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ISSUE NO. 68 APRIL 2016 WWW.AAVSO.ORG

# AAVSO

## Newsletter

SINCE 1911...

*The AAVSO is an international non-profit organization of variable star observers whose mission is: to observe and analyze variable stars; to collect and archive observations for worldwide access; and to forge strong collaborations and mentoring between amateurs and professionals that promote both scientific research and education on variable sources.*

## FROM THE DIRECTOR'S DESK

STELLA KAFKA



### *A challenge for all*

We live at a time of challenges!

Observing is challenging. It requires training, patience, work, and personal commitment. It can be frustrating because of factors outside one's control—instrument problems, weather instabilities, and light pollution. At the same time, it is very rewarding—we see a star changing in brightness in front of our eyes, we witness and record a unique event in the life of a star, sometimes a once-in-our-lifetime occurrence. And based on our observations, we enable pushing the boundaries of science, adding one more clue to the mysteries of the universe. As observers, this is what attracts us to the night sky. And we all hope that, by the end of our observing career, our contributions will lead to some answers.

In the last issue of the *AAVSO Newsletter* our president, Kristine Larsen, presented us all with a challenge: contribute 60 observations of 15 different binocular program variable stars (all submitted to the AID) by the upcoming AAVSO spring meeting. I hope that some of you are on your way to completing this challenge. For those who are interested in further pushing the boundaries of their observing capabilities, I have three more observing challenges:

We recently announced the first targets from the BRITE collaboration: they are among the 300 brightest stars in the sky, currently being observed and studied by the international team of the BRITE satellite (<http://www.univie.ac.at/brite-constellation/>). The cadence and observing requirements are also presented in the first target list, which in principle is a “wish list” of observations (<https://www.aavso.org/aavso-brite-targets>). These are targets mostly suited for our visual, DSLR, and PEP observers, and for those who have spectroscopic capabilities. Nevertheless, they have challenges of their own: they do saturate easily (so an appropriate exposure time needs to be selected), some of them show very small variations (so they are difficult for visual observing), some have short requested observing cadences (order of minutes), and the required spectral resolution seems to be high. At the same time, any data (both photometric and spectroscopic) are important for those targets, so all contributions—visual, DSLR, PEP—are very welcome!

For our CCD observers: We introduced a new exoplanet observing section, where we will be providing information on exoplanet observing. The first targets are already online, and I urge you to take a look and add them to your observing program. In addition to the usual R. A. and Dec. and magnitude information, we provide transit times for most of them. They range in brightness between V magnitudes 8 and 13.3, so there is a transit for anyone. Here's the challenge, though: for the data

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## PRESIDENT'S MESSAGE

KRISTINE LARSEN



As the old saying goes, the only thing that is definite in life is death and taxes. Since we just finished struggling with the latter, perhaps it is not unreasonable to also consider the former. I certainly hope to be observing variable stars for many decades to come, but I am quite certain that my lifespan will be considerably less than that of my favorite variables. And while my observations submitted to the AAVSO database will certainly live on well after my ultimate demise, there is another very tangible way that I can help assure the continued success of the organization I love far into the future. Yes, I am talking about making a charitable donation to the organization through my will.

There are several ways that you can make a so-called “planned giving” gift to the organization. The most common type is a bequest either to one of the named funds, for example, the Janet A. Mattei Research Fellowship Fund or the Building Fund, or in order to start a named fund of your own, as was done by Clint Ford and by Dorrit Hoffleit. Just include a specific provision in your will, and after your passing into the great light curve in the sky the

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**DIRECTOR'S MESSAGE  
CONTINUED...**

to be used by the scientific community, data both outside of and during transit should be acquired. This would allow scientists to assess the depth of the transit (with respect to the “out of transit” light) and from there study the properties of the exoplanet. As such, transit observations require careful planning—observing a transit would be similar to catching an eclipsing binary during eclipse. Furthermore, for transit observations to be of use to the scientific community, certain information on the data is required: the time of observations, airmass, measurements of the sky background, CCD temperature, the ensemble of the comp stars used, and perhaps the {x,y} location of the object of interest on your CCD. We are working towards accommodating all this information in the AAVSO International Database (AID), and our exoplanet section leader, Dennis Conti, has provided a very nice manual on exoplanet observing (available for download from the section webpage (<https://www.aavso.org/exoplanet-section>)). I challenge you to try out these targets, and I am looking forward to seeing observations being submitted to the AID.

Finally... For those who are interested in bizarre objects and their unfolding stories, last October, we issue an alert requesting observations of KIC 8462852, a Kepler object that showed bizarre non-periodic “dips” in its light curve. The behavior was weird enough to trigger science fiction-like scenarios of “alien megastructures” and “Dyson sphere-like

civilizations” around the star—popular fiction at its best! The most favorable scientific explanation is that this star has a suite of debris around it, which occasionally occults its light. The challenge with observing KIC 8462852 (V=11.88) is that, most of the time, its light curve is featureless—it is not possible to predict those “dips”. There is an imperative need for more data, though, if we are to catch another erratic “dip.” Perhaps this is another star for your target list?

I hope this provides enough food for thought—and enough challenges for those who choose to undertake them. Thank you for enriching the AAVSO International Database with your data and for all your help in our efforts to understand the dynamic, variable universe. I can’t imagine a world of variable star astrophysics without you!

Best wishes—clear skies,  
Stella ★

*Ed. note: the Spanish language version of Stella’s message can be found on page 8.*

**PRESIDENT'S MESSAGE  
CONTINUED...**

AAVSO will receive your gift and apply it to the purpose you specify. Remember that your assets will remain in your control until your passing, you can always modify your bequest as your circumstances or interests change, and there is no upper limit on the estate tax deductions that can be taken for charitable bequests. You may wish to consult with a lawyer to help make sure the language of your will clearly spells out your wishes.

There are also ways that you can support the organization during your retirement years, including charitable gift annuity, deferred gift annuity, and Charitable Remainder Unitrusts. These tend to be more complicated than the light curve of R Scuti, so please consult with your financial and/or legal representative to set up one of these trusts.

If you have already named the AAVSO in your will, I personally thank you on behalf of our organization, and ask that you please let Headquarters know about your plans. Knowing of your commitment helps the organization plan for the future, and also ensures that your wishes will be honored in a timely manner. For more information, please read about the various ways you can continue supporting the organization well into the future at <https://www.aavso.org/planned-giving-0>.

**DIRECTOR** Stella Kafka  
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The *AAVSO Newsletter* is published in January, April, July, and October. Items of general interest to be considered for the *Newsletter* should be sent to [eoaaagen@aavso.org](mailto:eoaaagen@aavso.org). Photos in this issue courtesy of D. Conti and J. O’Neill.

Membership in the AAVSO is open to anyone who is interested in variable stars and in contributing to the support of valuable research. Members include professional astronomers, amateur astronomers, researchers, educators, students, and those who love variable star astronomy.

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Now here is my challenge to you (you knew this was coming, right?). I’m committing right now to bequeathing \$5,000 to the Solar Fund upon my going Type Ia supernova, and another \$10,000 to establish a named fund to be used for the continued professional development and education of Headquarters staff. (many thanks to Director Stella Kafka for giving me the idea to support our valuable staff in this manner!). This is my small way of directly giving back to the staff who have been such a joy to work with over the years, as well as take care of observations of my favorite variable star. Who else is up for the challenge? Can I count on you to make bequests to the Building Fund, or the Student Meeting Scholarship Fund, or any of the other worthy funds listed at <https://www.aavso.org/funds>? Does anyone want to create a named bequest in order to fund data analysis, or subsidize meeting costs, or any of the other myriad

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## PRESIDENT'S MESSAGE CONTINUED...

ongoing expenses the organization occurs in order to meet its mission? Where have you received the most joy from being part of the AAVSO? Please consider being a supporter of that specific aspect of our organization well after you leave the instability strip. If your answer is “but I love it all!”, you can always bequeath money to the unrestricted General Fund. There is simply no wrong way to support our organization.

