NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

OCTOBER 2016

PRESIDENT'S NOTES

Clear skies, everybody! It's October; time to go outside again and reclaim the night. Outreach jumped out of the gate with a Kartchner Caverns star party on October 1. Solar and night sky viewing in one day makes it hard to top this venue for outreach. People from all over the nation (and a few from other lands) already out doing something fun (touring the cave) get to do something even rarer, see the wonders of the universe through telescopes. Everybody was happy and grateful, which made this a great time to bring a scope.

This month we have several minor meteor showers for the diehard meteor watcher. Meteor showers are named for constellation they appear to originate from as they enter and burn in Earth's atmosphere. So, the October Camelopardalid meteor shower (that peaked on the nights of October 5-6) will seem to come from…yes, that's right: Camelopardalis. Camelopardalis, is a large dim constellation, poleward of Perseus and east of Cassiopeia. None of the stars in Camelopardalis is brighter than magnitude 4, so that makes the constellation more of a dim patch of sky rather than a bold figure of a camel. Still, it is from this region that the meteors will radiate. Moonlight will not be a problem, but the annual shower is usually very weak, and this year is one of those years. If you're out those nights, you should probably be out for some other reason. The peak expected to be 16-20 an hour.

The October Draconids, peaked on the seventh. Some years, the Draconids show strong activity, up to a 1,000 meteors an hour. However, this is not one of those years. It, too, is predicted to be a fizzler. There are better prospects for this shower in 2017. So, if you want to see the difference between a weak year and a strong one, this is for you.

Lastly, this month, on October 21, after our general meeting and before dawn, the Orionids meteor shower hits its low but reliable peak of 16 to 30 an hour.

Now, on to the solar eclipse-imaging project, level 3 and 4: we look at clock-driven platforms for imaging the solar eclipse. Last month the focus was on stationary tripod possibilities. This month we up the complexity, but it is necessary to turn a moving celestial target such as the Sun into a stationary one.

If you have a motor driven mount for your telescope, you may already have the imaging platform you need for the eclipse. That is, if the mount isn't permanently bolted down in your observatory, or is too flimsy to track anything more than a few seconds without wobbling off target. If either is the case, you will need something else for the eclipse. Luckily, there are many choices out there, from bare bones do-it-yourself projects and small fork-mounted telescopes from which to shoot piggyback, to state-of-the-art travel-sized German equatorial mounts sized to fit in a suitcase.

Remember, you will be travelling either by plane or by surface transport, so you will need to pack it. Again, the scale of images you will be shooting determine the level of stability and quality of tracking in your imaging platform. If you are shooting separate, single, wide-field corona and star field images from a DSLR, with a 28mm to 80mm lens, you can get by with a hand-cranked barn door mount on a sturdy photographic tripod. You can build some clever barn door mounts yourself. A simple overview of what a barn door mount is and does can be found on Wikipedia (I checked for qualified references before citing this Wikipedia article!) at https://en.wikipedia.org/wiki/Barn_door_tracker. One well thought-out design with the theory behind it is by Chris L Peterson. This model uses a bread-board-based electronic circuit (for tracking), which is why the tracker is as big as it is. If you are comfortable enough to make your own circuit board, you could miniaturize the tracker significantly. His tracker can be found at Cloudbait.com http://www.cloudbait.com/projects/barndoor.html

Remember, if you are going to build a barn door mount, you will use it again and again, so make it sturdy and to last. You can make a hand driven barn door mount out of scraps and a couple of visits to hardware store, if you're handy, or for about $100-$200 if you make it motor driven. Several commercial tripod-topping clock drive devices are available as well. These are all quite small, light, easily packed devices that you can take on planes. Vixen, Sky-watcher, Ioptron, and AstroTrac, have tracking devices for wide-field-lensed cameras that run from $300-$600. These devices all have different weight limitations, but you should be able to use a single DSLR with lenses up to 300mm-500mm on any of them.

