News from the Society for Astronomical Sciences

Vol. 18 No.2 (August 2020)

SAS/AAVSO-2020 Joint Symposium

The 2020 Symposium, held online over five days, was a great success. Roughly 200 people were registered, and the roster of attendees on each day was about 150 people. Since this was an "online only" event, it was a real "hands around the world" gathering. Our participants from Australia and New Zealand were up before their dawn, the North and South Americans were in mid-day, and the Europeans and Indians were joining in their late afternoon or evening.

Thank you very much to the "production team"! Bob Gill, Jerry Foote, Wayne Green and Bob Buchheim spent a couple of months working out the details of the Webinar concept and testing various failure and recovery modes. As a result, the live event went on with a minimum of technical difficulties.

It was particularly nice to see the effective interaction among the participants during the Question-and-Answer sessions and in the chat windows. Virtual meetings aren't as good as live gatherings for impromptu discussions and meeting new people, but nevertheless, this was an informative and productive Symposium with a larger-than-normal participation.

Videos: if you weren't able to join the live sessions, I encourage you to check out the recordings of the presentations. The videos are freely available on YouTube (and will be linked from the SAS Website), so you can still see the technical papers. The links are:

Day 1= https://youtu.be/JhU44tDmkSI

Day 2= https://youtu.be/IcHIdgONoQI
Day 3= https://youtu.be/0Ew2iIq_r2k
Day 4=https://youtu.be/eNCuBDlnVGA
Day 5= https://youtu.be/qlfKLNNbDLA

The schedule of presentations is given on the next page. Feel free to share these links with your students and other astronomers who might be interested.

Proceedings: The PDF of the Proceedings will be on the SAS website soon.

Some thoughts from the 2020 SAS/AAVSO Symposium

I always leave the SAS Symposium with my brain overflowing from things I hadn't known before, and a list of targets/projects that I'll try to take a look at during the subsequent year. Here are some examples:

Surveys, strengths and weaknesses: At first blush you might think that long-period variables are one target where we could be "put out of business" by the professional surveys: the survey is likely to image the star at least a few times per year (probably more), hence getting reasonably good coverage of the lightcurve. However, the huge brightness range of many long-period variables means that the image exposure must be tailored to the current brightness of the target. Fixed-exposure surveys are likely to have trouble with these stars – overexposed when the star is bright, and underexposed when the star is faint – so these stars are still "ours" for the foreseeable future. Targeted observations can be tailored for the star's brightness on each observing night.

It is also interesting to note that for the bright LPVs, visual observers are critical – these stars can to be too bright even for modest-size telescopes. An educational example is Tom Polakis' paper about the challenge of CCD photometry of Betelgeuse.

Photometry Quality: In order to provide the best possible photometric observations of a particular object, we need to pay attention to procedure requirements that are "target-peculiar".

For example, binary star eclipse timing requires excellent clock accuracy during image acquisition – check your system, and if possible sync to an internet time service. For Mira long-period-variable stars, their extreme redness implies that excellent transformation to the standard system is needed.