Now, if only my refund check would hurry up and arrive.... ★

*Ed. note: the Spanish language version of Kris's message can be found on page 8.*

## DUBLIN'S IMAGES OF STARLIGHT

In February, the Dublin-based Irish Astronomical Society (IAS) and the Irish Federation of Astronomical Societies (IFAS) presented the exhibit “Images of Starlight” – “photographs of the solar system, objects in our galaxy (the Milky Way), and images of other galaxies. The exhibition...also display[ed] the equipment used for viewing and imaging the night sky, including binoculars, telescopes, and cameras. Guides on imaging the night sky with standard DSLR cameras [were] available together with information on [attendees'] local astronomy club.” This free exhibit was held at the National Botanic Gardens, Glasnevin, Dublin, Ireland, February 2 – 21, 2016, and was organized by the IAS and the IFAS, with the help and assistance given by Canon [Camera] Ireland, the Office of Public Works, and the National Botanic Gardens. ★

*John O'Neill (ONJ, Topsfield, Massachusetts, and Rush, Ireland) standing next to his total solar eclipse photo on display as part of the “Images of Starlight” exhibition held at the National Botanical Gardens, Dublin, on February 1, 2016.*



## EXOPLANETS ON THE ROAD

On Saturday, February 6, 2016, Dennis Conti, AAVSO's Exoplanet Section Chair, presented an overview of exoplanet observing to the Amateur Astronomers, Inc. (AAI) club of Cranford, New Jersey. The club is one of the largest amateur astronomy clubs in the U.S. and makes use of the William Sperry Observatory on the campus of Union County College. Following this overview presentation, Dennis conducted a workshop on exoplanet observing techniques by amateur astronomers. That night, the club, with Dennis' guidance, conducted a successful exoplanet observation of exoplanet HAT-P-3b, one of the exoplanets that is part of a larger Hubble pro/am collaboration. Shown here are members of the club who participated in the observation, along with Dennis (fourth from the left), in front of the club's 24-inch Cassegrain reflector.

The AAVSO Exoplanet Section may be found at <https://www.aavso.org/exoplanet-section> ★



*Dennis Conti (fourth from left), AAVSO Exoplanet Section Chair, with members of Amateur Astronomers, Inc., at the William Sperry Observatory, Union County College.*

## SPRING MEETING UPDATES

AAVSO 105th Spring Meeting will be held May 5-7, 2016, at the Crowne Plaza Hotel in St. Louis, MO. St. Louis was chosen partly because of its central location (a mere 450 miles from the geographic center of the continental US) and its convenience to a major airport. It is also home to a fantastic science museum with planetarium, two local astronomy organizations, and plenty of interesting things for spouses to see and do.



*McDonnell planetarium*

The theme of this year's meeting is Pulsating Stars, and we expect that only the Saturday afternoon session will be dedicated to general variable star astronomy. Three distinguished astronomers will be our keynote speakers, one on each day.

The meeting will begin on Thursday evening with a keynote address by Dr. Horace Smith, Professor Emeritus of Michigan State University and a noted expert on RR Lyrae stars. Dr. Smith's talk will be accessible remotely, to anyone for free, via GoToWebinar. To register please go to: <https://attendee.gotowebinar.com/register/5791902173743269122>

The title of Dr. Smith's talk is "Learning from Pulsating Stars: Progress over the Last Century". He provides the following Abstract: "Scarcely more than a century has elapsed since it began to be widely accepted that pulsation plays an important role in the variability of stars. During that century pulsating stars have been used as tools to explore a variety of astrophysical questions, including the determination of distances to other galaxies, the testing of timescales of evolution through the HR diagram, and the identification of the ages and star formation histories of stellar populations.



*St. Louis botanical garden*



*St. Louis at night*

"Among the significant early milestones along this investigative path are Henrietta Leavitt's discovery of a relation between the periods and luminosities of Cepheids, Harlow Shapley's proposal that all Cepheids are pulsating stars, and Arthur Stanley Eddington's use of the observed period change of delta Cephei to constrain its power source. Today our explorations of pulsating stars are bolstered by long observational histories of brighter variables, surveys involving unprecedentedly large numbers of stars, and improved theoretical analyses. This talk will review aspects of the history and our current understanding of pulsating stars, paying particular attention to RR Lyrae, delta Scuti, and Cepheid variables. Observations by AAVSO members have provided insight into several questions regarding the behavior of these stars."

Friday's schedule includes a keynote address by Dr. Lee Anne Willson, Professor Emerita of Iowa State University and expert theoretician on pulsating variables and a past AAVSO President, a special paper session on pulsating variable stars, and an evening visit to the St. Louis Science Center and Planetarium.

Saturday will include the AAVSO Membership meeting in the morning, from 9:00am to 10:30am, followed by an invited talk from Dr. Virginia Trimble, Professor of Astronomy at the University of California, Irvine, who specializes in the history of astronomy and in stellar and galactic structure and evolution. The membership meeting will be accessible remotely, to anyone for free, via GoToWebinar. To register please go to: <https://attendee.gotowebinar.com/register/3872154871646526978>

The afternoon will feature general paper sessions on a variety of variable star-related topics. The meeting will conclude with a banquet at the hotel on Saturday night.

Please join us in St. Louis, either in person or remotely via GoToWebinar!

For more information on the meeting, including a schedule and list of attendees to date, please visit the AAVSO meetings page and click on the link for the 2016 Spring Meeting (<https://www.aavso.org/apps/meetings/Spring2016/>).

Hope to see you there! ★

## SCIENCE SUMMARY: AAVSO IN PRINT

ELIZABETH O. WAAGEN (WEO), AAVSO SENIOR TECHNICAL ASSISTANT

AAVSO data are constantly being used by researchers around the world in presentations and publications. Below is a listing of some of the publications that appeared 2016 January 16 through April 7 on the arXiv.org preprint server and used AAVSO data or resources and/or acknowledged the AAVSO. To access these articles, click on the highlighted link or type the preprint number into the “Search or Article-id” box at <http://www.arXiv.org>.

