NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

SEPTEMBER 2015

PRESIDENT'S NOTES

As I write this, it is still raining out, the clouds are thick, and there has been little early morning clearing. This has been a long monsoon season, and I am ready for it to stop. Ok, enough bellyaching let's move on to what we can see and do in September and October.

On Sunday September 27, we are opening the Patterson Observatory at 6pm for the Super Moon total lunar eclipse. Keep the positive vibes for this evening. Clear skies could give us a big, blood red moon rising up from the east like an early great pumpkin. Remember to bring your cameras, as there could be plenty of photo opportunities.

The Orionids are active from October 4 to November 14, and should peak on the night of October 21. The Moon doesn't set until after midnight, but that is fine as the radiant of the meteors is out of the northern area of the constellation of Orion (near his club), and that will be well placed after midnight. The Orionids are not a high quantity show, you might see about 20 meteors per hour during the peak, but there have been years with outbursts of 65-75 meteors per hour. Another cool reason to watch the Orionids is that they are dust and grit from the one and only Comet P1; yep, Comet Halley. The dark skies make this a favorable year for watching the Orionid meteors, between midnight and dawn, and who knows we might get a lucky outburst.

The planet Uranus comes into opposition on the night of the 12 October, so will be well placed this month. Opposition in this case is when the planet is closest to Earth. Its magnitude is +5.9 so Uranus should be easily spotted in binoculars lying in the southern part of Pisces. Uranus will be east-southeast of magnitude 4 stars Epsilon Piscium and Delta Piscium. Even in a telescope of 4 inches or so it should be possible to see that it is not a star point but forms a disk (3.6 arc-seconds across), which has a pale green-blue tint. Telescopes larger than 8 inches on nights with good seeing may even detect some detail in the planet's cloud features. The contrast in the cloud tops may appear to be more prominent than usual with sunlight reflecting right back at us. For those with cameras or big scopes, here's an observing/imaging challenge. One or more of four of Uranus' moons, Arial (+14.4 magnitude), Umbrial (+15), Titania (+13.9) and Oberon (+14.1) may also be seen, given a night of good seeing and a telescope of 8 inches diameter or more.

October also signals the resurgence of outreach activities for the club. Schools are in session, and people are ready to look up to the stars again. Look to our calendar, website, and Facebook page to stay up to date, come out, and help when you can.

SEPTEMBER MEETING

of the Huachuca Astronomy Club will be held in the community room of the Student Union Building, Cochise College Sierra Vista campus on September 25 at 7PM. Our speaker is Dean Salman, a program specialist in the Advance Observing Program at Kitt Peak National Observatory. An amateur astronomer since he was 12 years old, Dean became interested in astro-photography in 1973. In addition to his work in the nighttime programs at the National Observatory, he operates a remote observatory located at the San Pedro Valley Observatory in Benson, Arizona. The meeting is FREE and open to the public. Cochise College is located at 901 N. Colombo Avenue, Sierra Vista.

We will be treating Dean to dinner at the Outback Steak House at 5PM on the night of the meeting. Members interested in joining us for dinner should RSVP to Ted Forte via email [tedforte511@gmail.com] or by posting a note on Haclist.

ALSO AT THE MEETING: Ted Forte will again be taking orders for the 2016 *RASC Observer's Handbooks* and the Astronomy Magazine Deep Space Mysteries 2016 calendars. We ask that you pay for your items when signing up. The advanced payment for the RASC handbook is $22.25 each. That price may be adjusted up or down slightly based on the actual cost. Refunds or additional payments will be handled when the books are distributed. The calendars are $6.50 each, which represents a 50% discount over the newsstand price. The books and calendars will be ordered after the October meeting.

