



News from the Society for Astronomical Sciences

Vol. 22 No.1 (May 2024)



Who Ya Gonna Call? If you use PlaneWave, DC3 Dreams ACP, or Optec products, or you are curious about small-telescope spectroscopy and photometry, you'll find like-minded enthusiasts at SAS-2024.

Join Us At SAS-2024

You are invited to participate in the Society for Astronomical Sciences' 43rd Annual Symposium, in Ontario, California on **June 20-21-22, 2024**. This is the premier annual conference devoted to small-telescope astronomical research. SAS-2024 offers both in-person and interactive online participation.

Registration links are:

In Person participation:

<https://socaastrosci.app.neon-crm.com/event.jsp?event=79&>

Interactive On-Line participation:

<https://socaastrosci.app.neon-crm.com/event.jsp?event=84&>

The Registration fee is \$100 (for SAS members) or \$125 for non-members.

The Symposium is held at the Double-Tree by Hilton: www.ontarioairport.doubletree.com (222 North Vineyard Avenue, Ontario, California).

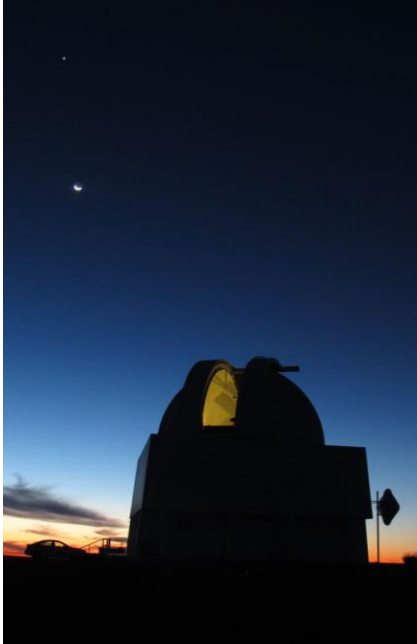
We bring together amateur astronomers, students, and professional astronomers for in-depth discussions of topics related to small-telescope science and research: instruments, new observing techniques, targets of observational campaigns, instrumentation and data reduction or analysis methods, developing collaborations, and sharing results, expertise and experience. Almost any topic related to astronomical research using modest telescopes is of interest to SAS. In the past

these have included – but are not limited to – asteroids, planetary observations, variable stars, solar observing, extra galactic transients, and extrasolar planets.

You do not need to be an expert to benefit from participating in the Symposium: our goal is to help you learn about small-telescope research opportunities. We provide a collaborative environment where you will learn how to perform quality observations, generate useful data, and contribute to astronomical science.

The **Agenda** and schedule of talks for SAS-2024 is on p.4 of this Newsletter

We hope that you will join us, either in person or online!



Cerro Tololo (by Bob Stephens)

Role of Small Telescope Research in 2024 and Beyond

The Agenda for SAS-2024 includes a Panel-discussion on the “**Role of Small Telescope research in 2024 and beyond**”. This is a follow-on to the workshop that was held at the AAS meeting in June 2023. That Workshop concluded that *the future of small-telescope research is bright and full of opportunity.*

We will have several participants from the June 2023 Workshop on a panel to discuss the opportunities and challenges for small-telescope research. All in-person participants at SAS-2024 are invited to participate (there won't be an online feed for this session).

The starting point will be the conclusions reached in June 2023, which were:

- **Collaboration** between amateurs and professional surveys will continue to be important,

in part because the major surveys have “bright limits” that are, coincidentally, just about where the amateur observers are hitting their faint limiting magnitude. So, the de facto division of the night

between bright-amateur and faint-professional targets seems to still be in force.

- *Small-telescope observations will be needed to **augment** the survey data.*
- *Small telescopes and amateur observers are needed to **Replicate** observations from other facilities,*

including a variety of “Routine but necessary” observations.

- *Small-telescopes and amateur astronomers will continue to play important roles in **Exploration and Education**:*

“Exploration” includes the freedom to undertake time-consuming and high-risk projects that would not be allocated time at professional facilities. Small-telescope research experiences have proven efficacy at preparing the next generation of scientists.

- *A big new challenge is **Communication**:*

The new surveys may issue tens of thousands of alerts per day. Collaboration between surveys and amateur astronomers might be inhibited by this flood of information.

InStAR Meeting following SAS-2024:

The Institute for Student Astronomical Research (InStAR) will be holding a meeting on Sunday, June 23 at the same hotel as SAS, with discussions and presentations related to small-telescope projects in education. This will be from 9:00-12:00 in the Hunters Peak room of the DoubleTree by Hilton Hotel Ontario Airport.