*The articles are divided by AAVSO resource used.*

**Publications using the AAVSO International Database (AID)**

O. Toloza, B. T. Gaensicke, J. J. Hermes, et al., “GW Librae: A unique laboratory for pulsations in an accreting white dwarf” (arXiv:1604.02162)[Apr 7, 2016]

Taichi Kato, Enrique de Miguel, William Stein et al., “PM J03338+3320: Long-Period Superhumps in Growing Phase Following a Separate Precursor Outburst” (arXiv:1604.01103)[Apr 5, 2016]

V. Suleimanov, V. Doroshenko, L. Ducci et al., “GK Per and EX Hya: Intermediate polars with small magnetospheres” (arXiv:1604.00232)[Apr 1, 2016]

P. Gandhi, S.P. Littlefair, L.K. Hardy et al., “Furiously Fast and Red: Sub-second Optical Flaring in V404 Cyg during the 2015 Outburst Peak” (arXiv:1603.04461) [Mar 14, 2016]

Zhibin Dai, Paula Szkody, Peter M. Garnavich et al., “Cataclysmic Variables observed during K2 Campaigns 0 and 1” (arXiv:1603.03859)[Mar 12, 2016]

K. T. Wong, T. Kaminski, K. M. Menten et al., “Resolving the extended atmosphere and the inner wind of Mira (o Ceti) with long ALMA baselines” (arXiv:1603.03371)[Mar 10, 2016]

Polina Zemko, Marina Orio, Gerardo Juan Manuel Luna et al., “Multi-mission observations of the old nova GK Per during the 2015 outburst” (arXiv:1603.03286) [Mar 10, 2016]

David G. Turner, “The Scale of Reddening for Classical Cepheid Variables” (arXiv:1603.02276)[Mar 7, 2016]

E. Mason and S.B. Howell, “The Kepler and Hale observations of V523 Lyr” (arXiv:1603.01410)[Mar 4, 2016]

Keiichi Ohnaka, Gerd Weigelt, Karl-Heinz Hofmann, “Clumpy dust clouds and extended atmosphere of the AGB star W Hya revealed with VLT/SPHERE-ZIMPOL and VLTI/AMBER” (arXiv:1603.01197)[Mar 3, 2016]

P. de Vicente, V. Bujarrabal, A. Díaz-Pulido et al., “28 SiO  $v=0$  J=1-0 emission from evolved stars” (arXiv:1603.01163)[Mar 3, 2016]

Joseph Patterson, Arto Oksanen, Jonathan Kemp et al., “T Pyxidis: Death by a Thousand Novae” (arXiv:1603.00291)[Mar 1, 2016]

S. Kiehlmann, T. Savolainen, S. G. Jorstad et al., “Polarization angle swings in blazars: The case of 3C 279” (arXiv:1603.00249)[Mar 1, 2016]

Jingzhi Yan, Peng Zhang, Wei Liu et al., “Long-term Optical Studies of the Be/X-ray Binary RX J0440.9+4431/LS V+44 17” (arXiv:1602.07778)[Feb 25, 2016]

U. Munari, S. Dallaporta, G. Cherini, “The 2015 super-active state of recurrent nova T CrB and the long term evolution after the 1946 outburst” (arXiv:1602.07470) [Feb 24, 2016]

Riccardo Furgoni, “Analysis of the Petersen Diagram of Double-Mode High-Amplitude  $\delta$  Scuti Stars” (arXiv:1602.07254)[Feb 23, 2016]

J. Smak, “Superhumps and their Evolution during Superoutbursts” (arXiv:1602.06702) [Feb 22, 2016]

V. Lipunov, E. Gorbovskoy, V. Afanasiev et al., “Discovery of an unusual bright eclipsing binary with the longest known period: TYC 2505-672-1 / MASTER OT J095310.04+335352.8” (arXiv:1602.06010)[Feb 19, 2016]

E. Paunzen and T. Vanmunster, “Peranso - Light Curve and Period Analysis Software” (arXiv:1602.05329)[Feb 17, 2016]

Nathan Smith, Jennifer E. Andrews, Schuyler D. Van Dyk et al., “Massive-Star Mergers and the Recent Transient in NGC4490: A More Massive Cousin of V838 Mon and V1309 Sco” (arXiv:1602.05203)[Feb 16, 2016]

M. Montargès, P. Kervella, G. Perrin et al., “The close circumstellar environment of Betelgeuse. IV. VLTI/PIONIER interferometric monitoring of the photosphere” (arXiv:1602.05108)[Feb 16, 2016]

T. Giannini, D. Lorenzetti, A. Harutyunyan et al., “A new insight into the V1184 Tau variability” (arXiv:1602.01676)[Feb 4, 2016]

Izumi Hachisu, Mariko Kato, “The UB $V$  Color Evolution of Classical Novae. II. Color-Magnitude Diagram” (arXiv:1602.01195)[Feb 3, 2016]

A. Gonneau, A. Lançon, S.C. Trager et al., “Carbon stars in the X-shooter Spectral Library” (arXiv:1602.00887)[Feb 2, 2016]

Albert Bruch, “Photometry of the long period dwarf nova MU Centauri” (arXiv:1601.05722)[Jan 21, 2016]

Akito Tajitsu, Kozo Sadakane, Hiroyuki Naito et al., “The 7Be II Resonance Lines in Two Classical Novae V5668 Sgr and V2944 Oph” (arXiv:1601.05168) [Jan 20, 2016]

Kyle B. Johnston and Adrian M. Peter, “Variable Star Signature Classification using Slotted Symbolic Markov Modeling” (arXiv:1601.02584)[Jan 11, 2016]

**Publications using the AAVSO Photometric All-Sky Survey (APASS)**

T. W.-S. Holoiien, K. Z. Stanek, C. S. Kochanek et al., “The ASAS-SN Bright Supernova Catalog I: 2013-2014” (arXiv:1604.00396)[Apr 1, 2016]

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## SCIENCE SUMMARY CONTINUED...

Jeffrey D. Simpson, G. M. De Silva, J. Bland-Hawthorn et al., “The GALAH Survey: Relative throughputs of the 2dF fibre positioner and the HERMES spectrograph from stellar targets” (arXiv:1603.08991)[Mar 29, 2016]

Joseph R. Schmitt, Andrei Tokovinin, Ji Wang et al., “Planet Hunters X: Searching for Nearby Neighbors of 75 Planet and Eclipsing Binary Candidates from the K2 Kepler extended mission” (arXiv:1603.06945)[Mar 22, 2016]

Charlie Finch and Norbert Zacharias, “Parallax Results From URAT Epoch Data” (arXiv:1603.05674)[Mar 17, 2016]

M. Rabus, A. Jordán, J. D. Hartman et al., “HATS-11b and HATS-12b: Two transiting Hot Jupiters orbiting sub-solar metallicity stars selected for the K2 Campaign 7” (arXiv:1603.02894)[Mar 9, 2016]

David G. Turner, “The Scale of Reddening for Classical Cepheid Variables” (arXiv:1603.02276)[Mar 7, 2016]

Rafael Brahm, Matías Jones, Néstor Espinoza et al., “An independent discovery of two hot Jupiters from the K2 mission” (arXiv:1603.01721)[Mar 5, 2016]

Jhon Yana Galarza, Jorge Meléndez and Judith G. Cohen, “Serendipitous discovery of the faint solar twin *Inti 1*” (arXiv:1603.01245)[Mar 3, 2016]

O. Bardho, B. Gendre, A. Rossi et al., “GRB 141221A: gone is the wind” (arXiv:1602.09014)[Feb 29, 2016]

Adela Kawka and Stephane Vennes, “Extreme abundance ratios in the polluted atmosphere of the cool white dwarf NLTT19868” (arXiv:1602.05000)[Feb 16, 2016]

T. W.-S. Holoien, C. S. Kochanek, J. L. Prieto et al., “ASASSN-15oi: A Rapidly Evolving, Luminous Tidal Disruption Event at 216 Mpc” (arXiv:1602.01088)[Feb 2, 2016]

A. Santerne, G. Hébrard, J. Lillo-Box et al., “EPIC211089792 b: an aligned and inflated hot jupiter in a young visual binary” (arXiv:1601.07680)[Jan 28, 2016]

J. Lillo-Box, O. Demangeon, A. Santerne et al., “EPIC210957318b and EPIC212110888b: two inflated hot-Jupiters around Solar-type stars” (arXiv:1601.07635)[Jan 28, 2016]

