Huachuca Astronomy Club
Sierra Vista Arizona

NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

APRIL 2018

PRESIDENT'S NOTES

Ah, another April in paradise, it is time for galaxy hunting. Leo is well up by nightfall, with the realm of galaxies in Coma Berenices and Virgo waiting to its east. There are galaxies sized and bright enough for even the smallest telescope. In addition, keep in mind that a Messier Marathon can (to a slightly lesser degree) be carried out on the first new moon in April. A few of the earliest setting objects are lost to evening glare but still the possible count is about 80, and that's more than I got at the March event at Keith's. Which, incidentally, was a lot of fun; thanks Keith and Teresa.

Last month I teased that that I'd write about filters this month. Well, I will at least get started on the subject. There is a vast array of astronomical filters out there today. Most filters, however, fall into one of three general types: *solar filters*, made to exclude either enough light or most wavelengths to make viewing the sun safe; *deep sky and light pollution filters* that block out unwanted wavelengths of light to increase contrast of faint fuzzies; and *color filters*, to be used for planetary exploration.

Color (dye, also known as Wratten) filters are used for both imaging with cameras and visually through the eyepiece. Like deep sky and light pollution filters, color filters single out sections of the visual spectrum to enhance contrast of the object being viewed. Colored filters come in many shades (wavelengths) and various densities of color.

As a rule, color filters are used when imaging and viewing at higher magnifications, which reduces the brightness of objects, so, smaller telescopes should use lighter color filters as they pass more light. This is not so hard and fast of a rule for imaging, where you can vary the length of exposure, but the eye doesn't sum light, it just takes the photons as they come. In this article, my focus is on visual usage. For example 12"-16" telescopes may have great success using a deep red filter on Mars to bring out maria (great plains dubbed "seas") and other surface features, dust clouds, and the polar caps. However, a smaller scope in say the 4"to 8" range fitted with the deep red filter will find the whole planet too dark to see much of anything except maybe the polar caps. So, don't go buying the darkest colors thinking they will necessarily show more. I've included a table at the end of this article to summarize what I'm about to discuss.

So which color filter to use? My main goal here is to help you get a good view of Mars as it comes close this summer, so let's concentrate on it. Unlike most of the planets normally seen by amateur astronomers, Mars is a terrestrial (rocky) planet. It does have an atmosphere, but it is thin, so we can see down to the surface features. That's where the action is. The first readily perceived surface features on Mars are the polar caps. Large scopes (over 8") can use a strong violet filter for the study of martian polar cap regions. However, it blocks so much light I don't use it even in my C14. Green is great for viewing the polar ice caps in scopes 6" and larger, as well as seeing yellow-tinted dust storms on the martian surface. Light green works well in telescopes 4" aperture and larger to increase contrast of Mars' polar ice caps.

As Mars gets closer more subtle surface features come into potential view, and filters can help make some sense of them. Yellow-green filters darken the maria. Yellow lightens the red-orange features, while increasing the contrast of blue-green areas. Also, orange does a wonderful job of sharpening and darkening the edge-details in the maria. Red and light-red filters for smaller scopes are also useful for the demarcation of the martian polar ice caps and maria, as I have already stated.

As Mars gets close, and if our local atmosphere is excellent, you can try blue filters to look for very subtle features, such as marian clouds, the clouds over the massive volcanoes, and small sand storms. I hope we don't see these (since they can obscure the entire face of the planet), but large sand storms will appear bright yellow in the telescope without filters. They are brightest in red filters, but can be also bright in yellow filters. If a big dust storm hits, make the most of what time you have. Stare every night and feel honored you are experiencing a planetary wide event, and that it may be the last you see of the martian surface this time around. Big storms can last for weeks.

Filtering planetary light is a subtle art; and every telescope, planet, and viewer is different. There are even differences in colors perceived by our individual eyes. It is normal to have one eye better at judging colors and tints while the other is better at brightness and shades of gray. So, if you are going to venture into filtering it might serve you well to get a set of filters with a range of colors and densities. Once you use them on Mars, you will find them useful on the other planets as well. Color filters are quite inexpensive for the usual 1.25" eyepieces.