For $600, you might start thinking about a small clock-driven travel telescope that you can look through, shoot through, piggyback onto, and still get on a plane. The Meade ETX series of small scopes instantly comes to mind. They sell for $500-$800. But, if money is no object, there is always a Questar portable observatory. These little scopes are wonderful travel companions and very good telescopes for solar, planetary, stellar, and terrestrial viewing. Safe white-light solar filters can be fitted to these scopes, as well as Hydrogen-alpha filters, to give you unforgettable high power views and images. Shots taken at prime focus and with various focal reducers and Barlow lenses these scopes will give you imaging in the 500mm-2000mm range. These are formidable imagers; imagine a ring of solar prominences surrounding the pitch-black shadow of the moon with or without the use of an H-alpha filter.

The last rig idea is to bring the telescope and mount you usually use. You probably have all the equipment you need now, which allows you to begin practicing now so you are well prepared then. Any telescope over 2000mm in focal length is overkill. You will get just a portion of Sun or Moon with no context in your shots. So, use your mount as a platform, and look around to find a wide-field telescope, you probably have one of those lying around or bolted on to something as well. Oh, and remember a good quality solar filter. If you don't have one, please order your filter soon or risk disappointment. Then, drive somewhere along the centerline a few days before the big day, do some nighttime viewing for a couple of nights, get your polar alignment refined, and the day of the eclipse shoot with your trusted equipment. Instead of spending the money on new equipment, splurge on travel costs, and feel comfortable about the drive, telescope, and cameras. Next time my solar rig and thoughts from other members going to the eclipse.

Welcome our new members

Gail Manahan of Hereford, AZ. joined last month via our on-line application. Justice Howley of Ft Huachuca joined at a Patterson event. Justice is our newest student member. Charles Moses of Herford joined at our Astronomy Day event at the Sierra Vista library. Welcome! We are glad you joined

Sign up for Handbooks and Calendars at the October meeting

Sign-up sheets for the 2017 RASC Handbooks and the Astronomy Magazine Deep Space Mysteries calendar will be available. Please pay the treasurer (Ted Forte) when signing up. The handbooks are $21 (regular price $27.95) and the calendars are $6.50 (regular price $12.99). You can also sign up for handbooks or calendars by sending a check (made out to HAC) to PO Box 922 Sierra Vista AZ 85636. You can even pay with your credit card or Pay Pal account by visiting www.hacastronomy.org and clicking on the Donate button. Please add 4% for the fees (Handbooks $21.85 and calendars $6.75)

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October's Speaker

Megan Kiminki is a Ph.D. student studying astronomy at the University of Arizona. Her research interests include star formation, massive stars, stellar kinematics, optical spectroscopy, and the development of user-friendly data analysis tools.

Megan received a B.S. in Astronomy and Biology from the University of Wyoming in 2010, and an M.S. in Astronomy from the University of Arizona in 2012.

Megan's talk is entitled "Eta Carinae, the Supernova Impostor: A Tale of Three Cosmic Eruptions".

In the mid-1800s, the enormous but previously inconspicuous star Eta Carinae grew brighter and brighter, eventually outshining all other stars but Sirius, before fading again over several decades. Astronomers had witnessed a "supernova impostor," a star that erupts in a violent outburst without destroying itself in the process. Eta Carinae today is surrounded by gaseous debris flying outward at more than a million miles per hour. Studying that debris, Megan and her colleagues have learned that this mysterious star's history goes back much farther than they thought: it has erupted not once but three times in the past thousand years. In this talk, she will discuss these results and their implications for our understanding of very massive stars.

We will treat Megan to dinner at the Outback Steakhouse before the meeting. Members that wish to join us should RSVP to Ted at tedforte511@gmail.com and be at Outback by 5 p.m.

The meeting will be held in the Student Union building at Cochise College at 7 p.m. It is free and open to the public.