The InStAR meeting is free, but if you plan to attend, please email Dr. Rachel Freed (InStAR President) so that she can keep a head count: Rachel Freed <r.freed2010@gmail.com>



Virtual Student STEM Research Symposium May 30-June 1, 2024:

The Physical Sciences Department of Colorado Mountain College is hosting a Symposium aimed at sparking support for community college and high school student research. Students, teachers, administrators, and mentors are invited to participate. You can attend in-person (at Colorado Mountain College in Steamboat Springs, CO) or on-line. There is no charge.

For more information and registration, see:

<https://coloradomtn.edu/student-stem-research-symposium>.

VEGA 2024 Spectroscopy Symposium:



VEGA-2024: This event takes place at the Haunsberg Vega Observatory near the city of Salzburg, on May 30 – June 1, 2024.

Many international professional astronomers and amateurs will report on their current research. Photometry and

spectroscopy remain the mainstays of astronomical science.

In addition to the lectures, you also have the opportunity to exchange ideas with the speakers in a nice atmosphere over lunch or dinner.

For more information, see:

www.astrophoto.at/VEGA

Nominations are open for AAS Chambliss Amateur Achievement Award

The American Astronomical Society's *Chambliss Amateur Achievement Award* is for an achievement in astronomical research that contributes to the advancement of the science of astronomy made by an amateur astronomer — that is, a person not employed in the field of astronomy in a professional capacity — who resides in North America. The key factor in deciding the recipient will be that the work contributes to the advancement of the science of astronomy.

Several SAS participants are past recipients of this award.

The award can be given annually, but it has actually been awarded only every 2-3 years, presumably due to a lack of nominations.

Surely, some of you know of worthy candidates?

Nominations are due between April 26 – June 30, 2024. Self-nominations are allowed. All nominations must include 3 people who will write letters of support.

Details are at <https://aas.org/grants-and-prizes/chambliss-amateur-achievement-award>.

An entertaining tidbit of astronomical History

A recent e-mail from SPIE (the International Society for Optics and Photonics) contained a fun and educational article:

“How amateur telescope makers helped defend America”

Amateur astronomers lent their telescope building talent to US and allied efforts to win World War II.

The article is available at

https://spie.org/news/photonics-focus/mayjune-2024/making-telescopes-and-defending-america?utm_id=znews0524e&spMailingID=11015155&spUseRID=MzMyMDgxNzU2NDU2S0&spJobID=1980307582&spReportID=MTk4MDMwNzU4MgS2#



