NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

NOVEMBER 2019

PRESIDENT'S NOTES

Potato or potatoe, whether or weather, Turkey or tofuerky? it's November! The garden is harvested. The nights are long. The skies are clear, and it is a wonderful time to look up. Almost straight up in the evening sky is the Andromeda Galaxy (M31) our closest galaxy neighbor (2.5 million light-years) from Earth, and the Triangulum Galaxy (M33, Pinwheel Galaxy) 2.73 million light-years away. I mention these two spiral galaxies a lot at outreach events first because they are the only two galaxies that can not only be seen (both are naked eye in dark clear skies) but studied in small and medium sized telescopes. Secondly, these two galaxies highlight that the universe far more complicated than the expanding balloon analogy that is usually used. These two galaxies are coming towards us (blue shifted} not receding (red shifted) as the more distant galaxies are.

Andromeda and Triangulum Galaxies

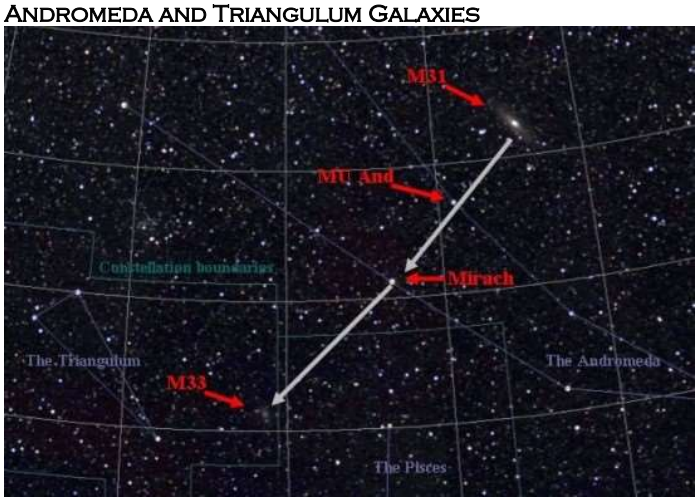
Notice that the Triangulum galaxy (M33) is about equidistant from the star Mirach as the Andromeda galaxy (M31). In other words, once you find Mirach and the Andromeda galaxy, a line between them will point, more or less, to the Triangulum galaxy. Source: ESO Public Outreach.

Thirdly, like cosmic mug shots we get a face on and a near profile of the classic spiral galaxy form. Andromeda seen in near profile shows an oval disk shape with dust lanes and a central bulge and central brightening. The face-on Triangulum galaxy shows multiple arms with vast vacant areas between them. The twirling arms themselves look like spinning prop blades that show structure. Clumpy clouds of dust and Hydrogen along their leading edges lead to regions of young, blue stars in areas of high rates of star formation that gradually decrease through the arms, and older suns show their age toward the following edge.

Fourthly? (also visible with small telescopes) we can see two satellite galaxies (M32, M110) around the far larger Andromeda, much as the Magellanic clouds (that cannot be seen from our local latitude) circle the Milky Way. This takes many people I meet at outreach events by surprise. Standing there in line to look at a galaxy for the first time they are confronted by scales of time and space and size they have never really come up against before, not really. In books in school, or in the distorted realm of movies. They take for granted that the planets orbit the Sun but when you change scales from solar systems to galaxies there's a disconnect. Sometimes the scale problem is due to the sizes involved, "galaxies are just too big and too nebulas to move around each other, aren't they?" Well they aren't they are, and they do. Other times distances seem so vast that even going at the speed of light, distances are just too far. Well, no there's that scale thing again. If there is plenty of time you can cover a lot of distance. And sometimes it is the scale of time, "there isn't enough time to have moved that far much less still be moving, right?" Well, while we won't see it happen, they have, they are, and they will continue to do so. Yes, my answers are simplistic, but they aren't meant to be condescending. It is just that I have a limited time with each observer near my size and distance machine.

And speaking of time… my time is up so until next time, get out there and stare.

ANDROMEDA AND TRIANGULUM GALAXIES



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AT THE NOVEMBER MEETING

The November meeting will be held at 7 pm on Friday, November 8 in the community room of the Student Union building at Cochise College, Sierra Vista campus. Our speaker will be Dr. Ann Zabludoff.