Dine under the Stars (DUTS) tickets

Please consider purchasing DUTS tickets to support the University South Foundation (owner of the Patterson Observatory). DUTS will be held adjacent to the Patterson on Saturday October 29, 2016 from 6-9 p.m. It features a buffet dinner donated by Outback Steakhouse, live music by guitarist Scott M. Davis, dance entertainment by the Alma Dolores International Dance Centre plus a silent auction and a 50/50 raffle. 100% of the proceeds go to supporting

the students, faculty, and staff of UA South. Since 2011, the foundation has awarded 161 UA South students over $200,000 in scholarships! Tickets are $45 adult, $25 Student (with valid ID) and $15 for children under 12. See Ted Forte for tickets.

Patterson Observatory Improvements

Several improvements to the Patterson Observatory are underway. Digital Dome Works is being replaced by a newer, more reliable system that uses Diffraction Limited's Max Dome II control. Shutter control will be via an Ethernet enabled relay with power provided through a slip ring assembly. Installation is in progress. Special thanks to Tom Kaye who is contributing not only his time and expertise but has fabricated and donated several dome control components. David Roemer, Rick Burke, Ken Duncan, Bert Kelher, Gary Grue and Ted Forte have provided the labor force for the installation.

A recent problem with the observatory's UPS power supply was corrected through the efforts of Rick Burke and Ken Kirchner.

Work also continues on the installation and alignment of the piggyback C8 and the ALPY 600 Spectroscope. David Roemer, Rick Burke and Ken Duncan have donated many hours toward this effort, with help from several other HAC members.

Thanks to all of the HAC members that have donated their time and resources to maintain, repair, and operate the Patterson Observatory. There are many more HAC'ers that donate their time than are mentioned here but you know who you are. We could not do it without you.

Chiricahua National Park?

Kudos to Bob Gent for spearheading efforts to re-designate the Chiricahua National Monument as a National Park. Due, in large part, to Bob's efforts in rallying support from citizens, cities, counties, and representatives in Arizona and New Mexico, Congresswoman Martha McSally has introduced a bill in the House to establish the new National Park and it seems to have broad support. The re-designation will boost tourism in Cochise County and move this natural wonder to the forefront of Southeastern Arizona's attractions. Well done Bob! Thanks for your efforts.

Benson's Outdoor Lighting Code

Bob Gent, the consummate dark sky warrior, is taking the next step in protecting our night. Over the next several months, he will be chairing the Benson Outdoor Lighting Code (OLC) Task Force. They will construct recommendations to city planners for Benson's code improvements. The effort is essential in protecting the quality of Kartchner's night sky as well as the obvious benefits for county wide dark sky preservation. Bob is a past president of the International Dark Sky Association and has been an active proponent for night sky protection for decades. He has helped cities, and counties craft responsible lighting ordinances in many jurisdictions all over America and the even abroad. Most recently, he was instrumental in the updating and improving outdoor lighting codes for the City of Sierra Vista and Cochise County. We are indeed fortunate to have such an advocate in our midst. For all you do, Bob, thank you!

Attention HAC Members

This is a Special Announcement for a Unique Event. Gary & Aracelis Grue are hosting a "First Light" Members Monthly Star Party at their brand new "Blue Marvel Observatory"! First Light is a very Special Event for an observatory owner and to be able to share this with other members is both Unique and can only happen Once, so you don't want to miss it.

Blue Marvel Observatory (BMO) is a 16' x 16' foot roll off roof observatory featuring a Spectacular 24" Newtonian on a Schaefer German Equatorial Mount, it's a 500lb Light Gathering Monster.

Gary says, early arrivals can come as early as 4:30 pm to set up; sunset is at 5:28 pm. Gary says, he and Araceles will have plenty of snacks and drinks but feel free to bring your favorite snack too.

Let's make this a Memorable "First Light" Members Star Party for Gary & Araceles. Remember that it ONLY happens ONCE and to be able to share it with your club mates is Truly a "Special Event."