Agenda & Schedule for SAS-2024

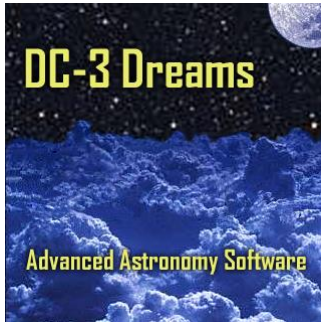
SAS-2024 Symposium		
start	duration	Thursday, June 20: Morning Workshop: Meteors and Orbits
8:00		Registration & Welcome
9:00	180	Meteors and Orbits: The Global Meteor Network
12:00	60	Lunch Break
13:00		Thursday, June 20: Afternoon Workshop: Tri-Color Imaging for Science
13:00	150	Tri-Color Imaging for Science
15:30	30	AAVSO perspective on Tri-color photometry
16:00		Welcome Reception
start	duration	Friday June 21: Technical Papers
		Registration
8:00	15	Welcome
8:15	25	Augmenting Time-lapse Imaging Results Using Literature and Catalog Data
8:40	25	Introducing FAST: Fast Acquisition of Streaked Targets
9:05	25	Automating Zeropoint Photometry with Freeware
9:30	10	Zenith sky brightness measurements near Barnesville, GA USA
9:40	20	Morning Break
10:00	10	Quantifying Isochrone Fit Precision (Poster)
10:10	25	Astrometry with a DSLR camera. Observation planning, image acquisition, and
10:35	25	Solar sail propelled CubeSat autonavigation in deep space: Experimental aster
11:00	45	Clarifying the Nature of Solar Cycles
11:45	60	Lunch Break
12:45	25	Speckle Toolbox Orbits Analysis
13:10	25	Orbital Analysis of the Binary Star WDS 17166-0027
13:35	25	Speckle Analysis of Ten Close Binaries from Mt. Wilson
14:00	25	Speckle Interferometry with the 100-Inch Hooker Telescope
14:25	25	Speckle Interferometry Follow-Up to Newly Discovered Gaia Astrometric Binar
14:50	20	afternoon break
15:10	25	Gaia Binary Follow-up with Gemini Speckle Interferometry
15:35	10	IT Her, A Misclassified Eclipsing Binary (Poster)
15:45	10	CCD photometric measurements of DY Pegasi
15:55	25	ZTF: Disambiguate variables through follow-up
16:20	10	upgrading a 24-inch cassegrain to direct-drive
16:30	25	Optical SETI Searches: Amateur's inside track?
16:55		Evening Break
19:00	60	Panel Discussion: Role of small telescope research in 2024 and beyond
		Saturday June 22: Technical Papers
		Registration
8:45	15	Welcome
9:00	25	The O'Connell Effect in Eclipsing Binary Stars
9:25	25	New Technologies and Dangerous Questions in Astronomy Education
9:50	25	An Off-the-Shelf, Fully-Instrumented Research Observatory for a Rural Commu
10:15	20	Morning Break
10:35	25	Wideband photometry of the semi-regular variable star RZ-Aries
11:00	10	Time Series Analysis of Variable Stars In Selected Globular Clusters (Poster)
11:10	25	Analysis of SX Phoenicis Variable Stars in the Omega Centauri Globular Cluster
11:35	75	Lunch break & Group photo
12:50	10	Photometry of Near-earth Asteroid 439437 (2013 NK4)
13:00	25	Deneb and the Alpha Cygini Variables
13:25	10	A Lifetime of Total Eclipses
13:35	25	AZ Cas Observation Conclusions
14:00	25	Spectroscopic observations of the 2024 eclipse of V695 Cyg
14:25	15	Good Afternoon, and Good Luck
14:40		Tear down A/V equipment & Vacate Conference Rm
14:40		Closing Reception in Breakout Room

SAS-2024 Symposium Sponsors

The Society for Astronomical Sciences is grateful to our Sponsors for their participation and financial support. Without them, our Symposium would not be possible. We encourage you to consider their fine products for your astronomical needs.



Sky & Telescope Magazine
The Essential Guide to Astronomy
<http://www.skyandtelescope.com/>



DC3 Dreams Software
Developers of ACP Observatory Control Software
<http://www.dc3.com/>



PlaneWave Instruments
Makers of the CDK line of telescopes
<http://www.planewaveinstruments.com/>



Sierra Remote Observatories
World Class Remote Imaging and Data Acquisition
<http://www.sierra-remote.com>

Introducing our new Sponsor: **Sierra Remote Observatories**

World Class Remote Imaging and Data Acquisition
From the Sierra Nevada Mountains
Unparalleled Seeing, Access and Support
www.sierra-remote.com

Sierra Remote Observatories (SRO) is a group of remote astronomical observatories located in the Sierra Nevada Mountains and dedicated to remote and robotic data acquisition, imaging, satellite tracking and space communications. We have been operational continuously since 2007, with more than 125 telescopes currently on-site. We are uniquely located in the Sierra Nevada Mountains in an area with excellent imaging conditions including:

- 1 arcsecond average summer seeing
- Frequent sub-arcsecond peak seeing, 1-2 hours following astronomical twilight
- Dark skies at 21.80 mag/square arcsecond
- A very low incidence of thunderstorms and no summer monsoons
- Average wind speeds of only 1 mph
- An average of 290 clear nights per year.

We have easy access, being only one hour from the Fresno-Yosemite International Airport and 4 hours from Los Angeles or San Francisco, by car. We have robust, secure and fast

fiber optic internet with satellite back up, network redundancy and 24/7 security. Our standard internet speed is 1 Gbps (full duplex) with higher gigabit speeds and dedicated fiber available. We have on-site technicians for daily repair and assistance. We supply 2 hours/month of free technical support with free assistance with telescope set up or free turnkey set up of your equipment. Roof control is based on on-site live weather telemetry (SkyAlert and SkyRoof). Clients have access to roof position and weather files. Our systems are redundant, including dual secure firewalls, an industrial grade Generac all-site generator, fiber optic internet and backup via Starlink. Our clients include astrophysicists, space industry professionals, astronomical institutes and amateur imagers. Contact us if you have any questions or if you are looking for a unique site to place your telescope. Our website is www.sierra-remote.com and our email address is <mailto:Info@SroService.com>. The president and founder, Keith Quattrocchi, can be reached at Info@SroService.com or by cell at 530-401-0643 (PST).