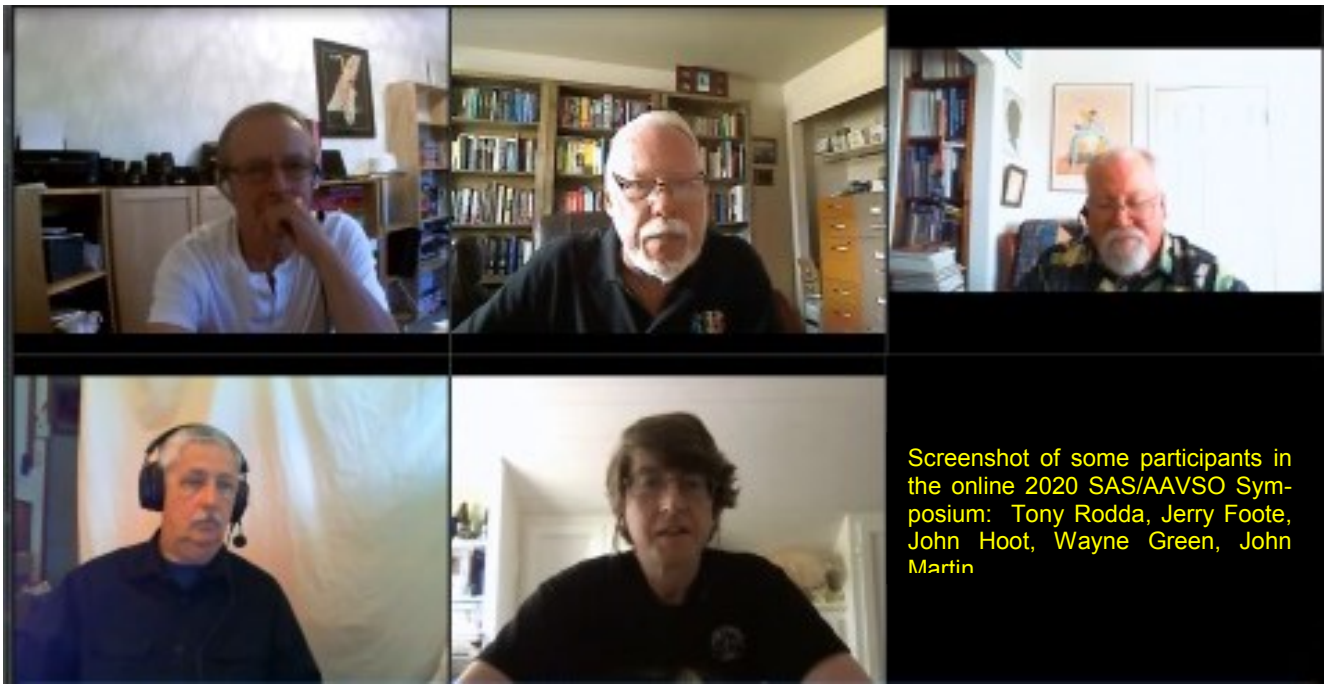
Small telescope photometry of exoplanet transits: After the thrill of "seeing" your first exoplanet, there are at least four important projects for small telescope photometry: (a) Provide additional transit lightcurves that can improve the determination of the planet's orbit period and add points to the "O-C" curve; (b) Search for transit-timing variations, which can have a variety of causes; (c) monitor the target star out-of-eclipse to identify any stellar variability, which can distort the transit lightcurve, transit depth, and timing of mid-transit; (d) use seeing-limited resolution CCD photometry – and maybe speckle interferometry – to unravel blended or unresolved stars of interest in the TESS database.

Observing cadence: several presentations touched on the bad effects of using an inadequate observing cadence (too few data points over too long an interval of time). Some years ago, several papers pointed out that asteroid rotation periods that were derived from "sparse" data sets could be very wrong. When the true rotation period is relatively short, and the time interval between observations (individual data points) amounts to many rotation periods, you can calculate a seemingly-valid rotation period. But the problem is that (unknown to you) what you've calculated is an alias between the rotation and the observing interval.

More than one presentation pointed out that this same difficulty is showing up in variable-star studies: an inadequate observing cadence results in a "wrong" pulsation or eclipse period being entered into the databases. It takes time-series photometry with rapid cadence to unravel the problem and determine the correct period – a task that is best handled by targeted observations using modest telescopes.

Taxonomy of variable stars: Several papers touched on problems of taxonomy, where a star is "known" to be a member of a certain class, but in fact is something different entirely. Taxonomy of the stars is important because we suspect that the members of a group are being driven by similar (identical?) physical processes. The theoreticians come up with models of (for example) stellar interiors – both composition and physical phenomena that cause photometric or spectroscopic variability. Then the model is tested by comparing "calculated" results to actual observations. If a star is assigned to the wrong class, then our understanding (theory) of that class is distorted, our understanding of that particular star is distorted, and we create conundrums because we are (unknowingly) comparing the theory of apples against the observations of oranges.

It turns out that small telescope photometry and spectroscopy can contribute to the understanding of stars that fall near the "boundary" between taxonomic groups, and those that are "outliers" from their own groups.



Screenshot of some participants in the online 2020 SAS/AAVSO Symposium: Tony Rodda, Jerry Foote, John Hoot, Wayne Green, John Martin

2020 JOINT SAS/AAVSO SYMPOSIUM PRESENTATIONS:

Day 1 (May 30, 2020) https://youtu.be/JhU44tDmkSI

John Hoot:	Gaia Data Enables New Methods of Analysis and Discovery
John C. Martin:	Beyond the Milky Way: Comparison Stars for Photometry in M31 and M33
Wayne Green, et al.:	Towards the Flux Calibration of Small Telescope Spectra
Anthony Rodda, et al.:	Lessons and Initial Observations with 3-D Printed Spectrograph

Day 2 (June 13, 2020) https://youtu.be/IcHIdgONoQI

Eric Dose:	Applying a Comprehensive, High-precision Catalog to Asteroid Lightcurves
John Hoot:	Vetting the MoTess GNAT Catalog
Gary Cole:	An Array Photo-Polarimeter for Blazar Measurements
Bruce Howard:	More Glass for Optical SETI
Talia Green, et al.:	Observation and Investigation of NGC 1662
Brandon Boniacio, et al.:	Measurements of Neglected Double Stars

