STAR CONFERENCE

Small Telescope & Astronomical Research

A Conference on Scientific Research, Technological Development, and Education through Research
June 19-22, 2008
Embassy Suites, San Luis Obispo, California

Affordable CCD cameras, compact go-to telescopes, and powerful personal computers (not to mention DSLR and video cameras) have transformed small telescopes into powerful tools for astronomical research. "Dobsonian" mirrors up to one-meter aperture and affordable control systems are being combined into highly capable equatorial and alt-az telescopes. These larger telescopes not only allow precise astrometric and photometric observations of faint objects but, with recently available spectrographs, both time-series and classification spectroscopy are now affordable. Robotic and remote access small telescopes are facilitating observations both locally and remotely around the globe. High school and undergraduate students are joining the ranks of amateur and professional astronomers in utilizing small telescopes for astronomical research. Whether conducting astronomical research or developing new telescopes or software, students gain invaluable hands-on experience in science and engineering while, as coauthors of published papers, their careers are given a boost.

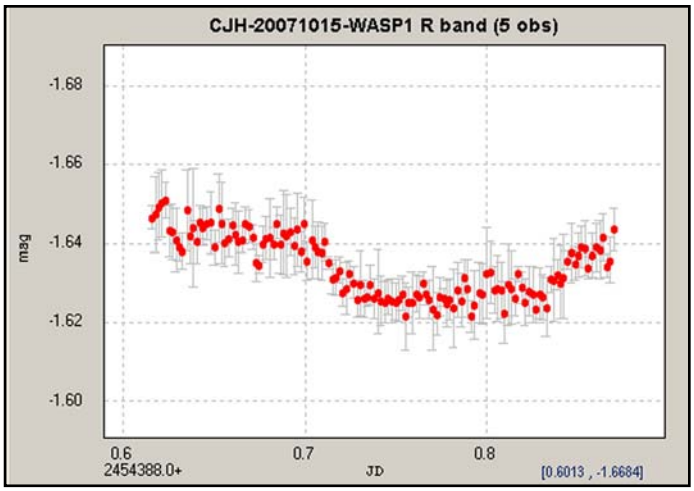
Small telescopes (especially goto SCTs equipped with CCD Cameras) have revolutionized amateur astronomy. The three students shown here, Noll Roberts, Casey Milne, and Neelie Jaggi, used the 10-inch telescope and SBIG CCD Camera at the Orion Observatory during a 2006 Cuesta College research seminar to discover two new variable stars.

Scientific Research

Research projects suitable for small telescopes include: occultation timing; astrometry of visual double stars; asteroid and comet positions; searches for asteroids, comets, nova, and supernova; photometric variations over time of asteroids, intrinsically variable stars, cataclysmic variables, eclipsing binaries, exoplanet transits, and microlensing events; and, with the larger of the small telescopes, spectroscopy time-series variability and classification.

Technological Development

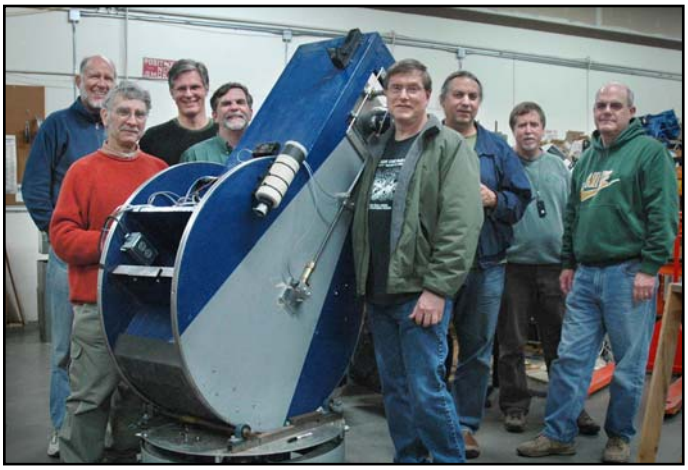
New spectrographs, CCD cameras, and software are being developed. A number of new German equatorial mounts and superb wide-field OTAs, driven largely by astrophotography demands, are also benefiting scientific research. Affordable, high-quality 32-inch mirrors are now readily available, as are low-cost, highly capable control systems. A new breed of "small" affordable equatorial and alt-az telescopes is being designed by students, amateurs, and commercial manufacturers. With the advent of advanced software, remote access robotic observatories have become commonplace. The engineering and software development of these high-tech instruments, telescopes, and observatories are challenging the creativity of a wide range of students, amateurs, and manufacturers.