Oh no, I've opened the can-of-worms that is the "which eyepiece design is best for planet viewing" debate. I fall on the side of 1.25", simple, fewer, best. That is standard 1.25"-sized eyepieces, simple eyepiece design (Plossl or Ortho), fewer lens elements (no need for 8 to 10 lenses), and the best quality eyepiece you feel comfortable buying for the task. There are special monocentric eyepieces, super flat field designs, exotic glass, and super hand-polished lenses, but you will be well served with well-made Orthos or Plossls and clean filters.

As Always Clear Skies Everybody

Color Filters for MARS

Wratten Number and Color	Light Transmission	**Bold font indicates best for large telescopes**
#8 Light Yellow	83%	Maria, Dust clouds
#11 Yellow-Green	78%	Maria
#12 Yellow	74%	Maria, Atmospheric clouds
#15 Dark Yellow / Amber	67%	Maria, Dust clouds, Polar caps
#21 Orange	46%	**Surface edge detail**
#23A Light Red	25%	**Maria and surface, Dust clouds, Polar caps**
#25 Red	14%	**Maria, Polar caps**
#38A Dark Blue	17%	**Dust storms, Polar caps**
#47 Violet	3%	**Clouds and haze above poles**
#56 Light Green	53%	Dust storms, Polar caps
#58 Green	24%	**Dust storms, Polar caps**
#80A Blue	30%	High clouds, Polar caps
#82A Light Blue	73%	Polar caps, Surface

2018 Membership Dues

Some members have not paid their dues for 2018. Dues will be collected at the April meeting (cash or check) Dues may also be paid on-line using a credit card or PayPal account at www.hacastronomy.org or mailed to PO Box 922 Sierra Vista, 85636.

At the April Meeting

Our April meeting will be held at 7 PM in the Student Union Building at Cochise College, 901 N. Colombo Avenue, Sierra Vista. HAC meetings are open to the public and admission is free.

Our April speaker is Dr. Kevin Hainline.

Dr. Kevin Hainline is an astronomer and researcher on the James Webb Space Telescope NIRCam science team at Steward Observatory at the University of Arizona. His research focuses on hunting for active galaxies and quasars and understanding the effects of a growing, powerful supermassive black hole on its host galaxy. Currently, he is helping to plan the initial deep observations to be done by JWST to explore the evolution of the earliest galaxies. He received his PhD from UCLA in 2012 and spent three years as a researcher and professor at Dartmouth College in New Hampshire, before moving to Tucson to work on JWST. Kevin has a passion for science outreach education, speaking about astronomy any chance he can get. Kevin is very enthusiastic.

His talk is titled: "The Extraordinary James Webb Space Telescope and the Future of Astronomy"

The James Webb Space Telescope (JWST), NASA's next generation space observatory, is set to launch in 2019 on a mission to explore the distant universe, nearby exoplanets, and young stars nestled in their cocoons of dust and gas. Unlike the Hubble Space Telescope, which was the size of a school bus, the full extent of JWST is around the size of a tennis court, complete with a segmented, gold-plated, 6.5 meter (21 feet) primary mirror. In this talk, Dr. Kevin Hainline, a member of the JWST NIRCam science team at the University of Arizona, will describe some of the revolutionary astronomy and cosmology research that this telescope will enable, focusing on the work being done here in Tucson.

Patterson daytime volunteers wanted

The University South Foundation will be offering small grants to area schools to help defray the cost of field trips to the UA Sierra Vista campus. Visiting students will tour the Discovery Gardens and the Patterson Observatory. We will need volunteers to staff the observatory and operate the solar telescope for these field trips. With the completion of the mini science center later this year, additional daytime operating hours are anticipated as well. Anyone wanting to volunteer should contact Ted Forte. Training (talking points for the tour and operating instructions for the solar scope) will be provided.