Dine Under The Stars

(DUTS) tickets will be on sale at the meeting (See Ted Forte). DUTS is the annual scholarship fundraiser for the University South Foundation. The Foundation exists to support the students, faculty, and staff of the University of Arizona, South but is also the owner of the Patterson Observatory. Supporting the foundation by purchasing DUTS tickets helps to insure that the Patterson Observatory remains open as the focus of our astronomy outreach. Please consider buying a DUTS ticket. Tickets are $40 adult, $25 student and $15 children 12 and under. DUTS is held adjacent to the Patterson Observatory on Saturday October 3 from 6PM until 9PM. The Dine under the Stars event includes a western buffet donated by La Casita Mexican Restaurant and Cantina, live Country Music brought to you by The Outriders, dance entertainment performed by the Alma Dolores International Dance Centre and stargazing at the Patterson Observatory. Special guests include the newly crowned Miss Sierra Vista and Miss Sierra Vista Outstanding Teen. DUTS will also feature an exclusive silent auction, and a 50/50 raffle.

Welcome Our New Members

Scott and Sylvia Conklin of Sierra Vista joined the club in September. Welcome, we are glad you joined.

October Outreach

We have an exceptionally ambitious outreach schedule the next few months and there are plenty of opportunities to get involved, help your club, and reach out to your community. Outreach is important to the future of our hobby and is perhaps the most rewarding experience you will have as an amateur astronomer. We need volunteers to assist with DUTS at the Patterson on Saturday, 3 October, 6-9PM. We will be teaching astronomy classes at Patterson each Tuesday evening in October at 7PM and weather permitting, we will have telescope time for the students starting around 7:45 – we need volunteers to operate telescopes and possibly assist the students with their own scopes. Our next Patterson Public Night is October 15 at 6:30PM and, as always, all members are encouraged to participate. We have an event at Col Smith Middle School on Ft Huachuca on October 8 starting at 7PM and anyone that would like to help with that should contact Ted Forte or Bob Gent. We will support a private star party at the Amerind Museum in Dragoon on October 10. Due to the nature of this event, only volunteers that will be setting up telescopes should attend. Please contact Bob Gent if you wish to help with that.

International Astronomy Day October 17, 2015

Kartchner Caverns Sate Park, Arizona

Astronomy Day is a worldwide event observed each spring and fall, and the Huachuca Astronomy Club of Southeastern Arizona will celebrate Astronomy Day on October 17, 2015 at Kartchner Caverns State Park. The public is invited to come enjoy this family-friendly, educational event.

Astronomers from HAC and the Astronomers of Verde Valley will host a solar observing program in the bus parking lot outside of the Discovery Center starting about noon. Weather permitting, guests will safely view our star through a variety of telescopes designed to display the many fascinating features of the sun including sun spots, filaments and solar prominences. There will be NASA Space stickers for the kids, and several fun activities throughout the day.

At 5:30 PM, the distinguished guest speaker, Dr. Chris Impey, will talk in the Discovery Center Theater, and this program is open to all park guests. Dr. Impey is a distinguished professor and deputy head of the department of astronomy at the University of Arizona. He has written popular books on astronomy, he has been on television science programs, and he has appeared on national radio programs to discuss the wonders of the universe. His astronomy research focuses on observational cosmology—using telescopes and other instruments to study the large-scale structure and evolution of the universe. He also does research on education and science literacy.

His talk is titled "Dreams of Other Worlds." Humans have dreamed of other worlds for thousands of years. Since 1995, when the first exoplanet was discovered, the inventory has grown to over 5,000 planets known beyond our solar system of which hundreds are Earth-like and dozens may be habitable. Astronomers project roughly, 20 billion habitable “Earths" in the Milky Way and the search for life on those worlds is the most compelling project in astronomy. The census is expected to be similar in each of the 100 billion galaxies in the observable universe. The potential of a boundless, biological universe recasts what it means to be human.