She has a B.S. in both Physics and Mathematics from M.I.T in Cambridge, M.A. as well as a Ph,D in Astronomy from Harvard University.

Ann Zabludoff's research is broadly distributed over extragalactic astronomy and observational cosmology. She has worked on the first generation of stars, the formation of massive galaxies, galaxy transformation via collisions, gravitational lensing, the dark matter distribution in galaxies, the intergalactic medium, the origin of galactic nuclear activity, the spectral classification of galaxies, the baryon budget of the Universe, and the evolution of the largest structures.

Welcome our new members

Steven Sautter and Christina Truka of Sierra Vista joined as a family in October. Rick Stephenson is the new telescope operator at the Butterfield Resort and Observatory in Benson, Erwin Van Hook joins us long-distance from Costa Mesa, California, and our newest member is David Garrett of Hereford.

Welcome! We are glad you joined.

2020 HAC Dues

Most HAC member's membership expire in December. HAC dues can be paid in person by cash or by check made out to Huachuca Astronomy Club at the meeting. You can mail your dues check to PO Box 922 Sierra Vista, 85636 or pay your dues with your credit card or Pay Pal account at www.hacastronomy.org. Pull down the 'membership' menu and click on 'renew'.

You can check with the treasurer (Ted Forte) if you are not sure if your membership is due for renewal next month. Annual family membership is $35, regular is $25. Active duty military pay 425 family and $20 regular. Students with valid ID pay $10.

Outreach Volunteers Needed

With the end of monsoon, we will again be accommodating outreach requests from teachers, youth groups and civic organizations. Interested members need only show up to be involved. We can use your help (with or without your telescope) at the Patterson Observatory and at the numerous outreach events we hold at schools, parks, and the library. Watch the HACAstro list for announcements and check the calendar there frequently (new events pop up all the time). No experience necessary – just bring your enthusiasm. You are sure to find it a fun and rewarding experience!

November Events

Mark your calendar for these special upcoming events:

November 11 Transit of Mercury. The event is in progress at sunrise and will be over about 11:05 am. The Patterson Observatory will be open for the event (sunrise to 11:10)

November 16 Kartchner 20th Anniversary Star Party. We will be at Kartchner for our usual noon to 9 pm routine.

November 23 Rune Winery Star Party. Join us for this fun event starting at dusk at the Rune Winery in Sonoita

These events are weather dependent and will be canceled in the event of cloudy skies.

This article is distributed by NASA Night Sky Network
The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

The Messenger Crosses the Sun: Mercury Transit 2019

By David Prosper

Did you know that there are two other objects in our skies that have phases like the Moon? They're the inner planets, found between Earth and the Sun: Mercury and Venus. You can see their phases if you observe them through a telescope. Like our Moon, you can't see the planets in their "new" phase, unless they are lined up perfectly between us Earthlings and the Sun. In the case of the Moon, this alignment results in a **solar eclipse**; in the case of Mercury and Venus, this results in a **transit**, where the small disc of the planet travels across the face of the Sun. Skywatchers are in for a treat this month, as Mercury transits the Sun the morning of **November 11**!

You may have seen the transit of Venus in 2012; you may have even watched it through eclipse glasses! However, this time you'll need a solar telescope to see anything, since eclipse glasses will only reveal the Sun's blank face. Why is that? Mercury is the smallest planet in our solar system, and closer to the Sun (and further away from Earth) during its transit than Venus was in its 2012 transit. This makes Mercury's disc too small to see without the extra power of a telescope. Make absolutely certain that you view the transit via a telescope equipped with a safe solar filter or projection setup. Do NOT combine binoculars with your eclipse glasses; this will instantly burn a hole through the glasses – and your eyes! While most people don't have solar telescopes handy, many astronomy clubs do! Look for clubs hosting Mercury transit observing events near you at bit.ly/findnsn (USA) or at bit.ly/awbtransit (worldwide).