The light curve of transiting exoplanet Wasp 1b observed by Jim Carlisle and remotely by Cindy Foote and Tom Smith as part of the Cuesta College 2007 research seminar. The transit occurred half an hour later than predicted.

Education through Research

Through hands-on research, these students develop an appreciation for the true exploratory nature of science. They also shift their educational careers into high gear. Whether by designing and developing telescopes and robotic observatories, making astronomical observations, or analyzing data and writing papers, students hone their skills as they provide their school with cutting-edge scientific research.



Russ Genet, Richard Berry, Howard Banich, Dave Rowe, Mel Bartels, Dan Gray, Ed Harvey, and Greg Jones pose by Dan's 14-inch alt-az telescope, which is a test bed for new alt-az telescope control systems.

The Cuesta College research seminar had a wide cross section of high school, undergraduate, and retired students-as well as several PhD's-working cooperatively to conduct and submit original research for publication. Jo Johnson, left, and Jim Carlisle, right, are reducing time-series photometric data of exoplanet Wasp 1b.

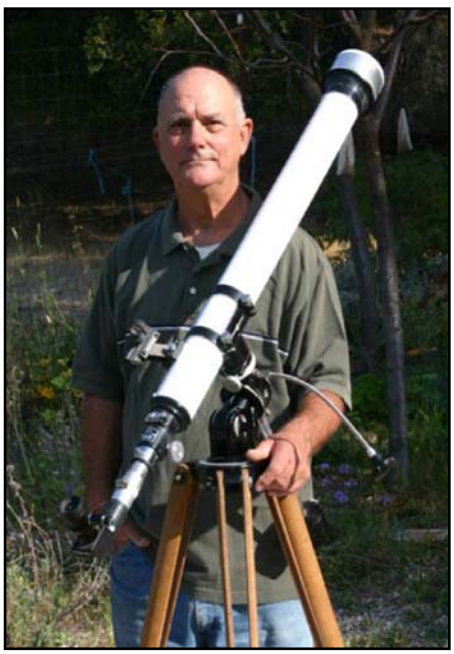
The Star Conference

The STAR conference is being co-chaired by Russ Genet, a Research Scholar in Residence at California Polytechnic State University and Adjunct Professor of Astronomy at Cuesta College, and by Jo Johnson, a student at Cuesta College. As a member of Russ' recently completed fall research seminar, Jo has five research papers to his credit and brings a vital student perspective to the conference. We are placing special emphasis on attracting high school and undergraduate students to the STAR Conference, and have established a scholarship fund, administered by the Dark Ridge observatory, to facilitate their participation. Donations are welcome.

The STAR Conference has been organized to accommodate a wide range of attendees, from high school students with an interest in science but little knowledge of scientific research, astronomy, or telescopes, to seasoned amateur and professional researchers with decades of observational and scientific or engineering experience. The morning and afternoon of Thursday, the first day of the conference, clearly illustrate the contrast between newcomers and seasoned hands.

A six hour tutorial will provide students and other neophytes to astronomical research and development with sufficient background to understand the remainder of the conference. In parallel with this tutorial will be a dozen two-hour, workshops for those already up to speed who desire do delve into details. Each two-hour workshop will feature several short talks followed by a moderated panel discussion.

The remainder of the conference, Friday, Saturday, and Sunday, will feature three different types of sessions. Plenary sessions, the first thing each of these three mornings,



Darrell Grisham, an amateur astronomer and member of the Cuesta College Fall 2007 research seminar, has proven beyond a shadow of the doubt that even very small telescopes can still do real science. His observations of visual double stars with a 3-inch, 1960's vintage Tasco telescope were almost twice as precise as what are generally considered good astrometric measurements. His observations have been published in the Journal of Double Star Observations.

Saturday afternoon will begin with a box lunch during a bus trip along the scenic California coast to the historic Hearst Castle overlooking the small town of San Simeon. After a tour of the castle, attendees will board the bus and travel to Santa Margarita Lake for a Star-BQ and evening presentation.

