PAPER SESSION ABSTRACTS

99th Annual Meeting
October 29-30, 2010
Woburn, MA

Session	Date	Time	Talks	*Length*
#1	10/29	2:00 pm – 3:30 pm	Elizabeth Waagen **"The AAVSO Centennial Calendar"**	*15 min*
			John Pazmino **"The Water Tank Observatory"** New York is still at times written off as a place for a credible astronomy observatory. It is the ideal place for observing by remote methods, yes, but not for direct observation of the stars in the very sky of the City. This is false myth. And it will be more forcibly so in the next few years. You see, we're planning and designing a new observatory on Manhattan. It will probe supernovae, active galactic nuclei, blackholes, quasars, neutron stars. It will collect data every bit as worthy as similar observatories in the best of other locations. What's more, to a level unheard of before, this facility taps into an urban resource never intended for astronomy. In fact, the targets mentioned above didn't exist in our profession when this resource began construction some 130 years ago. What about luminous graffiti, or light pollution? The emissions captured by this observatory is in a region of energy that has no competition from terrestrial emissions. It's the energy of the cosmic wind, the flux of atomic nuclei propelled at near lightspeed and crashing into air molecules. We capture the fragments of the collisions and construct the original incoming nucleus. One method of detecting the cosmic wind, or rain from the shower of debris, is by slowing the particles in water and monitoring the resulting Cerenkov emission. Several cosmic rain observatories use this technique, such as the Pierre Auger Observatory in Argentina. We can't in New York build such a facility from scratch. Our landscape isn't right for that, apart from the fanatical costs. In a history-making episode in astronomy that bonds the Stars to the City, we found an alternative, one that literally sits on your roof.	*15 min*
			Tom Williams **"Leon Campbell and his fifty years at Harvard College Observatory"** In traditional AAVSO historiography, Leon Campbell is presented as the first AAVSO Recorder, serving from 1915 to his retirement in 1949. Archival research provides a far different story about Campbell's engagement with AAVSO and variable star astronomy over that extended period. In this paper, Campbell's thirty-five years of support for the AAVSO in both informal and formal capacities will, instead, be set in the context of his full-time employment on the staff of the Harvard College Observatory.	*30 min*
			Aaron Price **"Scientific Literacy of Adult Participants in an Online Citizen Science Project"**	*30 min*

Session	Date	Time	Talks	*Length*
#2	10/30	10:30 am – 11:30 am	Rodney Howe **"Solar Astronomy: Plasma Motion Detection at Radio Frequencies"** This article discusses a study of solar plasma motion with a radio receiving system designed to detect plasma motion-driven microwaves, and the initial radio systems analysis to understand the receiving characteristics. A phenomenon of interest in solar astronomy is the increase in temperature from the solar photosphere to the solar corona. This study examines a testable hypothesis for how to measure the different altitudes via a temperature scale of the transition zone (between photosphere and corona) of the sun. When we choose the appropriate frequencies; ones close to the surface, 11.7 GHz, and one above the 2km transition breakpoint at 12.2 GHz, we can test for a couple of possible phenomena: (1) At Extremely Low Frequencies (ELF), we see a Doppler shifting in the phase of plasma motions, and (2) in a polarized recording of data we can measure electromagnetic waves in both electric and magnetic components. The temperatures being measured at 11.7 GHz are approximately 15,000 Kelvin and the temperature at 12.2 GHz is approximately 17,000 Kelvin. The plasma motions between these two temperatures should be a measure of the thermal Doppler motion in the solar plasma as phase differences between the two frequencies.	*20 min*
			David Turner **"Visual Observations of Delta Cephei: Time to Update the Finder Chart"** The current AAVSO finding chart for Delta Cephei continues to reflect the notion that visual eye estimates need to refer to reference stars for which the cited visual magnitudes on the Johnson V-system have been adjusted for a color correction to the eye V-system reflecting what is typical of the ‚Äúaverage‚Äù AAVSO observer. The correction for the best AAVSO observers, however, appears to be negligible, given that the collected phased eye estimates of Delta Cephei over the past decade (or more) follow a light curve that is greatly suppressed in amplitude from that displayed for Johnson V-band data. The author has previously (1999) advocated the use of a modified finder chart for Delta Cephei that doubles the number of suitable reference stars and eliminates the problem of a suppressed light amplitude in the light curve. As shown here, light curves generated with such a finder chart are also more suitable for studies of period changes in Cepheids like Delta Cephei using O-C analyses.	*20 min*
			Jerry Horne **"RS Sge Observations & Preliminary Analyses"** New V, B, Ic, and R band photometry of RS Sge was obtained using AAVSOnet telescopes, and the authors own equipment. Analysis of these new observations, allowed a comparison with other previously published observational data. RS Sge was confirmed to be an RVb Tauri type star, showing the characteristic multiple periodic nature of such stars. Observations indicated a fundamental period of 79 days with a longer amplitude modulation of 1174 days. While RS Sge was monitored almost nightly for more than 120 days, no eclipses were observed.	*20 min*