See you There on Friday Nov. 4th

Keith Mullen, HAC Member Star Party Coordinator (520)266-4230

Space Place Article September 2016

One Incredible Galaxy Cluster Yields Two Types of Gravitational Lenses

By Ethan Siegel

There is this great idea that if you look hard enough and long enough at any region of space, your line of sight will eventually run into a luminous object: a star, a galaxy or a cluster of galaxies. In reality, the universe is finite in age, so this isn't quite the case. There are objects that emit light from the past 13.7 billion years—99 percent of the age of the universe—but none before that. Even in theory, there are no stars or galaxies to see beyond that time, as light is limited by the amount of time it has to travel.

But with the advent of large, powerful space telescopes that can collect data for the equivalent of millions of seconds of observing time, in both visible light and infrared wavelengths, we can see nearly to the edge of all that's accessible to us.

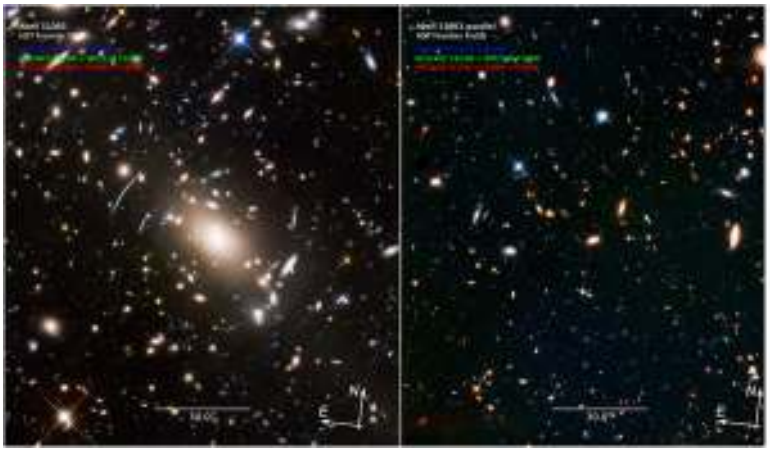
The most massive compact, bound structures in the universe are galaxy clusters that are hundreds or even thousands of times the mass of the Milky Way. One of them, Abell S1063, was the target of a recent set of Hubble Space Telescope observations as part of the Frontier Fields

program. While the Advanced Camera for Surveys instrument imaged the cluster, another instrument, the Wide Field Camera 3, used an optical trick to image a parallel field, offset by just a few arc minutes. Then the technique was reversed, giving us an unprecedentedly deep view of two closely aligned fields simultaneously, with wavelengths ranging from 435 to 1600 nanometers.

With a huge, towering galaxy cluster in one field and no comparably massive objects in the other, the effects of both weak and strong gravitational lensing are readily apparent. The galaxy cluster—over 100 trillion times the mass of our sun—warps the fabric of space. This causes background light to bend around it, converging on our eyes another four billion light years away. From behind the cluster, the light from distant galaxies is stretched, magnified, distorted, and bent into arcs and multiple images: a classic example of strong gravitational lensing. But, in a subtler fashion, the less optimally aligned galaxies are distorted as well; they are stretched into elliptical shapes along concentric circles surrounding the cluster.

A visual inspection yields more of these tangential alignments than radial ones in the cluster field, while the parallel field exhibits no such shape distortion. This effect, known as weak gravitational lensing, is a very powerful technique for obtaining galaxy cluster masses independent of any other conditions. In this serendipitous image, both types of lensing can be discerned by the naked eye. When the James Webb Space Telescope launches in 2018, gravitational lensing may well empower us to see all the way back to the very first stars and galaxies.