Small Telescope & Astronomical Research (STAR) Conference

June 19-22, 2008, Embassy Suites, San Luis Obispo, California's Central Coast

	Thursday June 19		Friday June 20	Saturday June 21	Sunday June 22
8:00-9:00	**1 - Tutorial** Telescopes & CCD Cameras	**7 - Workshops** (Parallel) Telescope Design Variable Stars Asteroids Undergrad Research	**11 - Plenary** Seven Morning Presentations	**17 - Plenary** Seven Morning Presentations	**21 - Plenary** Seven Morning Presentations
9:10 10:00	**2 - Tutorial** Astronomical Research				
	Break	Break	Break - Posters & Exhibits	Break - Posters & Exhibits	Break - Posters & Exhibits
10:30-11:20	**3 - Tutorial** Astrometry Basic Principles Double Stars Occultations	**8 - Workshops** (Parallel) Alt-Az Project Eclipsing Binaries Exoplanets Astrophotography	**12 - Parallel** Optics Undergraduate Research Intrinsic Variables	**18 - Parallel** CCD Cameras Nova/Supernova Searches Exoplanet Transits	**22 - Parallel** Dobsonian Telescopes Solar Research Asteroid Light Curves
11:40-12:30	**4 - Tutorial** Photometry Basic Principles Observations Reductions		**13 - Parallel** Control Systems Pro-Am Cooperation Cataclysmic Variables	**19 - Parallel** Spectrographs Discoveries and Surveys Exoplanet Microlensing	**23 - Parallel** Equatorial Telescopes Robotic /Remote /Nets NEO Astrometry
	Lunch	Lunch	Lunch	**Hearst Castle Tour** 12:45 Bus departs Embassy Suites box lunch on bus 2:00 Tour Hearst Castle & National Geographic Movie about building the Castle 5:30 Bus departs Hearst Castle for Santa Margarita Lake STAR-BQ	Lunch
2:30-3:20	**5 - Tutorial** Asteroids Variables Stars	**9 - Workshops** (Parallel) Spectroscopy Nova/SN Searches Solar Research Visual Doubles	**14 - Parallel** Structures Visual Double Stars Eclipsing Binaries		**24 - Parallel** Larger Observatories Astrophotography Control Software
3:40-4:30	**6 - Tutorial** Eclipsing Binaries Exoplanet Transits		**15 - Parallel** Alt-Az Project Occultations Exotic Variables		**25 - Parallel** Advanced Optics GNAT Analysis Software
5:00-7:00	Get-Acquainted Dinner (5:30) Dessert Reception (6:30)		Social Time Dinner (5:30)	7:00-8:00 Santa Margarita Lake STAR-BQ	Social Time Closing Banquet (5:30)
7:00-8:30	**10 - Plenary** Welcome & Inaugural Speaker		**16 - Plenary** Evening Presentation	**20 - Plenary** (8:00) Evening Presentation at Santa Margarita Lake	**26 - Plenary** Prize Presentations Closing Remarks

will provide seven fifteen-minute topical overviews. These overviews, 21 in all, will introduce all attendees to most, but not all, of the topics that will be covered in greater depth in the parallel special focus sessions which will occupy the remainder of the mornings and afternoons (except for Saturday afternoon, which will be devoted to a bus excursion and tour of Hearst Castle).

Each special focus session will explore a single topic in greater depth with three 15-minute talks. There are, all told, 30 STAR Conference special focus sessions. They are scheduled three at a time. Thus attendees must pick and choose between the special focus sessions as they can only attend 10 of the 30 sessions.

Finally, evening plenary sessions will provide presentations of general interest. Saturday evening's STAR-BQ at Santa Margarita Lake will feature a public talk as twilight falls, followed by a star party hosted by the members of the Central Coast Astronomical Society who will bring with them a wide assortment of telescopes. All conference participants are invited to bring telescopes and binoculars with them for astronomical viewing.

Two conference rooms will be devoted to commercial equipment and other displays for the duration of the conference, and there will be boards for displaying posters. Written papers are not mandatory, but are encouraged. The conference proceedings will be published as a book by the Collins Foundation Press.

On Sunday evening, following the banquet, door prizes will be given to lucky ticket holders. The STAR Conference 2008 Student and Amateur Prizes will be announced, plaques conferred, and several award recipients will give short talks that will describe, in readily understood terms, their research or development project. We hope you will join us for this conference.

For details please see **www.STARConference.org**, or contact Russ or Jo at STARConference@msn.com.