

Research Committee report for May 2015

May is the month when members present their projects at the monthly meeting (May 15, 2015).

There were four teams of members this year. New and continuing observing also took place.

1. Mary Ducca and Irene Greenstein described the educator workshop “Design of Discovery” which they attended at Johns Hopkins University’s Applied Physics Laboratory in Laurel, Maryland on March 8. This workshop was available because AAI is a member of the NASA Museum Alliance, and is a gateway to passing on space information to its members and the general public. The participants heard live presentations from APL and also from Jet Propulsion Lab in California, Johnson Space Center in Texas, and University Corporation for Atmospheric Research in Colorado. Designers and engineers told how they had chosen solutions for the MESSENGER mission to Mercury, Dawn to the asteroid belt, New Horizons to Pluto, and OSIRIS-REx to a near-Earth asteroid. Kevin Hussey (JPL) spoke on the terrific new software “Eyes on the Solar System” (eyes.nasa.gov) featuring 3d visualization of spacecraft missions. There were also some hands-on brainstorming activities.

2. Cliff Ashcraft presented evidence that the Great Red Spot of Jupiter is shrinking away. The oldest photo was taken in 1879 by Andrew Ainslie Common using a 36” f/5.8 reflector and a dry silver bromide plate. Common also took the first photo of the Orion Nebula. Cliff measured the width of the GRS storm on this image and also on images from the Voyager spacecraft, from the Hubble Space Telescope and from his own images. The size of the GRS is clearly decreasing slowly, and when the width data are plotted vs. date, they show a nearly linear trend downward. A quadratic equation was fitted to the points and reveals that the spot size will go to zero about 2068. Enjoy it while you can!

3. Tolga Gumusayak showed how he processes color images of deep sky objects, dispelling the misconception that this is a quick and easy task. Narrowband filters isolate the colors of the emission lines of hydrogen (H alpha), sulfur ([S II]), and oxygen ([O III]) gases. The square brackets indicate a “forbidden” emission line. Tolga showed the huge Heart Nebula, IC-1805 in Cassiopeia processed with dark and flat and bias frames, registered and stacked, then color combined. By assigning the filter colors to false color channels and playing with the intensities one can emphasize the outer hydrogen and sulfur or the inner oxygen gas. Star images show up better in broadband RGB filters than they do in the narrowbands.

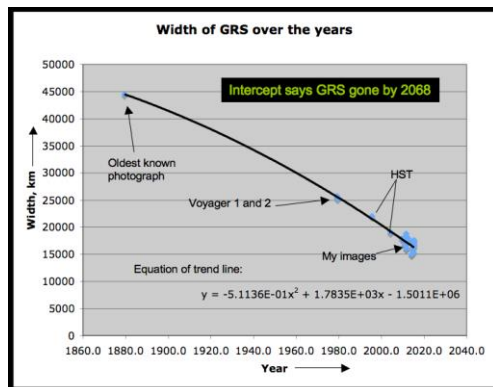
4. Steve Lowe and Mary Lou West discussed spectroscopy and described their efforts at recording stellar spectra. Pioneers in spectroscopy were Isaac Newton, William Herschel, Josef von Fraunhofer, Gustav Kirchhoff, and Robert Bunsen. AAI’s Star Analyzer 100 grating has been used on several telescopes (8, 11, 14, and 24 inch) with several cameras to record the optical and near infrared spectra of bright stars. A CCD camera is more sensitive than a DSLR camera in the ultraviolet and near infrared, so can record more chemical lines. Stars of various temperature classes have been taken such as hot O (Alnitak in Orion), cooler A (Castor in Gemini, Vega in Lyra, Epsilon Lyra, Denebola in Leo, and Altair in Aquila), and even cooler K (Pollux in Gemini). All the spectra were calibrated with RSpec software. Future projects include taking spectra of stars of other temperatures, of emission line stars, of planetary nebulae, and investigating variable stars in the globular cluster M5.

5. Other observations in May included:

Clif Ashcraft continues to take high resolution images and animations of Jupiter, its GRS, and fluid motions in the equatorial belts, even in daylight. He also composes crisp mosaics of the Moon at various phases.

Tolga Gumusayak continues to experiment with various processing methods and software packages. He has begun a series of images of M57, the Ring Nebula.

Jim Nordhausen is imaging Jupiter and Saturn, and has taken a really nice Venus on the quarter phase with his 10" Dob.



Respectfully submitted,
Mary Lou West, Research Committee Chair