Session	Date	Time	Talks	*Length*
#3	10/30	2:00 pm – 3:15 pm	Ashley Pagnotta **"The 2010 Eruption of U Scorpii"** We report on the 2010 eruption of the recurrent nova U Scorpii. This outburst was predicted in 2005 and discovered independently by AAVSO observers Barbara G. Harris and Shawn Dvorak on 28 January 2010 as a result of a monitoring program coordinated by our group at LSU in conjunction with the AAVSO. The eruption lasted approximately 64 days, over the course of which more than 35,000 pre-arranged and serendipitous observations were made in all wavelengths from radio to X-ray. We present multi-wavelength light curves (UBVRIJHKby+UV+X-ray) of the entire eruption which show the overall speed of the event, the expected first plateau, the unexpected second plateau, and the return to quiescence. As anticipated, the onset of the optical plateau coincided with the turn-on of the supersoft X-ray emission and the reemergence of the eclipses. Our comprehensive coverage shows fine-scale phenomena as well, such as flares of up to 0.5 mag in amplitude during the initial fast decline which are as yet unexplained and late aperiodic dips (distinct from the well-known eclipses) that are likely caused by accretion disk geometry.	*30 min*
			John Percy and Emil Terziev **"Irregularly Pulsating Red Giants: Which to Observe, How, and Why"** We summarize the results of our Fourier and self-correlation analysis of visual observations of 125 L-type ("irregular") pulsating red giants in the AAVSO International Database -- those with 249 or more observations. They show a spectrum of behaviour, from reasonably periodic, to semi-regular, to irregular, to not significantly variable. We briefly justify why to observe these stars in the first place. We suggest which stars might continue to be observed visually, which might be observed photometrically, and which might be dropped from the observing program. This raises interesting (and possibly controversial) questions about whether and why to drop stars from an AAVSO observing program.	*15 min*
			Qian Wang and Lee Anne Willson **"Multiple spiral branches on late AGB stars"** We present some 1-D hydrodynamical models that are capable of generating ring structures around evolved stars. In these models, the pulsation of the initiates the flow and generates shock waves from a static atmosphere. A secondary period is introduced by an orbiting companion. It creates a series of shocks with different strength. The most energetic one collects all the weak shocks forming super shocks around the star. The most interesting results are period coupling between pulsation period and orbiting period and multiple spiral arms in the far zone (>100AU). In the near zone (~100AU), the strong shocks greatly alter the density and temperature structure. This study enriches the possible mechanisms for the morphology of proto-planetary nebulae.	*20 min*
			Edward J. Los **"A Web Interface for the DASCH Photometry Database"** DASCH is "Digital Access to a Sky Century at Harvard", the effort to digitize approximately 530,000 astronomical plates in the Harvard College Observatory collection. We currently have over 900,000,000 magnitude estimates from the 10,000 plates that we have scanned. This paper presents our web photometry interface which allows access to all of our lightcurves and their underlying scanned images.	*10 min*