If you're interested in teaching kids about how these large telescopes "see," be sure to see our article on this topic at the NASA Space Place:
http://spaceplace.nasa.gov/telescope-mirrors/en/

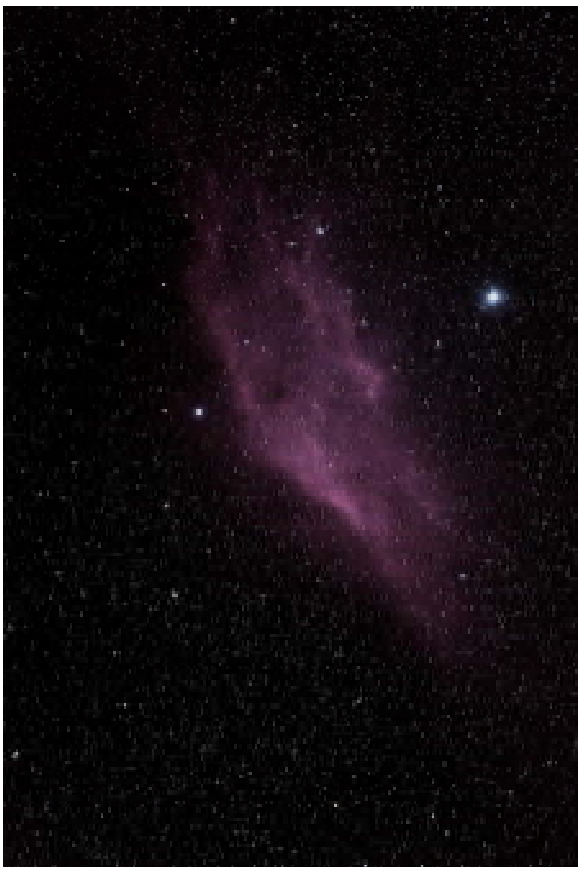


Galaxy cluster Abell S1063 (left) as imaged with the Hubble Space Telescope as part of the Frontier Fields program. The distorted images of the background galaxies are a consequence of the warped space dues to Einstein's general relativity; the parallel field (right) shows no such effects. Image credit: NASA, ESA and Jennifer Lotz (STScI)

Pictures from HAC Members

M78 – By Jay LeBlanc

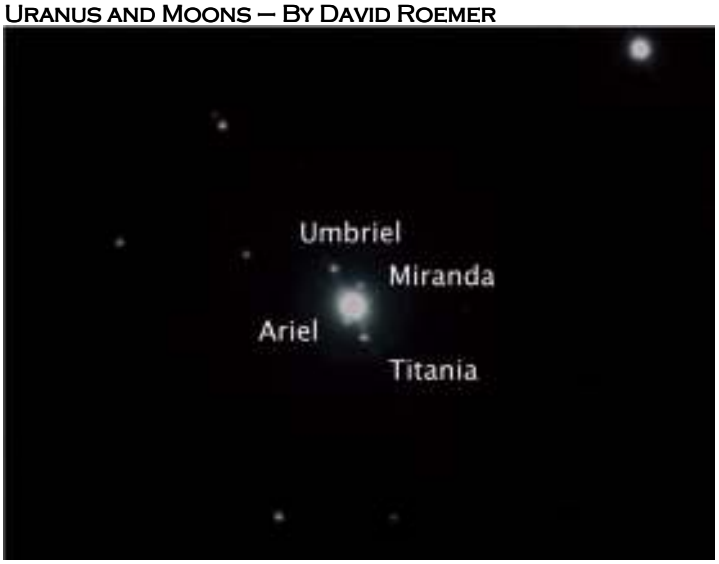
NGC 1449 – By Jay LeBlanc



NGC 1514 - By Jay LeBlanc

M57 - By David Roemer

Uranus and Moons – By David Roemer



M27 – By Mike Shade

want Ads

For sale: Meade 10" LX200 classic telescope

In very good condition, with tripod, 120v AC and 12v DC power converters with 25' power cords, dew shield, 8x50 finder scope, electric focuser, piggy back bracket, and soft sided carrying case. Also includes a set of Meade CCD color filters, Meade CCD 3.3 focal reducer and CCD variable T-adapter. Plus some other equipment. Asking $1,800.

Contact Bob Stroxtile at strox@ssvecnet.com or call 520-249-0875.