What a fun opportunity to see another planet during the day! This transit is expected to last over five hours. Folks on the East Coast will be able to watch the entre transit, weather permitting, from approximately 7:35 am EST until around

approximately 1:04 pm EST. Folks located in the middle of North America to the west coast will see the transit already in progress at sunrise. The transit takes hours, so if your weather is cloudy, don't despair; there will be plenty of time for skies to clear! You can find timing details and charts via eclipse guru Fred Espenak's website: bit.ly/mercurytransit2019

Mercury's orbit is small and swift, and so its position in our skies quickly changes; that's why it was named after the fleet-footed messenger god of Roman mythology. In fact, if you have a clear view of the eastern horizon, you'll be able to catch Mercury again this month! Look for it before dawn during the last week of November, just above the eastern horizon and below red Mars. Wake up early the morning of November 24th to see Mars, the Moon, and Mercury form a loose triangle right before sunrise.

Discover more about Mercury and the rest of our solar system at nasa.gov

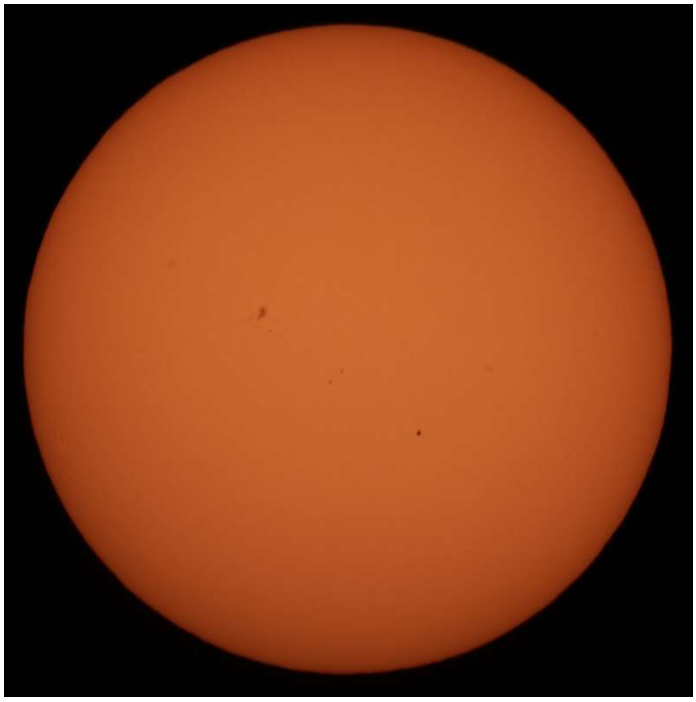
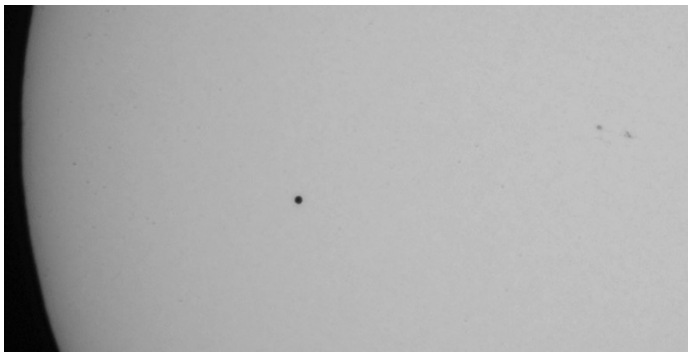


Photo of the May 9, 2016 transit of Mercury. Mercury is the small dot on the center right. Note how tiny it is, even compared to the small sunspot on the center left. Credit: Dave Huntz



This photo from the same 2016 transit event shows Mercury a bit larger, as it should; it was taken at a higher magnification through a large 16 inch telescope! Credit: J. A. Blackwell

Kennedy Space Center visit

Ted Forte

Having a non-astronomer travel agent (aka my wife) accounts in part for why I traded what apparently was the clearest October new moon week in decades for the cloudy skies and humid air of Florida's Space Coast.

Missed observing opportunities aside, our visit to the Kennedy Space Center was a memorable experience. It was my first visit so forgive me for this "what I did on my fall vacation" travelogue. I just had to report back and unload all of this "guess where I went" excitement.