Néstor Espinoza, Rafael Brahm, Andrés Jordán et al., “A Neptune-sized Exoplanet Consistent with a Pure Rock Composition” (arXiv:1601.07608)[Jan 28, 2016]

F. Taddia, J. Sollerman, C. Fremling et al., “Long-rising Type II supernovae from PTF and CCCP” (arXiv:1601.07368)[Jan 27, 2016]

Michael Hippke, Daniel Angerhausen, Michael B. Lund et al., “KIC 8462852 did likely not fade during the last 100 years” (arXiv:1601.07314)[Jan 27, 2016]

Kevin R. Covey, Marcel A. Agüeros, Nicholas M. Law et al., “Why are rapidly rotating M dwarfs in the Pleiades so (infra)red? New period measurements confirm rotation-dependent color offsets from the cluster sequence” (arXiv:1601.07237)[Jan 27, 2016]

G. Torrealba, S. E. Kposov, V. Belokurov et al., “The feeble giant. Discovery of a large and diffuse Milky Way dwarf galaxy in the constellation of Crater” (arXiv:1601.07178)[Jan 26, 2016]

Bradley E. Schaefer, “KIC 8462852 Faded at an Average Rate of 0.165+/-0.013 Magnitudes Per Century From 1890 To 1989” (arXiv:1601.03256)[Jan 13, 2016]

## *Publications using the International Variable Star Index (VSX)*

Ben Mow, Erik Reinhart, Samantha Nhim et al., “GSC 03144-595, a new triple-mode HADS” (arXiv:1603.08573)[Mar 28, 2016]

E. Plachy, L. Molnár, R. Szabó et al., “Target selection of classical pulsating variables for space-based photometry” (arXiv:1603.07579)[Mar 24, 2016]

Zhibin Dai, Paula Szkody, Peter M. Garnavich et al., “Cataclysmic Variables observed during K2 Campaigns 0 and 1” (arXiv:1603.03859)[Mar 12, 2016]

Jake D. Turner, Kyle A. Pearson, Lauren I. Biddle et al., “Ground-based near-UV observations of 15 transiting exoplanets: Constraints on their atmospheres and no evidence for asymmetrical transits” (arXiv:1603.02857)[Mar 8, 2016]

Riccardo Furgoni, “Analysis of the Petersen Diagram of Double-Mode High-Amplitude  $\delta$  Scuti Stars” (arXiv:1602.07254)[Feb 23, 2016]

V. Lipunov, E. Gorbovskoy, V. Afanasiev et al., “Discovery of an unusual bright eclipsing binary with the longest known period: TYC 2505-672-1 / MASTER OT J095310.04+335352.8” (arXiv:1602.06010)[Feb 19, 2016]

Scott G. Gregory, Fred C. Adams, Claire L. Davies, “The influence of radiative core growth on coronal X-ray emission from pre-main sequence stars” (arXiv:1601.07919)[Jan 28, 2016]

Z. Garai, T. Pribulla, L. Hambálek et al., “Search for transiting exoplanets and variable stars in the open cluster NGC 7243” (arXiv:1601.04562)[Jan 18, 2016]

Josep Martí, Pedro L. Luque-Escamilla, and María T. García-Hernández, “Multi-colour optical photometry of V404 Cygni in outburst” (arXiv:1601.01941)[Jan 8, 2016]

## *Publications using other AAVSO resources*

### *AAVSO Alert Notices*

Akito Tajitsu, Kozo Sadakane, Hiroyuki Naito et al., “The 7Be II Resonance Lines in Two Classical Novae V5668 Sgr and V2944 Oph” (arXiv:1601.05168)[Jan 20, 2016]

Igor Andreoni, Paolo D’Avanzo, Sergio Campana et al., “A time domain experiment with Swift: monitoring of seven nearby galaxies” (arXiv:1601.03739)[Jan 14, 2016]

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## SCIENCE SUMMARY CONTINUED...

*AAVSO history (Advancing Variable Star Astronomy, the Centennial History of the American Association of Variable Star Observers (Williams and Saladyga)):*

Karen Masters, Eun Young Oh and Joe Cox, Brooke Simmons and Chris Lintott et al., “Science Learning via Participation in Online Citizen Science” (arXiv:1601.05973)[Jan 22, 2016]

*AAVSO member(s) among authors*

Richard W. Schmude Jr., Ronald E. Baker, Jim Fox, et al., “The Secular and Rotational Brightness Variations of Neptune” (arXiv:1604.00518)[Apr 2, 2016]

We thank the above researchers for including the AAVSO and its resources in their work, and for acknowledging the AAVSO in their publication. We urge all those writing for publication to include the word “AAVSO” in their list of keywords. ★

## MEMBERSHIP HAS ITS PRIVILEGES

**MIKE SIMONSEN (SXN), AAVSO HQ, MEMBERSHIP DIRECTOR/DEVELOPMENT OFFICER**

Some people argue that they can get everything they need from the AAVSO for free, so why should they pay membership dues? While it is true that you can download observing charts, plot light curves, submit your own data, surf our website (an enormous source of information), and do many other things without actually being a member, there are a lot of advantages to being a dues-paying member. These include:

- Access to all member-only sections of the AAVSO website.
- Full and immediate access to the *Journal of the AAVSO* and the *AAVSO Newsletter*.
- Waiver of page charges for publication in the *Journal*.
- Access to VPHOT, the AAVSO photometry program.
- Use of the AAVSO’s Robotic Telescope Network, AAVSONet.
- Eligibility to participate in CHOICE courses.
- Member discounts on all items in the AAVSO Store.
- Discounted registration to attend AAVSO meetings and workshops.
- Eligibility to serve as an AAVSO Officer or Councilor.

I would argue that what you do for the AAVSO by supporting it with your membership dues is more important than what you get. Your willingness to pay dues demonstrates that what we do is important to you and to the science of variable star astronomy.

Your dues help us pursue original research, provide research support to professional astronomers, enable data collection and preservation, and enable us to maintain our website and online tools, as well as to support astronomy education and public outreach.

So, if you are a regular dues-paying member of the greatest variable star information and research organization in the world, thank you for your support. You have made the AAVSO what it is today. If you have been using the resources the AAVSO offers to the world for free, but have never taken the next step and joined, please consider becoming a member. If you are a variable star observer, a professional astronomer, an educator, a student, or someone interested in the secret lives of stars, consider supporting the AAVSO by joining today.

And if, in spite of all the emails and gentle reminders we send each year, you are a member who has forgotten to pay your dues for 2016, please renew your membership immediately. Because on April 1, 2016, your membership will become restricted, and you will lose all the privileges listed above! ★

*Ed. note: following are the Spanish language texts of the Director's and President's messages.*

## MENSAJE DEL DIRECTOR STELLA KAFKA

*Un desafío para todos*

¡Vivimos en un tiempo de desafíos!

Observar es un desafío. Requiere entrenamiento, paciencia, trabajo y compromiso personal. Puede ser frustrante debido a factores que escapan de nuestro control

—problemas con los instrumentos, inestabilidad del clima y contaminación lumínica—. Al mismo tiempo, es muy gratificante —vemos a la estrella cambiar de brillo frente a nuestros ojos, somos testigos y registramos un evento único en la vida de la estrella, a veces algo que ocurre sólo una vez en nuestras vidas—. Y basados en nuestras observaciones, posibilitamos expandir los límites de la ciencia, agregando una pista más para resolver los misterios del universo. Como observadores, esto es lo que nos atrae al cielo nocturno. Y todos esperamos que, para el fin de nuestra carrera como observadores, nuestras contribuciones hayan generado nuevas respuestas.

