

First Light Lite

March 1st, 2017

Jim Lynch, Mike Hunter, Gus Romano - Interim Editors

Ad Hoc Committees Update

First proposed last summer, and then delayed for a few months, the Ad Hoc committees have started working in earnest. These are: 1) the Website Committee, headed by Gus Romano, 2) the First Light Committee, headed by Jim Lynch, and 3) the Communications Committee (which includes membership, advertising and outreach), headed by Ed Swiniarski. At the February CCAS meeting, the web group reported on initial action items. That report is summarized below. The three groups will make an update report of progress at the March meeting. Anyone interested in contributing to these efforts should contact the appropriate committee chair.

After George's Silvis' presentation, Mike Hunter and Gus Romano discussed the approach to setting up the new web site:

- Created a team of Joel Burnett, Mike and Gus (chairman).
- Looked at numerous web sites and found the general design that we liked.
- Came up with common costing / design criteria (e.g., appearance, # of pages, use of blog, updateable by CCAS, training, standard language, etc.).
- Criteria designed to be presented to 2 developers for their proposal to us.
- In the meantime we continue with detailed design.

Website

Even though it is temporarily frozen, there is much useful information on the current CCAS website! In your browser, bring up www.ccas.ws.

January 5th CCAS Meeting Speakers

We'd like to thank our February 2nd speakers, Jim Lynch (JFL - You're welcome! My pleasure!) and George Silvis.

Jim Lynch's talk on String Theory and Loop Quantum Gravity (summary by Jim)

It has long been known (since Einstein's early work) that in order to explain the largest scales of the universe, i.e. cosmology, general relativity is the prime descriptive theory. In the last 75 years or so, it has also become apparent that you need to also need to understand very high energy particle physics to understand cosmology. What seemed to be two separate disciplines turn out to merge at the "Planck Scale", where gravity is just as strong a force as the other three familiar forces (the strong, weak and electromagnetic). During the last 50 years, many, many "scientist years" have been invested into trying to develop theory that successfully merges the four forces we know. The two leading contenders at this point in time are string theory and loop quantum gravity. In my talk, I gave a description of how these two theories work, how they differ, what their strong and weak points are, and where things might be going for them in the future. My own feeling, based on what I have seen and read is that these theories have some very promising pieces of the truth in them, but are far from being complete. We are still seeing "quantum gravity" through a glass darkly. I hinted at one further theory that is currently being researched, creating space and time from "quantum entanglement." That is a third big topic, and I am hoping to give a talk on that to CCAS in the coming year. I would also note that I am giving a repeat of this CCAS talk at Woods Hole Oceanographic on May 10th, only with a bit more math thrown in. Any CCAS folks interested in coming (it's a public talk) can contact me via email for further details and directions. (WHOI occasionally throws in some "non - oceanographic" talks for general interest!)

Gorge Silvis' Talk on Asteroid Occultations (summary by Gus)

- Definition – an object and possibly a companion, with high proper motion, passes over a star (that is, a shadow of that occultation passes over the earth in a predicted path).
- A large telescope is not necessary for some observations, but the process of seeing and capturing data about the occultation may be tricky.
- Properly done, this provides real science in improving and refining the predicted timing of the event.
- Measurements include exact time and observer location.
- A method: turning off the drive to enable drift scanning (14 pixels / second movement with a streak). Problem: timing not ascertained.
- Another method: capture sound of the scope coming on + WWV. Will work as long as the drive makes enough noise.

- One possible solution if the drive is not loud enough, look for blip on an oscilloscope.

Upcoming Speakers and Topics

Our March 2nd speaker is Dr. Frank Primini of the Harvard Smithsonian Center for Astrophysics. His title is: “Probing the nucleus of M31 with the Chandra X-ray Observatory”.

ABSTRACT: M31 is the closest giant spiral galaxy to us, and we believe it’s similar to our own Milky Way. It contains hundreds of compact x-ray sources, believed to be the remnants of stellar evolution. In this talk, I’ll review some of what we’ve learned about M31's x-ray population from the Chandra X-ray Observatory and other x-ray telescopes, with particular emphasis on the nucleus of the galaxy. Because of Chandra’s superb angular resolution (for an x-ray telescope), it offers a unique perspective on the crowded environment of the nucleus, where we believe lurks a black hole with a mass about 200 million times that of the Sun.

Future talks are:

April - Observatory and Foundation Report,

May - Stella Kafka, AAVSO.

June - TBD

July - TBD

August - Dr. Tony Stark, HSCfA

Note From Bernie Young on Asteroid Occultations

784 PICKERINGIA

After the February 2nd meeting, I took a group out to the observatory to attempt to record an occultation of an 11.5 magnitude star by the 14.9 magnitude asteroid 784 Pickeringia. We had about an hour to power up the equipment and acquire the target before the event, predicted to occur at 10:31:23 EST. The altitude of the target was 82 degrees which conjures up a comparison with problems of polar

navigation. Viewing a transit near zenith with an alt/az telescope requires a higher slewing rate in azimuth than we normally experience.

We begin a session where accurate pointing is required by doing a GOTO to a nearby bright star (Capella in this case), centering it in the crosshairs of the camera, focusing it, and then synchronizing the planetarium program controlling the telescope to the bright star.

Slewing to the target star did not produce the star. After a few hectic minutes we managed to locate the target star on the computer screen. Rotating the star field on the computer screen resulted in a match to the camera field. A match was also made with printed star charts. Ten minutes to go.