Small Telescope Science in the News

With JWST now operational, and Vera Rubin Observatory coming along, we may be heading into another season of worrying about the value of small-telescope and amateur observations. The best evidence in favor of small-telescope observations is their contribution to research. Here are some interesting reports that have appeared in the literature over the past few months, illustrating the science that is facilitated by small-telescope photometry and spectroscopy.

Observations of the new meteor shower from comet 46P/Wirtanen

by D. Vida, et al

pre-print at <https://arxiv.org/abs/2402.07769>

The authors report on measurements of a newly-predicted meteor shower, produced by comet 46P/Wirtanen, using the cameras of the Global Meteor Network. The shower peaked at a zenithal hourly rate (ZHR) of less than one meteor/hr, but the combination of continuous-observing and a large network of cameras enabled the team to measure the ZHR, the position of the radiant, and the trajectories of 23 individual meteoroids.

Dr. Vida will be presenting a workshop on the Global Meteor Network at SAS-2024. Hopefully this paper will encourage you to join us for that workshop. We'll learn how to participate, and the science results that are coming out of the project.

Comparison of the disk precession models with the photometric behavior of TT Ari in 2021-2023

By V. F. Suleimanov et al, *Astronomy & Astrophysics*, March 2024

Pre-print at <https://arxiv.org/pdf/2403.15254.pdf>

TT Ari is composed of a red dwarf star and a white dwarf with an accretion disk of material pulled off of the red dwarf. Such systems can display a variety of photometric signals, including the orbital period (≈ 3.3 h for TT Ari), a modulation at a slightly shorter period than the orbit, a modulation at a slightly longer period than the orbit ("positive superhumps", ascribed to apsidal precession of an elliptical accretion disk), and other brightness modulations of uncertain origin.

The authors here use two Sectors of TESS photometry (separated by a couple of years), plus long runs of ground-based CCD photometry from two small (5-inch aperture) telescopes. The superb precision and uninterrupted time-series photometry over a nearly month-long TESS Sector yields wonderful analysis of the frequency content of the signal. All three periods (orbit, negative and positive superhumps) are clearly seen; and the authors show that the positive and negative superhumps can exist together, which certainly complicates the task of envisioning what the accretion disk is doing! The ground-based photometry fills in some of the long gap between the TESS Sectors, showing similar frequency content. It is impressive how nicely the ground-based and TESS photometry match, when phased to the period of the negative superhumps (see Figure 6 in the paper).

The authors also find very low-frequency, seemingly random fluctuations in the TESS and ground-based photometry. These fluctuations have a power-law spectrum, which is

ascribed to random viscosity fluctuations (flickering?) in the accretion disk.

It is remarkable and impressive what you can find in photometric time-series of cataclysmic variables like TT Ari; and equally wonderful that small-telescope observations can contribute to unravelling the activity of these systems.

The Abrupt Resumptions of Pulsations in α Cygni (Deneb)

Helmut A. Abt, Joyce Guzik, Jason Jackiewicz
PASP Vol 135, No 1054 December, 2023

Abstract available at

<https://ui.adsabs.harvard.edu/abs/2023PASP..135I4201A/abstract>

Note that co-author Joyce Guzik is a good friend of SAS.

Whenever the role of small-telescope observations is discussed, a comment to the effect of "we own the bright sky" will be heard; because only small-telescope observations can provide the combination of rapid cadence, high accuracy, and long persistence that is needed for some projects. Here's a mystery that fits into that paradigm:

Deneb is plenty bright! Its radial velocity shows semi-regular pulsations with a dominant period of about 12 days. These pulsations gradually damp down; and then abruptly resume. These "resumptions" occur at intervals averaging 72.4 ± 0.3 days. Photometric data (including TESS and AAVSO, among others) shows evidence of these pulsations and resumptions, but the ground-based data suffers from too-infrequent sampling to reproduce the phenomenon.

No other star is known to show this phenomenon, but that might be because nobody has specifically looked for it.

The authors encourage further observations by ground-based observers to confirm the ~ 70 -day resumption interval and lack of correlation with pulsation phase in both radial velocity and light curve data.

Are any of you SAS observers up to the challenge? It would probably be most productive for a small team to form up, with both photometry and spectroscopy, to coordinate the observing campaign. Now is the time – Deneb is coming into its prime observing season right now!