En la última edición del Newsletter de AAVSO, nuestra presidente, Kristine Larsen, nos presentó un desafío: contribuir con 60 observaciones de 15 estrellas variables diferentes del programa de binoculares (todas enviadas a la AID) para el próximo encuentro de primavera de AAVSO. Espero que varios de ustedes estén en camino a completar ese desafío. Para aquellos interesados en poner a prueba aún más los límites de sus capacidades observacionales, tengo tres desafíos más:

Recientemente anunciamos los primeros objetos de la colaboración con BRITE: están entre las 300 estrellas más brillantes del cielo actualmente observadas y estudiadas por el equipo internacional del satélite BRITE (<http://www.univie.ac.at/brite-constellation/>). La cadencia y los requerimientos para las observaciones también aparecen en la primer lista de objetos, que en principio es una “lista de deseos” de observaciones (<https://www.aavso.org/aavso-brite-targets>). Son estrellas en su mayoría adecuadas para nuestros observadores visuales, DSLR y PEP y también para aquellos que tienen la posibilidad de tomar espectros. Sin embargo, presentan desafíos en sí mismas: saturan con facilidad (por lo que hay que elegir un tiempo de exposición adecuado), algunas muestran variaciones muy pequeñas (por lo cual son difíciles para la

observación visual), para otras se requieren cadencias de observación muy altas (del orden de minutos) y la resolución espectral solicitada parece ser alta. Al mismo tiempo, todos los datos (tanto fotométricos como espectroscópicos) son importantes para estos objetos, así que todas las contribuciones —visuales, DSLR, PEP— son bienvenidas.

Para nuestros observadores de CCD: presentamos una nueva sección de exoplanetas, donde estaremos dando información sobre cómo observarlos. Los primeros objetos ya están en línea y les sugiero que les echen un vistazo y que los agreguen a sus programas de observación. Además de la habitual información de coordenadas y magnitudes, les damos los horarios de los tránsitos para la mayoría de ellos. Hay un tránsito para cada tipo de observador ya que van desde magnitud 8 hasta 13,3. Sin embargo, aquí está el desafío: para que los datos sean utilizados por la comunidad científica, hay que tomar mediciones tanto durante el tránsito como fuera de él. Esto permitirá a los científicos determinar la profundidad del tránsito (con respecto a la luz “fuera de tránsito”) y a partir de allí estudiar las propiedades del exoplaneta. Como tales, las observaciones de tránsitos requieren de un planeamiento cuidadoso —observar un tránsito sería similar a atrapar a una binaria eclipsante durante el eclipse—. Más aún, para que las observaciones de tránsitos sean útiles a la comunidad científica, se requiere cierta información en los datos: el tiempo de las observaciones, la masa de aire, mediciones del brillo de fondo de cielo, temperatura de la CCD, el conjunto de estrellas de comparación usadas y, quizás, la posición {x,y} del objeto de interés en tu CCD. Estamos trabajando para adaptar toda esta información a la Base de Datos Internacional de AAVSO y nuestro líder de la sección de exoplanetas, Dennis Conti, nos ha facilitado un muy buen manual de observación de exoplanetas (disponible para bajar desde la página de la sección (<https://www.aavso.org/exoplanet-section>)). Los desafío a probar estos objetos y espero ansiosamente ver sus observaciones en la AID.

Finalmente... Para aquellos de ustedes que se interesan en objetos extraños y las historias que de ellos se desprenden, en octubre pasado publicamos un alerta solicitando observaciones de KIC 8462852, una estrella de Kepler que mostraba rarísimas caídas de brillo sin período en su curva de luz. El comportamiento era suficientemente extraño como para disparar escenarios de ciencia ficción de “megaestructuras alienígenas” y “civilizaciones con Esferas de Dyson” alrededor de la estrella —¡ficción popular en su máximo esplendor!—. La explicación científica más favorable es que esta

estrella tiene un grupo de escombros a su alrededor que ocasionalmente ocultan su luz. El desafío en observar KIC 8462852 ( $V=11.88$ ) radica en que, la mayor parte del tiempo, su curva de luz no presenta cambios, no es posible predecir esas caídas. Hay una enorme necesidad de más datos si es que queremos atrapar otra errática caída. ¿Tal vez esta sea una estrella para agregar a tu lista?

Espero que esto les de suficiente material para pensar y suficientes desafíos para aquellos que quieran tomarlos. Gracias por enriquecer la Base de Datos Internacional de AAVSO con sus datos y por toda su ayuda para con nuestros esfuerzos por entender al universo dinámico y variable. ¡No puedo imaginarme un mundo de astrofísica de estrellas variables sin ustedes!

Saludos y cielos claros,  
Stella. ★

## MENSAJE DEL PRESIDENTE KRISTINE LARSEN

Como dice el viejo dicho, las únicas cosas que son seguras en la vida son la muerte y los impuestos. Puesto que acabamos de terminar nuestra lucha contra estos últimos, tal vez sea razonable considerar la primera. Desde luego, espero poder observar estrellas variables por muchas décadas más, pero estoy bastante segura que mi vida será considerablemente menor que la de mis variables favoritas. Y mientras mis observaciones enviadas a la base de datos de AAVSO sin duda vivirán mucho tiempo después de mi desaparición definitiva, hay otra manera muy tangible en que puedo ayudar a asegurar el éxito continuo de la organización que amo bien lejos en el futuro. Sí, estoy hablando de hacer una donación de caridad a la organización a través de mi legado o testamento.

Hay varias maneras en las que usted puede hacer una llamada “donación planificada” para la organización. El tipo más común es un legado ya sea para uno de los fondos con nombre, por ejemplo, el Fondo Beca de Investigación Janet A. Mattei o el Fondo del Edificio, o con el fin de iniciar un fondo con su nombre, como han hecho Clint Ford y Dorrit Hoffleit. Basta con incluir una disposición específica en su testamento y después de su paso a la gran curva de luz en el cielo, la AAVSO recibirá su legado y lo aplicará a la finalidad que usted haya especificado. Recuerde que sus activos se mantendrán bajo su control hasta su fallecimiento, siempre se puede modificar su legado a medida que sus circunstancias

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## MENSAJE DEL PRESIDENTE CONTINUED...

o intereses cambian, y no hay límite superior en las deducciones de impuestos sobre bienes que se pueden tomar para legados de caridad. Es posible que desee consultar con un abogado para ayudar a asegurarse que el lenguaje de su testamento explica con claridad sus deseos.

También hay formas en que usted puede apoyar a la organización durante sus años de jubilación, incluyendo una donación anual benéfica o una donación anual diferida. Estos tienden a ser más complicados que la curva de luz de R Scuti, así que por favor consulte con su asesor financiero y/o legal para establecer uno de estos fideicomisos.

Si ya ha incluido a la AAVSO en su testamento, personalmente le agradezco en nombre de nuestra organización y le pido que, por favor, haga saber sus planes a nuestra sede acerca. Sabiendo su compromiso ayuda a la planificación a futuro de la organización y, también, asegura que sus deseos se cumplirán, a su debido tiempo. Para obtener más información, lea acerca de las diversas formas en que puede dar

su apoyo continuo a la organización en el futuro en <https://www.aavso.org/planned-giving-0>.