Session	Date	Time	Talks	*Length*
#4	10/30	3:45 pm – 5:00 pm	John N. Rachlin and Mark G. McGettrick **"A variable star database for the iPhone / iPod Touch"** We present a database of variable stars for the iPhone / iPod Touch mobile platform. In the past 10 years, astronomical and biomedical research has been transformed by the ubiquitous availability of data repositories, and the commensurate opportunities for statistical analysis and data-mining. In order to make such databases accessible to mobile users, we have developed an application framework that allows us to "mobilize" datasets onto the Apple iOS platform. This framework includes the ability to query the data, sort results, and view the details of individual records. For astronomical applications, we have also developed specific extensions to support object visibility based on the observer's geographical location and date/time. We demonstrate the platform using the International Variable Star Index (VSX) database.	*20 min*
			Edward F. Guinan **"Artificial Intelligence (AI) Approaches for Analyzing automatically Zillions of Eclipsing Binary Light Curves."** Major advances in observing technology promise to vastly increase discovery rates of eclipsing binaries (EBs) as well as other types of variable stars. For example, missions such as the Large Synoptic Survey Telescope (LSST), the Panoramic Survey Telescope and Rapid Response System (Pan-STARRS), Gaia and the AAVSO APASS are expected to yield hundreds of thousands (even millions) of new variable stars and eclipsing binaries. Current personal interactive (and time consuming) methods of determining the physical and orbital parameters of eclipsing binaries from the current practice of analyzing their light curves will be inadequate to keep up with the overwhelming influx of new data. At present, the currently used methods require significant technical skill and experience; it typically takes 2-3 weeks to model a single binary. We are therefore developing an Artificial Intelligence / Neural Network system with the hope of creating a fully automated, high throughput process for gleaning the orbital and physical properties of EB systems from the observations of tens of thousands of eclipsing binaries at a time. The EBAI project -- Eclipsing Binaries with Artificial Intelligence -- aims to provide estimates of principal parameters for thousands of eclipsing binaries in a matter of seconds. Initial tests of the neural network's performance and reliability have been conducted and are presented here. Several practical applications also will be presented. This research is supported by the National Science Foundation: Research at Undergraduate Instituions (RUI) Program Grant AST-0507542.	*20 min*
			Paula Szkody **"The Latest Results on Accreting Pulsating White Dwarfs"** In the last few years, ground and space-based data on the dozen known accreting pulsating white dwarfs present in cataclysmic variables have produced some surprising results. These include the finding that the instability strip is wider than for non-accreting white dwarfs and that the pulsations can disappear. One of the reasons for the disappearance is the heating of the white dwarf following a dwarf nova outburst, which moves it out of the instability strip. We will show our results from following 3 systems after their outbursts (GW Lib, V455 And and SDSS0745+45) and how these objects differ in resuming their pre-outburst pulsation characteristics.	*15 min*

Session	Date	Time	Talks	*Length*
#4	10/30	3:45 pm – 5:00 pm *(continued)*	Doug Welch and Grant Foster **"Analyses of "Peculiar" W Virginis Stars in the Milky Way"** We describe the analysis of lightcurve data for several candidate "peculiar W Virginis" stars in the field population of the Milky Way. Soszynski et al (2008, 2010) have reported results for the Type 2 Cepheid population from OGLE-III. One of their important findings was a division of the W Vir variables into "regular" and "peculiar" subtypes. The latter are characterized by higher luminosities and a different lightcurve morphology. Furthermore, the fact that approximately 25% of the sample of "peculiar" W Vir stars were found to be in eclipsing systems suggested that all such stars were in binaries. The orbital periods of the eclipsing or ellipsoidal variations were found to be 10-20 times the pulsation period. Pulsation periods for "peculiar" W Virs stars were found to be between 4 and 10 days in the LMC and between 4.4 and 17.7 days in the SMC, although a claim that such behavior was present in longer-period RV Tau stars was also made. Identifying Milky Way counterparts to "peculiar" W Vir stars would have many potential benefits. The most obvious one is proximity which allows radial velocity and spectral analysis with intermediate-size telescopes. The number of known or suspected W Vir stars in the Milky Way is large and growing. It would be surprising if there had been no evidence for such behavior in Milky Way stars to date - even if a subclass had not been identified - and indeed it is the case that several stars with similar propertied have been identified. In this paper, we report the time-series analyses of Milky Way "peculiar" W Vir candidates from AAVSO, ASAS-3, MACHO, and SuperWASP photometry in addition to noting binary orbit parameters for the candidates, when known.	*20 min*
Poster Abstracts			Helmar G. Adler **"Simple Pulse-Width-Modulation (PWM) LED Source for Linearity Testing of DSLR Camera Sensor"** To create meaningful photometry data knowledge of the linearity performance of the sensor in use (e.g. CCD or CMOS-array) is essential. The emergence of embedded controllers makes it possible ‚Äì even for the hobbyist ‚Äì to build fairly low-cost, highly controlled devices with capabilities that can be utilized to make light sources with pulse-width modulated LEDs. A simple system, comprised of a laptop computer, an embedded controller with an LED and a few additional parts will be shown. Experiences and data regarding linearity testing of the source itself and, subsequently, characterization of a Canon DSLR camera with the source will be shown. The technique can easily be extended to other sensors. The camera is currently used to take photometry data of Epsilon Aurigae.	
			Kristine Larsen **"Revisiting the Un-named Fleming Variables"** In a 1998 article in JAAVSO, Dorrit Hoffleit brought attention to fourteen of the nearly 300 variables directly discovered by Williamina Fleming or discovered under her direction at the HCO. These fourteen stars had not been given permanent designations in the General Catalogue of Variable Stars at the time of Hoffleit's article. In the intervening 12 years since the publication of her study, a number of these stars have been further observed, both by AAVSO members and automated telescopes (such as Hipparcos). This poster will revisit these fourteen stars and update their status as variable stars.	