Chris Impey, PhD.
Photo from https://en.wikipedia.org/wiki/Chris_Impey

After the talk, join with astronomers and look through their telescopes at close-up views of a crescent moon. Visitors will see the craters and mountains of moon, distant galaxies, nebulae, and star clusters. The outdoor activities are weather dependent, but the talk will go on rain or shine. Regular park admission fees apply. For additional information about Kartchner Caverns, see: http://azstateparks.com/Parks/KACA/index.html

Space Place Article Sept 2015

Measure the moon's size and distance during the next lunar eclipse

By Ethan Siegel

The moon represents perhaps the first great paradox of the night sky in all of human history. While its angular size is easy to measure with the unaided eye from any location on Earth, ranging from 29.38 arc-minutes (0.4897°) to 33.53 arc-minutes (0.5588°) as it orbits our world in an ellipse, that doesn't tell us its physical size. From its angular size alone, the moon could just as easily be close and small as it could be distant and enormous.

But, we know a few other things, even relying only on naked-eye observations. We know its phases are caused by its geometric configuration with the sun and Earth. We know that the sun must be farther away (and hence, larger) than the moon from the phenomenon of solar eclipses, where the moon passes in front of the sun, blocking its disk as seen from Earth. In addition, we know it undergoes lunar eclipses, where the sun's light is blocked from the moon by Earth.

Lunar eclipses provided the first evidence that Earth was round; the shape of the portion of the shadow that falls on the moon during its partial phase is an arc of a circle. In fact, once we measured the radius of Earth (first accomplished in the 3rd century B.C.E.), now known to be 6,371 km, all it takes is one assumption—that the physical size of Earth's shadow as it falls on the moon is approximately the physical size of Earth—and we can use lunar eclipses to measure both the size of and the distance to the moon!

Simply by knowing Earth's physical size and measuring the ratios of the angular size of its shadow and the angular size of the moon, we can determine the moon's physical size relative to Earth. During a lunar eclipse, Earth's shadow is about 3.5 times larger than the moon, with some slight variations dependent on the moon's point in its orbit. Simply divide Earth's radius by your measurement to figure out the moon's radius!

Even with this primitive method, it's straightforward to get a measurement for the moon's radius that's accurate to within 15% of the actual value: 1,738 km. Now that you've determined its physical size and its angular size, geometry alone enables you to determine how far away it is from Earth. A lunar eclipse is coming up on September 28, and this Supermoon eclipse will last for hours. Use the partial phases to measure the size of and distance to the moon, and see how close you can get!

Image credit: Daniel Munizaga (NOAO South/CTIO EPO), using the Cerro Tololo Inter-American Observatory, of an eight-image sequence of the partial phase of a total lunar eclipse.

UA Campus to celebrate special "Moon Tree" with event featuring Jack Roosa

TUCSON (August 18, 2015) —Three University of Arizona campus partners will celebrate the campus Moon Tree with a special program on Friday, October 30th, 2015 from 4:30-5:30pm. The event will be held in the Kuiper Space Sciences Building Auditorium and will feature remarks from Jack Roosa, son of Apollo 14 astronaut Stuart Roosa.

The event is a collaborative effort hosted the University of Arizona Campus Arboretum, the University of Arizona Lunar and Planetary Laboratory, and the University of Arizona Poetry Center.

The Moon Tree is an American Sycamore located on the UA campus between the Kuiper Space Sciences Building and the Flandrau Science Center and Planetarium. The Moon Tree was grown from a seed that travelled to the moon on the Apollo 14 space mission with astronaut Stuart Roosa in 1971. The seed was sent to space as part of a project of the US Forest Service Research Program, to study the effects of zero gravity on germination. The Sycamore has been part of the University of Arizona campus since it was planted in 1976. NASA documents it as one of only 64 surviving moon trees located around the world.

This event is sure to have something for everyone as we celebrate interconnections to this magnificent Tree. In addition to Jack Roosa, speakers at the celebration include Steve Leavitt, Director of the Laboratory of Tree-Ring Research; Tanya Quist, Director of the University of Arizona Campus Arboretum; Tim Swindle, Director of the University of Arizona Lunar and Planetary Laboratory, and Tyler Meier, Director of the University of Arizona Poetry Center.