This article is provided by NASA Space Place.

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Space Place Article **April 2018**

Measuring the Movement of Water on Earth

By Teagan Wall

As far as we know, water is essential for every form of life. It's a simple molecule, and we know a lot about it. Water has two hydrogen atoms and one oxygen atom. It boils at 212° Fahrenheit (100° Celsius) and freezes at 32° Fahrenheit (0° Celsius). The Earth's surface is more than 70 percent covered in water.

On our planet, we find water at every stage: liquid, solid (ice), and gas (steam and vapor). Our bodies are mostly water. We use it to drink, bathe, clean, grow crops, make energy, and more. With everything it does, measuring where the water on Earth is, and how it moves, is no easy task.

The world's oceans, lakes, rivers, and streams are water. However, there's also water frozen in the ice caps, glaciers, and icebergs. There's water held in the tiny spaces between rocks and soils deep underground. With so much water all over the planet—including some of it hidden where we can't see—NASA scientists have to get creative to study it all. One-way that NASA will measure where all that water is and how it moves, is by launching a set of spacecraft this spring called GRACE-FO.

GRACE-FO stands for the "Gravity Recovery and Climate Experiment Follow-on." "Follow-on" means it's the second satellite mission like this—a follow-up to the original GRACE mission. GRACE-FO will use two satellites. One satellite will be about 137 miles (220 km) behind the other as they orbit the Earth. As the satellites move, the gravity of the Earth will pull on them.

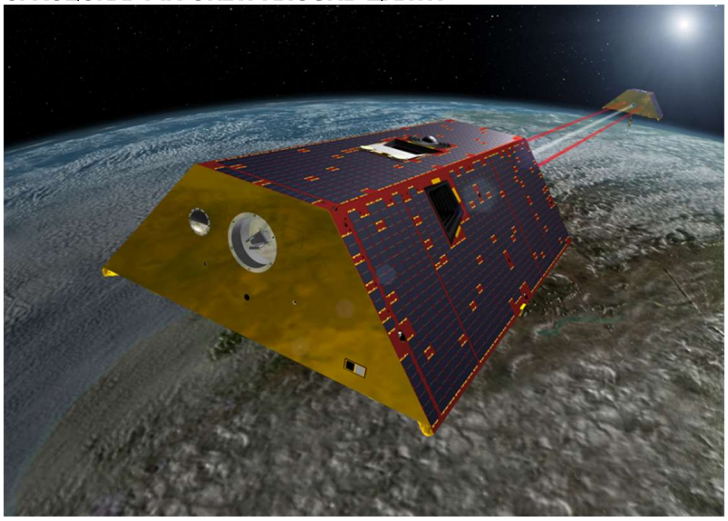
Gravity isn't the same everywhere on Earth. Areas with more mass—like big mountains—have a stronger gravitational pull than areas with less mass. When the GRACE-FO satellites fly towards an area with stronger gravitational pull, the first satellite will be pulled a little faster. When the second GRACE-FO satellite reaches the stronger gravity area, it will be pulled faster, and catch up.

Scientists combine this distance between the two satellites with lots of other information to create a map of Earth's gravity field each month. The changes in that map will tell them how land and water move on our planet. For example, a melting glacier will have less water, and so less mass, as it melts. Less mass means less gravitational pull, so the GRACE-FO satellites will have less distance between them. That data can be used to help scientists figure out if the glacier is melting.

GRACE-FO will also be able to look at how Earth's overall weather changes from year to year. For example, the satellite can monitor certain regions to help us figure out how severe a drought is. These satellites will help us keep track of one of the most important things to all life on this planet: water.