We had multiple objectives for our trip:

1. See my daughter in Orlando 2. See the ocean 3. Gorge on fresh seafood, and 4. Visit Kennedy; and so, I can confidently report 'mission accomplished'.

This was my first visit to the east coast since moving to Arizona and it was good to see the ocean I grew up with. Sure, the Pacific is an ocean, but you don't get to swim in it without a wet suit or a layer of blubber – the Gulf-Stream-warmed waters of the east coast are a different animal entirely. And the seafood is different too.

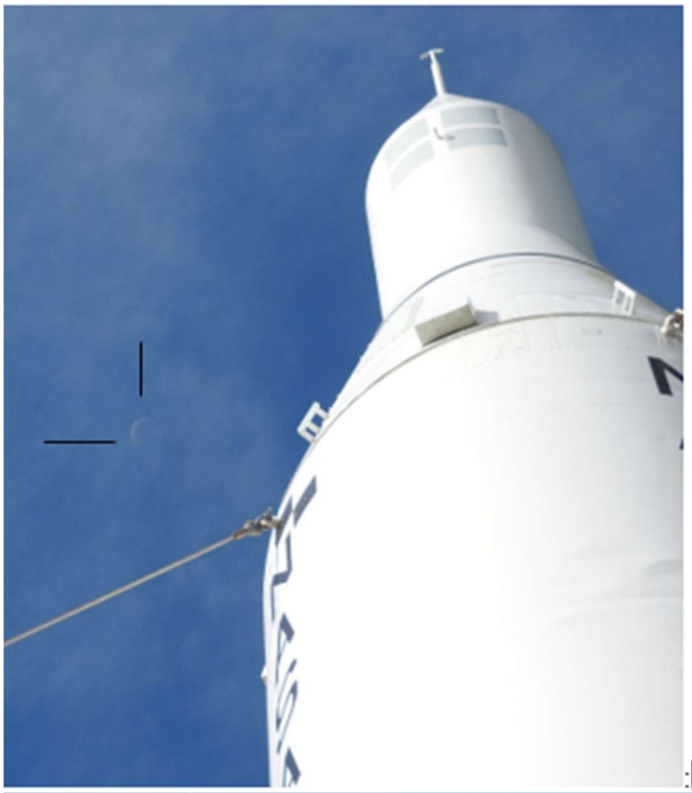
I have to confess that I didn't actually swim- it wasn't exactly beach weather, it was rather cloudy and drizzly all week, so it turned out I got less spousal resistance to our repeated visits to Kennedy. Remember that my travel companion was the sort to respond to my … "wow, that's where Alan Shepard lifted off" with a "that's nice" acknowledgement. But she was a trooper (bless her heart) and never even rolled her eyes, not once, least not so I noticed.

If you are a space buff and haven't been to KSC, it is worth going. If you haven't been in a while, it will look different. Space X, Boeing, Blue Origin and other commercial ventures have a very visible presence and of course there are new displays all the time. The Space Shuttle Atlantis makes for a really impressive display and was new in 2013. The Apollo/Saturn V center was upgraded and reopened just this year. And there are mock ups and models of the new Orion Crew Capsule and the Space Launch System. The literature says to allow two days to see it all – we did four and there were still things left unvisited.

Dolores Hill mentioned in her talk how disconcerting it was that the Space X Falcon 9 exploded on launch complex 40 just a week before OSIRIS REx was scheduled to launch from Complex 41 about 1.5 miles away. Knowing that and seeing the two sites side by side from across the Banana River was remarkable.