The celebration will be followed by a screening of the Desert Moon Movie from 6-6:35pm, and a Star Party on the University of Arizona Mall from 6:30-10:00pm, hosted by the Tucson Amateur Astronomy Association.

Events are free and open to the public.

The Moon Tree celebration is the first of several upcoming collaborative events co-hosted by The UA's Campus Arboretum and Poetry Center. This fall, the two programs will co-host ***Po-e-tree***, poetry readings under the trees. Participants are invited to sit under the shade of the trees to read and discuss poetry. Po-e-tree will be held on four Saturdays between October and December:

- 10/3/15, 3:30-5:00pm: "**Listening to the Trees**," sharing the wisdom of the trees through the poems of celebrated poets
- 10/31/15, 1:00-2:30pm: "**Desert Poetry,**" poems written by various poets who were inspired by our Southwest environment.
- 11/21/15, 3:30-5:00pm: "**Conversations with Nature,"** the poetry of Mary Oliver
- 12/5/15, 3:30-5:00pm: "**Poetry and Science,"** the poetry of Alison Hawthorne Deming

Docents will guide participants and discussion. No previous experience with poetry is necessary to enjoy the Po-e-Tree events. Participants should meet at Old Main where the

Poetry Center Docents will direct you to the Po-e-Tree site. Consider arriving early to attend a campus tree tour, scheduled the same day, and offered free to the public by UA Campus Arboretum Docents. Parking on campus is free on weekends.

About the University of Arizona Campus Arboretum

The University of Arizona Campus Arboretum is a living laboratory, dedicated to promoting stewardship and conservation of the hundreds of plant species collected and installed on the campus grounds throughout the University's history. The goal of the Campus Arboretum is to preserve, curate and enhance this extensive collection as a resource for research and education programs that promote the historic, scientific, environmental, economic, aesthetic and educational value of these arid-adapted plants.

About the University of Arizona Lunar Planetary Laboratory

The Lunar and Planetary Laboratory (LPL) was founded in 1960 by planetary astronomer Gerard P. Kuiper, after whom the Kuiper Belt of icy objects in the outer Solar System is named. Early work supported NASA's Apollo missions to the moon. Today LPL is an interdisciplinary planetary research institute whose subjects span the entire Solar System with faculty, research staff, and students coming from a variety of backgrounds. World-renowned telescopes, laboratories and spacecraft missions are used to explore moons, planets and other extraterrestrial objects, analyze extraterrestrial materials like meteorites, or simulate conditions on the planets. Others concentrate on the theoretical work required to explain all the observations.

About The University of Arizona Poetry Center

The University of Arizona Poetry Center is housed in one of three landmark buildings for poetry in the nation. In addition to its world-renowned collection of contemporary poetry, the Poetry Center is known for its readings and lecture series, international symposia, classes and workshops, writers' residencies, and a wide range of programs for children and youth. The Poetry Center was most recently recognized with a 2014 Governors Arts Award.

For additional information about these events, please visit http://arboretum.arizona.edu/events

Media Contact:
Tyler Meier tmeier@email.arizona.edu
520-626-5880 http://poetry.arizona.edu

WantAds

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 (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

FOR SALE: Celestron 8" OTA and Lens

Comes with a Starizona Hyperstar III Lens. Shoot astro-images at f/2.1 Focal Ratio. Both for $1000.00