You can learn more about our planet's most important molecule here: https://spaceplace.nasa.gov/water

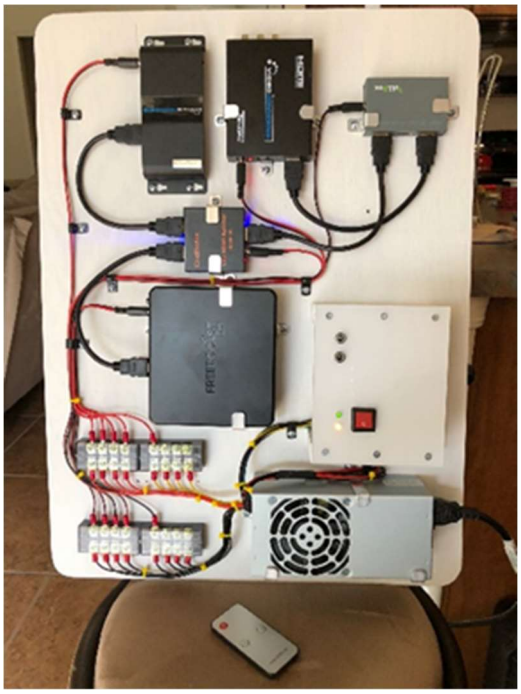
An artist's rendering of the twin GRACE-FO spacecraft in orbit around Earth



Credit: NASA

Patterson Observatory Update

A lot has been going on at the Patterson! Our telescope improvement team has been working to bring video from one of the piggybacked C8s that ride on the main scope onto the widescreen TV in the central bay. Ken Kirchner designed and built a video conversion board that enables us to distribute video (or a mirror of the computer desktop) to the TV in the central bay, a projector in the classroom or even out to YouTube. It's pretty cool.



Speaking of the central bay, the bay's conversion into a "mini science center" is nearly complete.

The room is now filled with displays and more are on their way. The development of the bay as a display space was made possible by a grant from the Southern Arizona Rural Activation and Innovation Network (RAIN), which is funded by the National Science Foundation and by the hard work of our dedicated volunteers. Improvements and innovations are ongoing and we can use your help. Just let Ted Forte know that you want to be involved.

We are making good use of the new science display area through the generosity of the University South Foundation. The foundation is offering "mini-grants" to fund field trips to the Patterson (and the Discovery Gardens). The grants pay for transportation and a snack or lunch and several schools have already applied. We'll host our first school (Bowie Elementary) on April 16. We anticipate a great deal of interest in the grant program and we can use all the volunteers we can get to run the solar scope and give tours and/or talks to the students. No matter what your experience level, you can be of great assistance, even if it's just as traffic control.

Progress is being made on plans to build an extension to the Patterson Observatory that will house restrooms, a break room (kitchenette), and a storage area.

The new extension will attach to the east side of the building and connect through a new archway leading from the existing classroom. The steel frame structure will be covered in metal paneling similar to what is currently below the dome. A full set of construction plans was sent to the city on April 5 for preliminary approval and once the city planners sign off, we'll be ready to go out for completive bids. We could begin construction as early as June.

The Patterson observatory is owned by the University South Foundation and operated by HAC volunteers. All of the observatory improvements, including the restroom extension, and the mini grant program is funded by a generous endowment made to the foundation from the David Patterson estate. Very little would happen without our dedicated HAC volunteers; without our astronomers the observatory would be a storage shed, and hundreds (if not thousands) of people would be deprived of this remarkable community resource.

Want to be a part of it all?

It's easy; all you need do is express an interest and show up. Another way you can help is to spread the word – make sure your friends and neighbors, your kid's teacher or scout leader, and your work associate know about our events. And, the third way you can help is to support the foundation through donations and by purchasing tickets to our annual Dine Under the Stars event (which this year will be October 20th).

Astronomical League Convention

Registration is now open for the A.L. convention that will be held in Minneapolis Minnesota July 11 through 14. https://www.astroleague.org/content/more-about-alcon-2018 contains an informative 6-minute video about the event.

Upcoming outreach events

Saturday, April 14 we will host members of the Math and Computer Science Club at Patterson. The event will start at 6 pm with Pizza in the classroom.

Monday, April 16 we will host our first school field trip under the new University South Foundation travel grant program. Students from Bowie elementary will arrive at 10 am. They will be split into two rotating groups to visit the Patterson Observatory and the Discovery Gardens. We'll do solar observing if we can but the event is rain or shine.