Ahora aquí va mi reto para usted (usted sabía que esto sucedería, ¿verdad?). Estoy comprometiéndome, ahora mismo, a legar \$ 5000 para el Fondo Solar cuando me vuelva una supernova de tipo Ia, y otros \$ 10.000 para establecer un fondo con mi nombre que se utilizará para el continuo desarrollo profesional y educativo del personal de la sede (muchas gracias a la directora Stella Kafka por darme la idea de apoyar de esta forma a nuestro valioso personal). Esta es mi pequeña manera de devolver directamente a los empleados con los que ha sido un placer trabajar a lo largo de estos años, así como cuidar las observaciones de mi estrella variable favorita. ¿Quién más está listo para este reto? ¿Puedo contar con usted para hacer legados al Fondo del Edificio, o el Fondo de Becas de Estudiantes para Reuniones, o cualquiera de los otros fondos dignos enumerados en <https://www.aavso.org/funds>? ¿Alguien quiere crear un legado con su nombre con el fin de financiar el análisis de datos o subvencionar los costos de reuniones o cualquiera de los otros innumerables gastos en los que debe incurrir la organización con el fin de

cumplir su misión? ¿Dónde ha recibido la mayor alegría de ser parte de la AAVSO? Por favor considere dar su apoyo en ese aspecto específico de nuestra organización mucho después de salir de la franja de inestabilidad pulsacional. Si su respuesta es “¡pero me encanta todo!”, siempre se puede legar dinero al Fondo General sin restricción. Simplemente no hay una forma incorrecta de prestar apoyo a nuestra organización.

Ahora, aunque sólo fuera que mi cheque de reembolso se diera prisa y llegase.... ★

## A NOTE ON THE TRANSLATIONS

We are grateful to Sebastián Otero and Jaime García for providing, respectively, the Spanish language versions of the Director's and President's messages. We hope that readers of the *Newsletter* will enjoy this feature.

## IN MEMORIAM

MEMBERS, OBSERVERS, COLLEAGUES,  
AND FRIENDS OF THE AAVSO



*Mercedes Richards*

### MERCEDES T. RICHARDS

*John Percy (University of Toronto)*

Mercedes T. Richards, professor of astronomy at Penn State University, passed away on February 3, 2016, at the age of 60, from complications of a chronic medical condition. Although not an AAVSO member or observer, her four decades of research dealt almost exclusively with variable stars such as Algol, which AAVSOers know and love. As a Black woman, and a popular and effective teacher and mentor, she was an inspiration and role model to students and colleagues alike. Her “Astro 1” course was one of the most popular on campus. Her stated goal was to “infect” her students with a lifelong passion for science, and she did just that. She was especially active in programs to promote and support undergraduate teaching and research, and outreach to the public and to school teachers

and students, and to minorities and the underserved. Her many awards included a Fulbright Distinguished Chair, and the Musgrave Gold Medal—Jamaica’s highest academic honor.

Mercedes was born in Jamaica. She received her BSc from the University of the West Indies, her MSc from York University in Toronto (with a thesis on Nova Cygni 1975), and her Ph.D. from the University of Toronto (with a thesis on Algol, supervised by Tom Bolton and Stefan Mochnacki). That’s where I got to know her well. She was a professor at the University of Virginia from 1987 to 2002, when she moved to Penn State as a Full Professor and subsequently Assistant Chair. She enjoyed traveling the world, both to attend conferences and collaborate with other astronomers, and to develop astronomy internationally through programs such as the Vatican Observatory Summer School and the Caribbean Institute of Astronomy.

The heart of her research, and the topic of most of her dozens of research papers, was the development and

application of “Doppler tomography” to visualize the 2D and 3D flow of gases in close, interacting binaries such as Algols, RS CVns, polars, and other cataclysmic variables. These spectroscopic observations were backed up with hydrodynamic simulations, the goal being to understand the complex interplay between gravitational and magnetic forces in cool stars. Most recently, she collaborated with her husband Donald Richards, professor of statistics at Penn State, in the statistical analysis of large-sample astronomical databases. She also held important leadership positions, such as President of the International Astronomical Union’s Commission on Close Binary Stars, and Councilor of the American Astronomical Society.

Outside astronomy, she was a wife, mother, Quaker, poet, violinist, board-game aficionado, traveler, and friend of the underprivileged. She leaves her husband Donald, and their daughters Chandra and Suzanne.

*Contributed by John Percy, University of Toronto, with additional information and image from the Penn State website.*

## TALKING ABOUT THE AAVSO

**ELIZABETH O. WAAGEN (WEO), AAVSO HQ**

**Events**—AAVSO members, observers, and friends have given or will be giving presentations about the AAVSO and variable stars at the following venues:

*January 5, 2016*—**Stella Kafka** (KKS, Cambridge, Massachusetts) spoke on “The AAVSO” to the Society of Physics Students at an Evening of Undergraduate Research, 227th Meeting of the American Astronomical Society, Kissimmee, Florida.

*January 13, 2016*—**Stella Kafka** gave a presentation on “Variable Stars and their Stories” to the Central Florida Astronomical Society at the Emil Buehler Planetarium at Seminole State College, Sanford/Lake Mary Campus, Sanford, Florida.

*January 14, 2016*—**Stella Kafka** spoke on “The AAVSO Program: A Resource for Variable Star Research” at Embry-Riddle Aeronautical University, Daytona, Florida.

*January 27, 2016*—**John O’Neill** (ONJ, Topsfield, Massachusetts, and Rush, Ireland) gave a talk entitled “John Birmingham and his New Star” to an enthusiastic audience of about 70 people at a public open night held at the historic Dunsink Observatory, outside of Dublin, Ireland.

*January 30, 2016*—**John O’Neill** and **Sara Beck** (BSJ, Topsfield, Massachusetts, and Rush, Ireland) had a display at the Galway (Ireland) Astrofest that featured historical Irish variable star observers and a variable star estimation exercise.

*February 5, 2016*—**Stella Kafka** spoke on “The AAVSO as a Resource for Variable Star Research” at the Institut de Ciències de l’Espai (ICE), Barcelona, Spain.

*February 10, 2016*—**Barbara G. Harris** (HBB, New Smyrna Beach, Florida) spoke on “Science with your DSLR Camera: Variable Star Photometry” to her astronomy club, the Central Florida Astronomical Society, at the Emil Buehler Planetarium at Seminole State College Sanford/Lake Mary Campus, Sanford, Florida.

*March 2, 2016*—**Bill Goff** (GFB, Sutter Creek, California) gave a talk about AAVSO, variable types, and the V404 Cyg outburst to the Nevada City Astronomers. Bill says that “there were about 20 people at the meeting and there were lots of questions!”

*March 3, 2016*—**Gary Poyner** (PYG, Birmingham, England) spoke on “Historic Novae” at the Mexborough and Swinton Astronomical Society, South Yorkshire, England.

*March 5, 2016*—**Gary Poyner** spoke on the “BAA Variable Star Section and an Introduction to observing Variable Stars” at the BAA Back to Basics meeting, Cheltenham, Gloucestershire, England.

*March 16, 2016*—**John Percy** (Toronto, Ontario, Canada) gave a talk to the large astronomy group at the University of Toronto on “Low-Tech Astrophysics: Scientific Results from Visual Observations of Pulsating Red Giants,” summarizing the recent work of his students as reported in the *Journal of the AAVSO*.