Deneb is a Large Amplitude Polarimetric Variable

by Daniel V. Cotton, et al

Pre-print at <https://arxiv.org/pdf/2404.17707v1>

Speaking of Deneb: It has just been discovered that it is a polarimetric variable. The authors report on measurements made with polarimetric instruments with a 36-inch 'scope and with 14-inch 'scopes. A few SAS observers have experience with polarimetry, and others might be ready to experiment with it. Deneb may be a fruitful target for your efforts.

The polarization variations are irregular, with amplitude of $\sigma_p \approx 700$ ppm. The authors think that are probably caused by either (1) a clumpy stellar wind, or (2) non-radial stellar pulsations. Characterizing the effect will require an observing campaign of high-accuracy polarimetry, accurate photometry in multiple bands, and probably spectroscopy to monitor the H-alpha line at high resolution; and lasting at least a couple of months.

Rediscussion Of Eclipsing Binaries. Paper XVIII. The F-Type System OO Pegasi

By John Southworth

Pre-print at <https://arxiv.org/pdf/2404.01092v1>

This isn't a report of small-telescope results, but it is a nice report on an object that is well within our range of capabilities.

The target OO Peg (= HD 206417) is $V_{\text{mag}} \approx 8.4$. Its orbital period is just under 3 days. It displays eclipse depths of $\Delta_{\text{mag}} \approx 0.37$ magnitudes (in TESS bandpass), and orbital radial velocity of $\approx \pm 100$ km/s. It does make you wonder why the eclipses were discovered by *Hipparcos* instead of some backyard observer.

This might be a good target for amateur and student observers who want to experience eclipsing binary star observations

(photometry and spectroscopy) and modelling. It would probably be a good idea to get multi-band photometry of the lightcurve (or at least the primary and secondary eclipses) into the record. The AAVSO database contains a grand total of only two eclipse lightcurves – one in unfiltered and one in V-band – and zero time-series spectra.

Spectroscopic and Photometric Study of the Asymptotic Giant Branch Star T Cephei

By David Boyd

JAAVSO Vol5 #2 (2023)

(see https://app.aavso.org/media/jaavso/3899_Jzldqfw.pdf)

Here is a wonderful example of the power of small-telescope spectroscopy and photometry in the hands of a disciplined observer: B- and V-band photometry and simultaneous low-resolution spectroscopy, roughly every 10 days through the entire pulsation cycle of this oxygen-rich Mira star.

His data replicates prior observations and conclusions about this star, at a much finer-grain in time-resolution than is practical at most large observatories. The star's pulsation drives changing brightness, changing color (bluest near peak brightness), changing spectral type and T_{eff} (earlier spectral type and higher T_{eff} when brighter), all of which is clearly displayed in the data reported here. Also noted in this star is transient brightening of hydrogen-Balmer emission, presumably driven by shocks deep within the star's atmosphere at certain phases of the pulsation.

The explanation of his analysis approach is a good, clear tutorial for others who might like to try their hands at similar projects. Bravo!

SAS Leadership

Corporate Officers:

Bob Buchheim – President
Robert Stephens – Treasurer
Robert Gill – Secretary

Board Members:

Wayne Green
John Menke
John Martin
Tony Rodda
Jerry Foote (Emeritus)

Newsletter Editor:

Robert Buchheim

Sponsor & Vendor contact:

SASLiaisons@gmail.com
Wayne Green
Tony Rodda

Registration:

Lorraine Moon

All SAS Leaders are volunteers, serving without compensation.

Advisors:

Dr. Arne Henden
Dr. Alan W. Harris
Dr. Dirk Terrell

Membership Information

The Society for Astronomical Sciences welcomes everyone interested in small telescope astronomical research. Our mission is to foster amateurs' participation in research projects as an aspect of their astronomical hobby, facilitate professional-amateur collaborations, and disseminate new results and methods. The Membership fee is \$25.00 per year.

As a member, you receive:

- Discounted registration fee for the annual Symposium.
- A copy of the published proceedings on request each year, even if you do not attend the Symposium.

Membership application is available at the MEMBERSHIP page of the SAS web site: <http://www.SocAstroSci.org>.

The SAS is a 501(c)(3) non-profit educational organization.

SAS Contact Information

9302 Pittsburgh Avenue, Suite 200,
Rancho Cucamonga, CA 91730

On the web:

www.SocAstroSci.org

Program Committee:

program@SocAstroSci.org

Membership:

Robert Stephens:
rstephens@socastrosci.com

Send Newsletter Submissions to:

Bob@RKBuchheim.org