Wednesday April 18 we will host a group of about 20 kids and adults at the Patterson Observatory. Organizer Cort Tullis will provide Pizza. Starts at 7:30 pm

Thursday April 19 is a busy day. First, weather permitting; we will set up solar telescopes to participate in Earth Day at the Veteran's Memorial Park farmer's market from 10 am until 2 pm. Then, later that evening, we will open the Patterson Observatory for our monthly Public Night. Doors open to the public at 7:30.

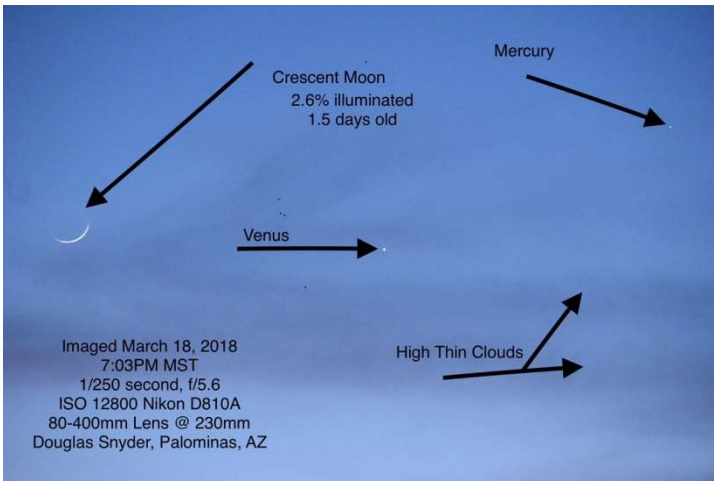
Saturday April 21 we will be at Patterson to celebrate both Astronomy Day and UA Family Day. We will participate rain or shine in this event that runs from 10 am until 2 pm.

Monday, April 23 is another school field trip to Patterson. This rain or shine event is for Coronado Elementary and is scheduled for 9 am until noon.

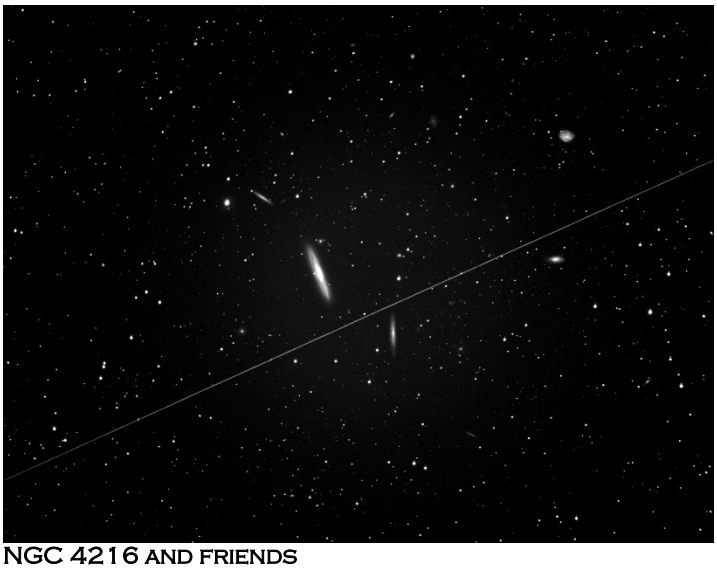
Friday, April 27 is the Math & Science Experience at the Patterson Observatory. We will host hundreds of middle school students from all over the county at this Cochise College managed event. This one too, is rain or shine and runs from 8:30 am until 1 pm.