*March 25, 2016*—**Stella Kafka** gave a presentation on “The AAVSO Program: A Resource for Variable Star Research” at the University of Pittsburgh, Pennsylvania.

*May 10, 2016*—**Gary Poyner** will speak on “Historic Novae” at the Leicester Astronomical Society, Leicester Space Centre, East Midlands, England.

*May 12, 2016*—**Gary Poyner** will speak on “Historic Novae” at the Worcester Astronomical Society, Worcestershire, England.

*June 13, 2016*—**Gary Poyner** will give an “Introduction to Variable Star Observing” to the Wolverhampton Astronomical Society, West Midlands,

England. As past President of this Society, Gary says he has visited many times to give talks—“all Variable Star related of course.”

*October 6, 2016*—**Gary Poyner** will speak on “Historic Novae” at the Rugby Astronomical Society, Worcestershire, England.

**Other outreach**—**Lew Cook** (COO, Concord, California) continues his monthly column, “Stars over Ka’u,” for the Ka’u Calendar newspaper in Pahala, Hawai’i, where his house was located for a number of years. In his March 2016 article ([http://www.kaucalendar.com/news/03\\_16p12.html](http://www.kaucalendar.com/news/03_16p12.html)), Lew talks in part about his observing as a member of the team watching for the anticipated eruption of a recurrent nova in the Andromeda Galaxy and includes a good, very “reader-friendly” summary of what recurrent novae are, their components, how they differ from regular novae, etc.

Lew also wrote about this recurrent nova and recurrent novae in general and his AAVSO observing in the Mount Diablo Astronomical Society’s newsletter *Diablo Moon Watch* for March—“The Search for a Recurrent Nova in the Andromeda Galaxy.”

**John Percy** writes that his outreach “has continued this winter, to groups ranging from elementary school (‘The Search for Other Earths’) to secondary school (‘The Amazing Universe’) to large groups of library visitors and other later-life learners (‘Facts and Fallacies about the Universe’). Nothing specifically about the AAVSO, but variable stars are always mentioned somehow. [His] April 2016 column in the *Journal of the Royal Astronomical Society of Canada* is “Beta Cephei Stars: The Brightest Class of Stars that You Have Probably Never Heard Of” (see <https://www.aavso.org/files/vsots/winter05.pdf>.)”

AAVSO member/observer **Chris Maloney** (MCPA, Helena, Arkansas) has been busy teaching a continuing education course in astronomy at Phillips Community College of the University of Arkansas (Helena), where he also works as a full time physics/math instructor. Classes were held February 3 and 17, March 2, 16, and 30, and April 20. He says: “topics include the scale of the cosmos, the night sky, the solar system, history of astronomy, stellar evolution, galaxies, and a bit of cosmology.”

“Since we got a large STEM grant, I’ve been pretty busy spending money on things I’ve wanted my whole career! One of these is an inflatable planetarium system which seats ~30 adults. Since the fall, I’ve given about 10 shows or so. About 3 of these were done last fall. On February 17 I conducted my talk under the dome with about 10 adult participants. We discussed the night sky, but I had to throw in a few minutes on Algol, delta Cephei, and a bit more about variable stars!

“[My talk on] March 16 [was] on the history of astronomy. Since joining the AAVSO, my perspective on this has changed somewhat. Though I’ve given talks and conducted lessons on the history of astronomy in the past (three times during for-credit courses), this time the role of variable star astronomy [received] a lot more attention!

“You asked for interesting interactions with participants. I had the pleasure of announcing the LIGO result [detection of gravitational waves from a binary black hole merger] to the class on February 17. They were fascinated. In this week’s session, one of the students brought a bowling ball, a golf ball, and a blanket. He’d been inspired by the idea of rubber-sheet demos to convey concepts from general relativity. We managed to get the golf ball to ‘orbit’ the bowling ball before everyone left... I hope to get one or two of them interested in variable stars....”

Thank you, speakers!

We know many of you are involved in outreach related to the AAVSO and variable stars—let us help you spread the word! Send us information about your event (upcoming or past) for inclusion in the July 2016 *AAVSO Newsletter* (submission deadline June 15, 2016). Many thanks for your education and outreach efforts on behalf of the AAVSO and variable star observing! ★

## Z CAMPAIGN UPDATE 2016

MIKE SIMONSEN (SXN), AAVSO HQ

We are now in the seventh year of the Z CamPaig. I want to thank all the CCD and visual observers who have contributed to this campaign since 2009. With your help we have met all the original science goals, published several papers, identified new Z Cams, unearthed a poorly understood group of anomalous Z Cams, and whittled down the list of Z Cam suspects and impostors.

I'm happy to report that there is still plenty to do.

All the bona fide Z Cams should be observed every night. They still have surprises in store for us, and now that we have classified them unambiguously we need to maintain a historical record of their unique and interesting behavior. The gold is buried in the long-term light curves of these stars. So if you adopt them into your program, consider it a multi-year, or lifetime, commitment.

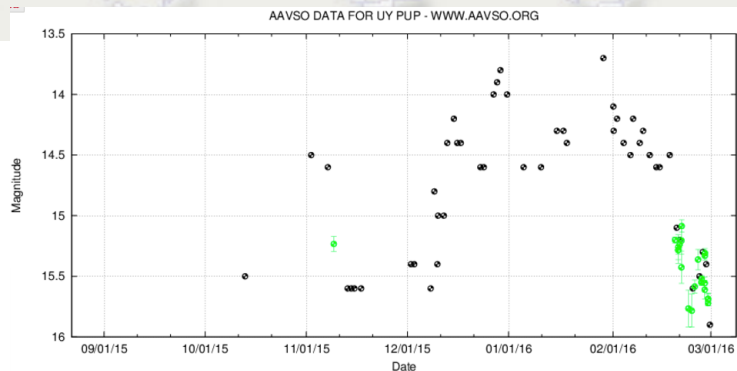
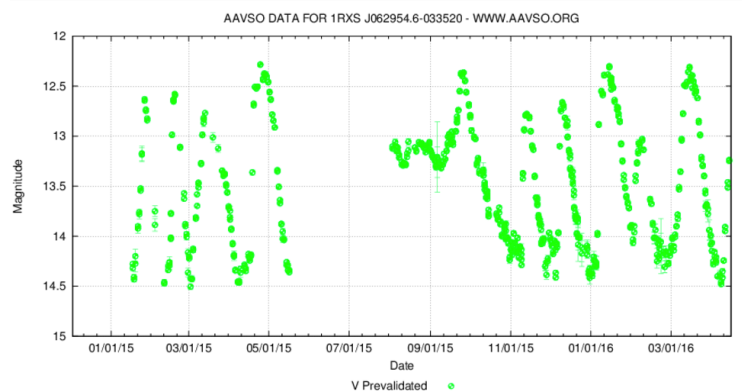
There are plenty of bright Z Cams that visual observers can follow throughout their range of variability. CCD observers should concentrate on Z Cams that get fainter than 15.0V, especially the handful of challenging faint targets mentioned later in this update.

The Z Cam List website lists all the bona fide and suspected Z Cams.

### New Discoveries

In the February 2015 Z CamPaig Update I asked observers to concentrate on a new Z Cam candidate, 1RXS J062954.6-033520 (J0629). Fortunately, patience and persistence have paid off—I am making the call on this one as a new bona fide Z Cam system. As you can see in the light curve below, J0629 was in standstill coming out of the seasonal gap, hovering between 13.0 and 13.2V. The standstill lasted through the month of August 2015, and then J0629 went into outburst from standstill at the end of September. A paper is in preparation.