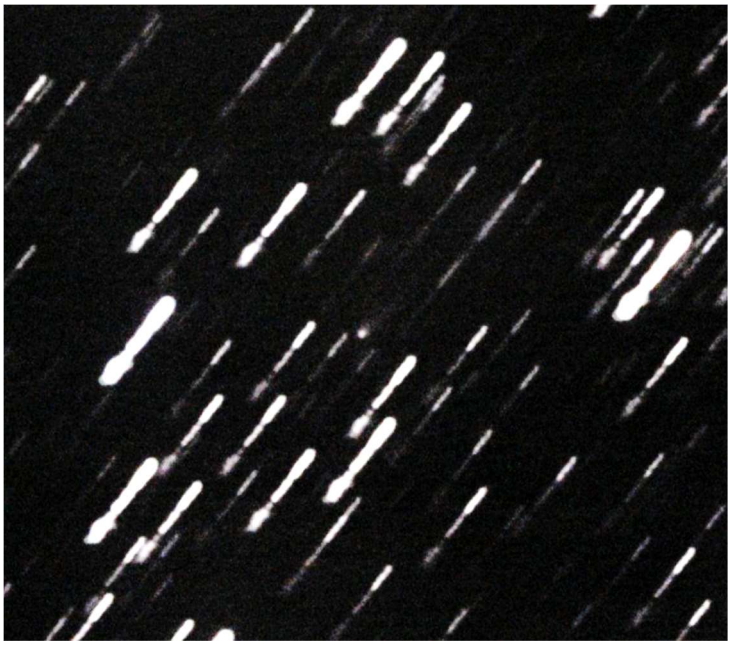
I left a few tee shirts in the gift shop and, try as I might, I couldn't deplete the entire oyster population of Cocoa Beach, so don't be afraid to plan a trip.

Here are a few pictures (notice the moon in the shot of the Juno II rocket)



Pictures from HAC Members

Cave Nebula (Caldwell 9) Mark Orvek



Interstellar Comet 2019 Q4 Borisov David R

Please Volunteer to become board members
Remember to come to the November meeting to vote for and perhaps become Club Officers. It really takes very little time and effort to be a HAC board member. In fact, if you ever thought about joining a board this is the one on which to start, the chapter of your civic biography.

There are several board members that due to family and health issues would welcome a spell off the board, so please don't be shy, become a HAC Board member.

Kartchner Star Party Dave Tannenbaum

Club Officers and Contacts

President: David Roemer **Vice President:** Bill Howard

Secretary: Bert Kelher **Treasurer:** Ted Forte

Past President: open

Board Members-at-Large

Howard Day Ken Duncan Gary Grue Ken Kirchner

***Nightfall* Editor:** Cindy Lund cindy.jean.lund@gmail.com

Webmaster: Ken Kirchner

Facebook Editor: Bert Kelher

Website: http://www.hacastronomy.org

Facebook: http://www.facebook.com/HuachucaAstronomyClub

Email: info@hacastronomy.org

HAC Nov/Dec Calendar of Events

SU	MO	TU	WE	TH	FR	SA
NOV 3 Daylight Savings Time Ends	**4** **3:23AM** CC Astro Class at Patterson	**5**	**6** CC Astro Class at Patterson	**7**	**8** **HAC Meeting Student Union**	**9**
10	**11** **Transit of Mercury Patterson Obs Event dawn**	**12** **6:34 AM** Vesta Opposition	**13**	**14**	**15**	**16** Kartchner 20th Anniversary Astrronomy Outreach
17 Leonid Meteors	**18** School Field Trip at Patterson 9:30AM Leonid meteors	**19** **2:11 PM** Leonid Meteors	**20**	**21** **Patterson Public Night 6 PM**	**22**	**24** Rune Winnery Star party
24	**25**	**26** **8:06AM**	**27**	**28** 	**29** Saturn/Moon 0.9° apart	**30**
Dec 1	**2**	**3** **11:58 PM**	**4**	**5**	**6**	**7** 
8	**9**	**10** Venus/Saturn 1.8° apart	**11** **10:12 PM**	**12**	**13** **HAC Meeting** Geminid meteors	**14** Geminid meteors
15 Geminid meteors	**16**	**17**	**18** **9:57 PM**	**19** **Patterson Public Night 6PM**	**20**	**21** Winter Solstice 9:19 PM
22	**23**	**24** 	**25** **10:13 PM** 	**26**	**27**	

Mark your calendars for Dine Under the Stars on October 5. All event times MST.

Join **HacAstro** to keep up to date with all of the Huachuca Astronomy Club events

Send an email to: HACAstro+subscribe@groups.io