Pictures from HAC Members

Moon, Venus, Mercury on March 18 2018 Evening
Dave Tannenbaum



Moon, Venus, Mercury on March 18 2018 Evening
Doug Snyder



NGC 4216 and friends
David Roemer

Mars
David Roemer

Want Ads

For Sale: Meade 10" 2120 OTA with HTMC

I bought it on Cloudy Nights from a guy in Wickenburg, had the secondary professionally cleaned at Starizona in Tucson. The OTA comes with either a Celestron 1.25 visual back or a 2" rotating visual back, an adjustable focus finder as shown in the picture, and a Vixen style dovetail bracket. Of course, there is also a front cover.

Asking $500

Contact Carl Swanson at (480)600-7353 or cswanson@gotsky.com

For Sale: Meade EXT60AT never used before, includes tri-pod.

Asking $200.00 B/O
Contact Keith Mullen at 266-4230

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: 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: 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 the adapter for an Optec TCFS3i 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: 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

Fork Mounted C-14 for Sale

This monster telescope is not a grab and go. It is at the limit of one person setup. At well over 100 lbs. of heavy metal, it deserves its own place. Nor is it a go-to, although I have added electronic setting circles and push-to computer. The Lumicon NGC-Max is a standalone computer, but can also be connected to a PC to use with planetarium programs, like "The Sky". The cables are included.

This scope works wonderfully at f/11, pulling in faint fuzzies and tack-sharp planets. May I mention Mars is coming? Also included is the Lumicon Giant Easy Guider system for those times you want to view or image at a few f-stops faster. The giant easy-guider changes the telescope to either f/7 or f/5 for wide-field viewing and includes a prism guiding port for guiding eyepiece.

If f/5 isn't fast enough for your imaging pleasure, then strip off all that stuff, put on the Starizona HyperStar Type 3 Lens, and shoot without guiding at f/1.9. I retrofitted the HyperStar kit, along with a new corrector plate with StarBright XLT optical coatings. Two-minute subs are all you'll need to grab most of what's out there, down to about mag 18. It comes with a couple of camera adaptors, and if you need a different adaptor, Starizona is just up the road. I've also added a feather-touch 1:10 micro-focuser that really makes a difference.

This C-14 is a wonderful classic and comes with the original adjustable 2" mirror diagonal, heavy-duty wedge, heavy-duty field tripod; counter weight bars and weights, and all the original trunks. I even have the manuals.

I do not want to ship, and it is something you'll want to try first anyway. I won't break up the package. After much consideration, I am asking $4,500. Email me if you're interested in a test drive. david_roemer@earthlink.net

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

HAC April/May Calendar of Events

SU	MO	TU	WE	TH	FR	SA
8 April 0:18AM	**9**	**10**	**11**	**12**	**13** Hac Meeting Student Union Mercury Stationary	**14** MACSclub at Patterson 7pm
15 6:57PM	**16** Patterson school field trip 10 AM until 1 PM	**17** Venus 5° from moon	**18** Youth Grp at Patterson 7:30pm	**19** Earth Day 10am-2pm at Vet park Patterson Public Night 7:30 pm	**20**	**21** UA Family Day / Astronomy Day Patterson 10am-2pm Lyrid Meteors
22 Earth Day 2:46PM Lyrid Meteors	**23** Patterson school field trip 9 AM until noon Lyrid Meteors	**24**	**25**	**26**	**27** Math & Science Experience Patterson Obs. 8am- 1pm	**28**
29 5:58 PM Mercury greatest West elongation	**30** Jupiter 4° S of Moon	**1 May**	**2**	**3**	**4** Saturn 1.7° S of Moon	**5** Eta Aquarid Meteors
6 Eta Aquarid Meteors	**7** 7:09 PM Eta Aquarid Meteors	**8** Jupiter at Opposition	**9**	**10** School Field trip at Patterson 9 AM to noon	**11** School Field trip at Patterson 9 AM to noon	**12** Member Star Party
13	**14**	**15** 4:48 AM	**16**	**17** Patterson Public Night 7:30 PM	**18** Hac Meeting Student Union	**19**
20	**21** 8:49 PM	**22**	**23**	**24**	**25**	**26**
27	**28**	**29** 7:20 AM	**30**	**31**	**1 Jun**	

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