Enter the clouds. With a clear sky we can see a magnitude 11.5 star with an exposure 4X the normal video exposure. We jumped between 4X and 16X (about ½ second exposure) as bands of cirrus clouds came and went. We like a short exposure to get precise timing of the disappearance and reappearance of the star. With about 20 seconds to go, I decided to use a 16X exposure. It's better to have a less precise measurement than no measurement at all.

The event time came and went; no occultation...a miss. Having a miss seems to be happening more frequently, and may be due to deteriorating astrometry as proper motion of stars alters the 30+ year old Hubble guide star catalog. Hopefully things will improve as new astrometry is released from the Gaia survey.

There is always some doubt: Were we really on the correct star? You can be more certain if you can see the asteroid too. The Mallincam allows exposures up to 999 seconds, but 14 seconds was more than enough to light up the magnitude 14.9 asteroid. So we started recording 14 second exposures. After 15 minutes the target star began to look like a snow cone. Another 5 minutes and it was distinct. Another 19 minutes and you could see it pulling away. We took dark frames (more exposures with the cover on the telescope) to subtract the signal component generated by heat. A good rainy day project.

What about the other 11 stations attempting to record this event. David Dunham, the president of the International Occultation Timing Association was planning to set up 6 remote stations along interstate 81 in Pennsylvania. He also got the

observatory and New Mexico Tech to record. A trio from Greenwich, Westport, and Shelton, Connecticut, who frequently attempt the same events as we do observed. There were also stations in Oklahoma and near Pittsburgh. Three other stations reported a miss. The rest did not observe, mostly due to logistics or technical reasons. No body observed an occultation. Not a good night for the good guys.

It's been 5 years since the Werner Schmidt Observatory recorded its one and only asteroid occultation. We're overdue, and will keep trying.

Our next attempt

At 10:39 EST during the March 4 star part a the 26 km diameter asteroid (5024) Bechmann will occult a 10.4 mag star in the constellation Virgo for observers along a path across Europe, USA, SE Canada. In the case of an occultation, the combined light of the asteroid and the star will drop by 5.90 mag to 16.30 mag (the magnitude of the asteroid) for at most 1.9 seconds. This update is based on UNSO/Flagstaff astrometry for the asteroid kindly provided by Hugh Harris, astrometry for the asteroid kindly provided by the IAU Minor Planet Center.

The WSO has announced it will attempt to observe this event. We are flanked by observers on the SW and SE coasts of Spain. We are near the edge if the path and have only a 16% probability of seeing an occultation, but it's at a good time and worth the attempt. Five other observers have also announced their intentions to attempt this event. After the event we will take time exposures in an attempt to see the 16.3 magnitude asteroid.

Star Parties

Winter season once per month "QUARTER MOON SATURDAY STAR PARTIES", **all open to the public**, began September 10th, 7:30-9:30PM.

From September thru June, we will have one regularly scheduled Star Party each month taking place usually ** at 7:30-9:30pm on the Saturday closest to the date of First Quarter Moon (about 7 days old).

(** In May and June, these events start at 8:30 because of later sunset times.)

When the moon is near its First Quarter, the terminator (the line dividing light from dark) is favorable for viewing sunlight or shadow on the sides of craters. This time is also favorable for observing the dark side of the moon occult (visually cover) stars in the sky as the moon moves in its orbit. Depending upon the calendar, we may also be able to observe planets and other celestial objects.

Here is the remaining schedule for “Quarter-Moon Saturday Star Parties” thru June, 2017; **the public is invited:**

Saturday March 4th

Saturday April 1st

Saturday May 6th

Saturday June 3rd

POSSIBLE CANCELLATIONS for Star Parties: Cancellations will be very rare since we have lots to do "inside" as well as outside. Even if the forecast is "iffy"; the Staff Leader for the night may elect not to cancel in spite of possible clouds. If clouds arrive after staff and guests have convened, a virtual Star Party will usually take place indoors to include overviews of the sky for that night using computer simulations with our big screen TV, videos of interesting sky events recorded previously, demonstrations and/or training on the use of scopes and other equipment, and consultation/discussions on things astronomical, etc.

However, sometimes a solid forecast for overcast or rain or a storm will result in cancellation of a given Star Party. **IF IN DOUBT ABOUT THE WEATHER AND THE STATUS OF A STAR PARTY, CALL THE OBSERVATORY AT 508-398-4765 AFTER 7:45 pm.** No answer means the event has been cancelled.

Observatory and Education News

Bernie Young and the Observatory staff have received some rather nice feedback on their education efforts . While we can't directly share this, we can certainly pass on a "good job" to the Observatory crew!

Directions to Dennis Yarmouth HS and Schmidt Observatory

For information on the location of our Dome behind Dennis-Yarmouth High School, click on the purple button "Old Website" and once there, click on "Meeting Location" viewing the two maps that are there: external for the Dome, and internal to locate the high school library where meetings are held.

For meetings, drive in the south entrance road and go around behind the main building. Park in the lot about half way down the building and go in the back door and turn down the hall to your left to find the library.

For Star Parties at the Dome, drive in the north entrance road all the way past the north side of the main high school building, through a gate, and on to park near our Dome.

H&K directions

Please be reminded that Gus Romano or his delegate “host” a dutch-treat dinner gathering for members and friends each CCAS meeting night (before the meeting) at the South Yarmouth Hearth & Kettle restaurant at 5:45pm; (the meetings begin at 7:30 at D-Y.) The speaker for each meeting is always invited. Please join the group to dine and talk about all things interesting, including astronomy, each month before our meeting. The H&K is at 1196 Rt 28, South Yarmouth, about a half mile west of the Station Avenue/Main Street intersection with Rt 28 (stop light).