on March 10, 2012.
Credit: Earth to Sky-Bishop CA [[Click for slow motion movie](#)]
[[Click for Youtube movie: Chaos at 119,000 feet](#)]

April is the Cruellest Month

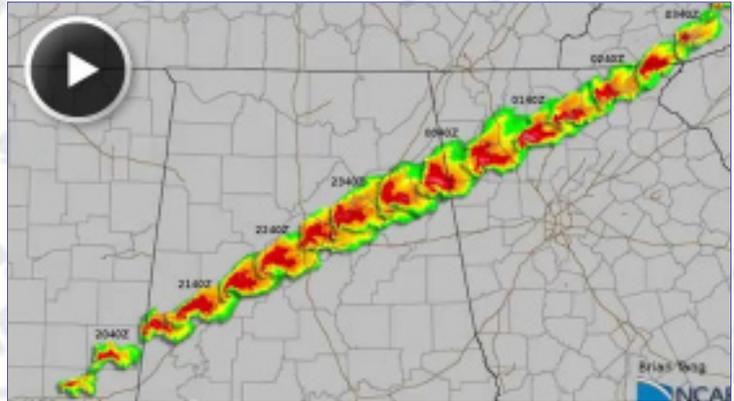
April 13, 2012: In the opening lines to *The Waste Land*, T.S. Eliot wrote “April is the Cruellest Month.”

You might agree if you live in the southeastern United States. Last April, a historic outburst of 202 tornadoes turned broad swaths of that part of the country into a disaster zone.

“The event of April 27th and 28th 2011 was the costliest convective storm in U.S. history,” said Kevin Knupp, professor of atmospheric sciences at the University of Alabama-Huntsville. And he doesn’t just mean costly in terms of property damage — 316 people lost their lives.

Of the 202 twisters that day, 62 tore through Alabama, where Knupp works. Ten of them were ranked EF 4 and 5 on the Enhanced Fujita Scale. Three tornadoes churned paths more than 120 miles long, and a large number of the twisters cut swaths more than a half mile wide.

Knupp saw the results first-hand, and he’s been studying them ever since. Aided by a team of graduate students and colleagues, he’s sifted through gigabytes of data collected by NASA and NOAA satellites and local ground sensors. A year later, they have drawn some interesting conclusions.



A new ScienceCast video recaps the events of April 27-28, 2011, and explores what researchers have learned from the outbreak. [Play it](#)



In advance of a tornado, storm clouds approach Huntsville, AL, in April 2011. More: [A Story from the Tornado Zone](#)

One discovery was how rapidly an EF-5 spun up near the small town of Hackleburg, Alabama.

“The Hackleburg storm got its act together really quickly,” says Knupp. This particular twister formed only 50 minutes after the underlying thunderstorm appeared. For comparison, the average time for tornado formation is 2 hours. The twister blasted through north Alabama with winds over 200 mph, killing 72 people.

Knupp’s team believes that something called a “thermal boundary” set the stage for the birth of the killer. Cool, moist air on one side of the boundary formed a low cloud base — “kind of like a wall,” he explains. Warm air from the storm ran into the wall and swept upward. Updrafts are a key ingredient of tornadoes. In this case, updrafts as swift as 75 feet per second were recorded.

They also noticed that many of the tornadoes seemed to cluster in space and time. Knupp offers the example of Arab and Guntersville, neighboring communities not far from NASA’s Marshall Space Flight Center: “16 tornadoes touched down in the area — 13 of them in a half hour period.”

In advance of a tornado, storm clouds approach Huntsville, AL, in April 2011.

Could local topography have attracted the twisters?

There does appear to be a link between the shape of the landscape and the path of these tornadoes.

“Arab-Guntersville is in a valley between two mountain ridges, and valleys can channel the flow of air, like in a breezeway,” notes UA-Huntsville atmospheric scientist Tim Coleman, a member of the research team.

Coleman also noticed a correlation between the slope of the terrain and the onset of damage tracks. “Winds intensified on the downward slopes of mountains in the area—and that is sometimes where the damage path starts.” He has observed this phenomenon in past tornadoes in east Tennessee and southern Virginia.

This tornado-topography hypothesis might seem obvious, but researchers have not always had enough data to test it—that is, not until April 2011.

Prompted in part by the outbreak, Coleman has studied tornado paths all over the southeast and found some interesting repeats. For example, just north of Birmingham, several violent tornadoes have tracked within a 10-mile wide band since 1977. A similar track appears to the north and west of Huntsville.

“More research is needed to see if topography really plays a role,” cautions Coleman. “The more we can learn, the more accurate we can make tornado warnings.”

They’re likely to get more data in the near future. It is April, after all.

Author: [Dauna Coulter](#) | Editor: [Dr. Tony Phillips](#)
Credit: [Science@NASA](#)



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If you're just joining us for the first time,

THANKS, and welcome to the DAS!

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■ *FOCUS* editor
Joe Neuberger

A Month of Important and GREAT Events for the DAS...

May is full of important and great events for the DAS member.

FIRST, and most important, there's our election for President, Vice-President, Treasurer and Secretary. Make sure you cast your VOTE before month's end!

Then there's our May 15th ANNUAL DINNER MEETING with probably one of the greatest speakers that we've ever had for this event. Speaker Ed Rezac was on the ground floor of the Hubble service missions! WOW! And what's better than the camaraderie of our DAS members! So get your reservations in NOW.

And lastly, the MSP's at the Sawin later in the month. Oh, AND IT'S WARM OUT!