Day 3 (June 14, 2020) https://youtu.be/0Ew2ilq_r2k

Daniel Parrott:	Tycho software for minor planets
Owen Dugan:	Astronomy Will Not Trail Off: Novel Methods for Removing Satellite Trails From Celestial Images
Robert Zellem:	Exoplanet Watch: Utilizing Small Telescopes Operated by Citizen Scientists for Transiting Exoplanet Follow-up
Joyce Guzik, et al.:	Data Analysis of Bright Main-Sequence A- and B-type Stars Observed Using the TESS and BRITE Spacecraft
Sahana Datar, et al.:	Comparing the Ages of NGC 1513 and NGC 2420
Brian Cudnik, et al.:	The Prairie View Observatory: First Light

Day 4 (June 20, 2020) https://youtu.be/eNCuBDlnVGA

Gordon Myers & Stella Kafka	AAVSO Member's Meeting
Eric Hintz, et al.:	Confirmation of Short Period Pulsating Variables Using an Array of Robotic Telescopes
Sujay Nair, et al.:	Analysis of HAT-P-23 b, Qatar-1 b, WASP-2 b, and WASP-33 b with an Optimized EXOplanet Transit Interpretation Code
Elias Koubaa, et al:	Assessing Habitability of Exoplanet Targets

Sujay Nair, et al.:	Studies of Exoplanets with Candidate TOI 717.01 and Confirmed HAT-P-3b
Quinn Perian, et al.	Looking for Transit Timing Variations in TrES-1 b
Rick Wasson:	Observation of Gaia (DR2) Red and White Dwarf Binary Stars in the Solar Neighborhood

Day 5 (June 21, 2020) https://youtu.be/qlfKLNNbDLA

Arne Henden:	New Life For the Bright Star Monitors
Kristine Larsen:	Identification and Analysis of Pulsating Red Giants Misclassified by ASAS and ASAS-SN
Forrest Sims:	The photometric and spectroscopic development of the 2019 eruption of the Recurrent Nova V3890 Sgr followed with small telescopes.
Tom Polakis:	Photometry of Betelgeuse Through Its Recent Faint Minimum

Call for Contributions: This issue of the SAS Newsletter is a bit thin. Your editor suspects that some of you have interesting stories that your colleagues would be like to read about: Small projects that you're doing; Interesting (or curious) observations you have made; Projects for which you could use a few collaborators; Reviews and lessons-learned from new equipment you've put into service; or other astronomical tidbits.

If you have something to share, contact Bob Buchheim:

Bob@RKBuchheim.org.

Interest in "mid-term" online events?

Our ongoing experiments with online special-interest meetings (on Spectroscopy, 3-D printed instruments, and Observatory automation) have been useful for the participants. The key feature is that a modest number of people who are interested in a particular subject can meet regularly, get to know each other, and share problems, progress, and successes in fully-interactive online meetings.

If there is a topic that you'd like to see addressed in this way, let us know: Send a note to Bob Buchheim Bob@RKBuchheim.org.

Small Telescope Science in the News

Here are some interesting notes that have appeared in the literature over the past few months, showing the science that is facilitated by small-telescope photometry and spectroscopy.

A survey for variable young stars with small telescopes: III – Warm spots on the active star V1598 Cyg
Dirk Froebrich, et al
see: *arXiv:2007.14969v1*

The Hunting Outbursting Young Stars (HOYS) project (https://hoys.space/) is a citizen-science initiative that lies at the intersection of "astro imaging" and "stellar photometry". The idea is straightforward: collect a huge library of (mostly) amateur images of star-forming regions, run an astrometric and photometric pipeline on them, and watch for interesting activity by the stars in the image. HOYS is run by Dr. Dirk Froebrich at the University of Kent, in Canterbury, UK.

The project targets a list of 25 young clusters.

There are currently about 70 observers registered with the project, which has collected over 30,000 images and made over 130 million photometry data points. The project is very flexible about their image requirements – telescopes as small as 2 inches aperture can be used (although larger 'scopes are obviously desired), any sensor is acceptable (CCD, CMOS, DSLR), and any optical filter is acceptable (U-B-V-R-I, H-α, Blue-Green-Red, etc). Registration is free, as explained on the project website (hoys.space). There are no requirements regarding observing cadence or number of images you submit – it is strictly a "do what you want, when you want" imaging project.

This paper is an example of the research results that are coming out of this initiative. V1598 Cyg (Vmag ≈ 14) is within the IC 5070 HII region, which is associated with the Pelican Nebula. Its long-term lighcurve shows variation of about 0.15 mag with a roughly 6 year period. Rapid-cadence observing campaigns reveal a ≈19.7 hr cycle (amplitude ≈ 0.05 mag). The authors attribute this to rotational modulation of a spotted star; and even see evidence of spot evolution over the time period of their observations.

Symposium Sponsors

The Society for Astronomical Sciences thanks 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.

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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.

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