Contact Max Mirot at galiloeo@yahoo.com

Club Officers and Contacts

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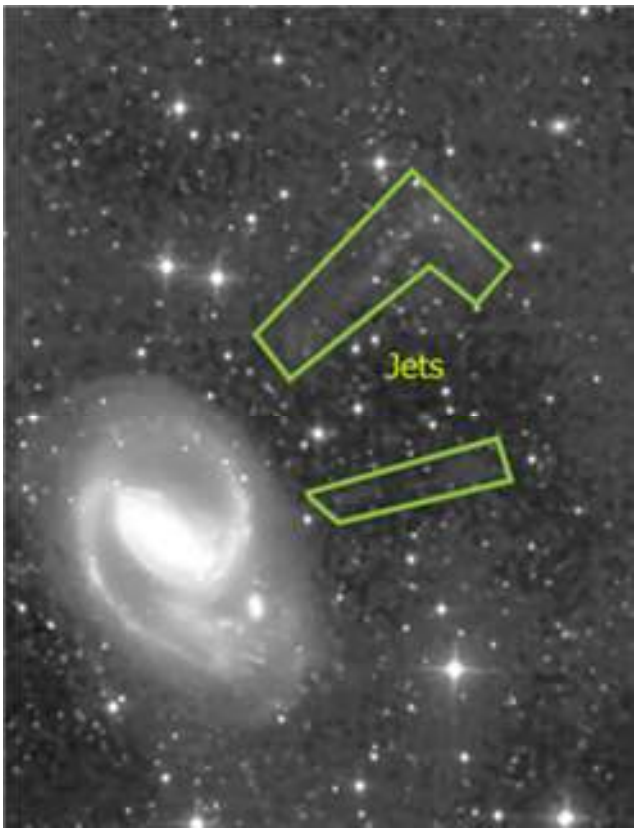
Photons from Down Under

Images By Alex Woronow

Object: NGC 1097, Telescope 17" Planewave CDK, CameraFLI Proline 16803, Location Sliding Spring, Au Exp. LRGB 7x600" each, processed in PixInsight

NGC 1097, features a glowing inner ring of stars at center that probably encircles a supermassive black hole. Smaller associated galaxy is NGC 1097A.

Apparent dimensions: 9′.3 × 6′.3
Apparent magnitude: 10.1
Surface brightness: 22.6
FOV: 25 arc minutes



NGC 1097, also called Arp 77, has been processed to bring out the two jets that can just be seen in my two lower images. These jets are not hot gases, but star streams, ejected from the galaxy.

In addition, an unusually high number of Quasars lie in the surrounding region of the sky!

HAC Calendar of Events for Sep-Oct 2015

SU	MO	TU	WE	TH	FR	SA
13 Sep 2:41AM	**14**	**15**	**16**	**17** Patterson Public Night 7PM	**18**	**19**
20	**21** 4:59AM Venus at Greatest Brillance	**22** Astronomy for the Curious Class Patterson	**23**	**24**	**25** HAC Meeting Student Union 7PM	**26**
27 10:50PM **Eclipse Watch** Patterson 6PM	**28** Vesta at Opposition	**29** Astronomy for the Curious Class Patterson	**30**	**1 October**	**2**	**3** **DINE UNDER THE STARS**
4 5:06PM	**5**	**6** Astronomy for the Curious Class Patterson	**7** Teacher Exchange Patterson	**8** 7PM Col. Smith Middle School Stem Night Mornings: Venus	**9** **Draconids peak on the 8th** ← Mars and Jupiter	**10** **Amerind Star party 5PM** Conjunctions
11	**12** 8:06PM Uranus Opposition	**13** Astronomy for the Curious Class Patterson	**14**	**15** Patterson Public Night 6:30PM	**16**	**17** **Astronomy Day** Kartchner star party
18	**19**	**20** 4:31PM Astronomy for the Curious Class Patterson	**21**	**22**	**23**	**24**
25	**26**	**27** 8:05PM Astronomy for the Curious Class Patterson	**28**	**29**	**30** HAC Meeting Library commons 7PM	**31**
Nov 1	**2**	**3** 7:24AM Astronomy for the Curious Class Patterson	**4**	**5** Boy Scouts Patterson 6:30PM	**6**	**7** Guano Happens Kartchner 8:30AM
8	**9**	**10**	**11** 12:47PM	**12** Teacher Exchange Patterson	**13**	

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