For Sale: Pier Tech electric telescoping pier with Lati-wedge made for the latitude of Sierra Vista

All the hardware, bolts, nuts, washers and plates are with the pier. Pier Tech can make new legs for it to make it correct for anywhere in the world. The pier and wedge have never been used and the only time the pier was out of the box was to take the photos. New today, the pier and wedge are $3,400. Asking $2,800.

Contact Bob Stroxtile at strox@ssvecnet.com or call 520-249-0875.

For Sale: Planewave CDK14 corrected Dall-Kirkham telescope.

Includes the OTA, (new November 2014), optional truss rod shroud and optional upper dovetail and the accessories that were included with the telescope (primary to secondary spacing tool). There is NO FOCUSER (they do not come with one, you need to add one) but the adapter for an Optec TCFS3i (which is the focuser I used) is included. I also have the factory wooden shipping crate. The telescope has been in use every clear night in the observatory in Sonoita. This is an outstanding instrument and a great imaging scope.

FOR SALE: Meade Starfinder 8"

Reflector Telescope

Will sell at a very reasonable price. Included are a Telrad Finder, Filters, and additional Lenses.

Contact Mr. Jim Moses at (520) 803-0913 or by email jjmoses2@gmail.com

FOR SALE: Celestron Celestar 8 inch S/C Deluxe - $1200.

Will also sell pieces individually

Contact Rhonda and Terry Taylor at (520) 366-2378 or by email at twrl2@yahoo.com. Or see Craigslist at http://sierravista.craigslist.org/bar/4523742100.html

FOR SALE: Older Optical Guidance Systems 12.5" f/9 Ritchey-Chretian telescope.

Very good Paul Jones ceramic optics, Robofocus secondary focuser, will include Takahashi collimating telescope. Some of the images through the scope are at Mshadephotography.com.

Contact Mike J. Shade at mshade@q.com

FOR SALE: 8" Celestron Nex Star

Good condition with all original accessories.

Contact Mae Childs at maechilds2014@aol.com

Our sponsors have been keeping us supplied in door prizes for some years. If you have not contacted them lately, please consider this. They have a lot of great astronomical products that we all need.

For more information on products and contact information, their websites are:

Farpoint Astronomy	http://www.farpointastro.com/
Starizona	http://starizona.com/

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HAC Oct/Nov Calendar of Events

SU	MO	TU	WE	TH	FR	SA
9 OCT 12:33 AM	**10** 	**11**	**12**	**13**	**14**	**15** Uranus at Opposition
16 12:23 AM	**17** Berean Academy Students at Patterson 8 AM	**18** Cub Scouts at Patterson 6 PM	**19** 1 AM Aldebaran Occultation	**20** Orionid Meteors	**21** HAC Meeting Student Union Megan Kiminki Orionid Meteors	**22** 13:14 PM **Girl Scouts at Patterson 6PM** Orionid Meteors
23	**24** (Rain date for Cubs sched. on October 18)	**25**	**26**	**27**	**28**	**29** **DINE UNDER THE STARS**
30 1:38 PM	**31** 	**1 Nov**	**2** Pie in the Sky at Joyce Clark Middle School 6:30 PM	**3** Patterson Public Night 6PM	**4** Member star party at Blue Marvel Obs. (Gary Grue)	**5**
6 Daylight Savings Time Ends	**7** 2:51 PM	**8** 	**9**	**10**	**11** 	**12**
13	**14** 8:52 AM	**15**	**16** Leonid meteors	**17** Leonid meteors	**18** **Hac Meeting Student Union Vishnu Reddy** Leonid meteors	**19**
20	**21** 3:33 AM	**22**	**23**	**24** 	**25**	**26**
27	**28**	**29** 7:18 AM	**30**	**1 DEC**	**2**	

All event times MST. Join Haclist to keep up to date with all of the Huachuca Astronomy Club events
Send an email to: haclist-subscribe@yahoogroups.com