Almost all the CCD data in this light curve are from Josch Hamsch, but this is a great star for everyone to follow. It ranges from 12.3 to 14.5V, so it's observable visually in a 10" telescope throughout its range, and at  $-3$  degrees declination it is observable from both northern and southern observatories.



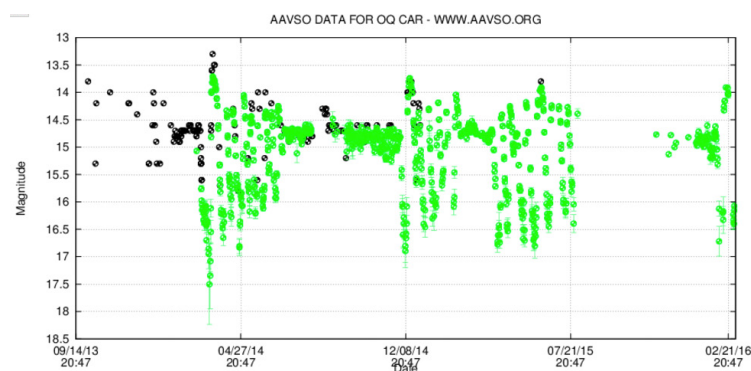
### UY Pup: Déjà vu

In February of 2014 Rod Stubbings wrote to me telling me he had discovered a new Z Cam star hiding in the dwarf novae weeds, OQ Car. I wrote about his discovery here. This year Rod wrote to me with an almost identical story. This time the subject was UY Pup. Rod has been following this star for years and had become familiar with its normal dwarf nova pattern of outburst and quiescence.

After an outburst at the end of December 2015 UY Pup failed to return to quiescence, and by the time he wrote to me in February UY Pup looked like it was stuck in the low to mid-14th magnitude range, right where I would expect to see a standstill occur in a dwarf nova that ranges from 13.0 to 16.1.

I immediately got it on the observing queues for AAVSONet and enlisted a few friends to begin nightly monitoring of it with their CCDs. As luck would have it, UY Pup dropped out of standstill almost as soon as we began collecting CCD data, but Rod's visual data look like they will be enough to write another discovery paper.

After the first historic standstill of OQ Car, that system went into a very active phase, with several unambiguous standstills occurring since mid-2014. Those have all been well observed with visual and CCD data. With any luck, UY Pup will reward us with more confirmation in the coming months now that we have trained a bunch of telescopes and observers on her.



CONTINUED ON NEXT PAGE

## Z CAMPAIGN UPDATE CONTINUED...

### Z Cam Stars needing more data

*AY Psc*—We did a pretty good job of covering this star in the second half of 2014 but most of us forgot all about it once the observing window came around in 2015. This is an active and rewarding star to follow as well as one of only three eclipsing Z Cams known.

*BP CrA*—Almost the same story with BP CrA. It was well covered in 2014, but there has been some drop-off in 2015. We almost missed the standstill in November. Weather has been an issue for many southern observers, but let's try to get better coverage going forward.

*ES Dra*—This one has been in standstill more than the active phase in the last few years. In fact, it may be in standstill right now. At 62 degrees declination, this one is circumpolar for most northern observers. We should have year-round coverage. Please redouble your efforts, or consider adding this one to your CCD program.

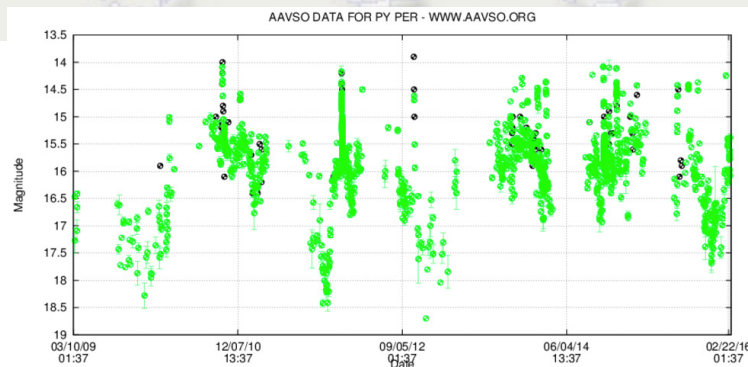
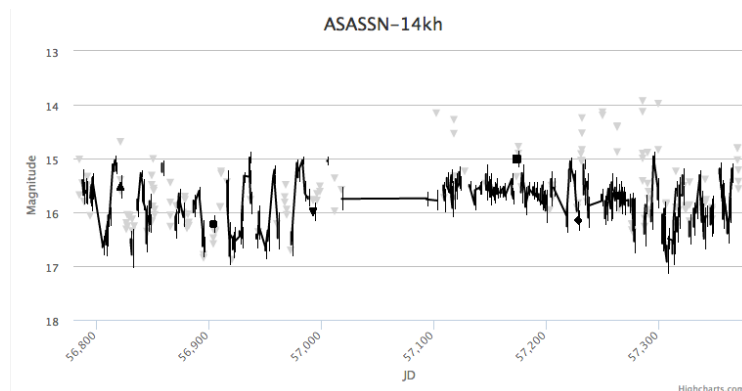
*HX Peg*—The practical observing window for this interesting Z Cam is only about 6 months, so we really need to make the most of it when it is well placed. Coverage dropped off significantly in 2015. It should be back in view by the end of July. I'll try to remind everyone then.

*MV Leo (Leo5)*—This is one of the few Z Cam targets visible during the dregs of spring. There is a real dearth of Z Cams between 10 and 16 hours, so we should be killing this one, but coverage has trailed off recently.

### Z Cam Suspects

The full list of Z Cam suspects can be found on the Z Cam List page. As a rule of thumb, if I still have the object listed as UGZ: in the table, I still believe there is a chance the object may yet turn out to be a Z Cam. Otherwise, I am fairly convinced it is whatever else is listed under type. Here are a few suspects of particular interest for various reasons.

*ASASSN-14kh*—This star is a new Z Cam suspect with no data in the AID. The data from ASASSN look like they could contain a standstill. The sequence team has created a sequence for this star so you can plot charts and start observing it now.

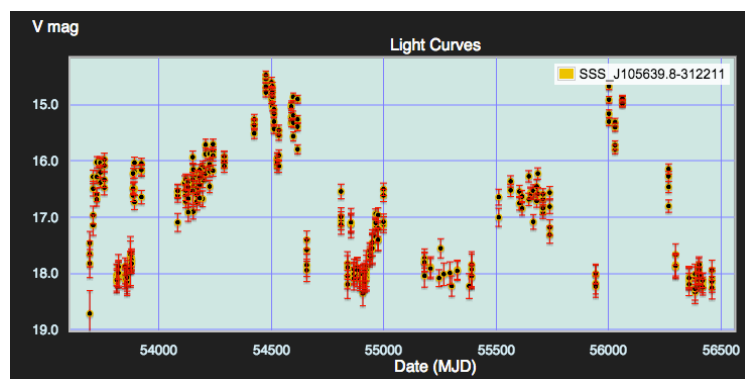


*PY Per*—I was almost certain this star was in a standstill in February 2015, but it didn't materialize. This star seems to be switching between high accretion rate states with normal frequent dwarf novae outbursts and low accretion rate periods where outbursts are rare and VY Scl-type fading events dominate the light curve. I'm now leaning towards NL/VY but clinging to hope for very unscientific reasons. I just happen to like this star. I mean look at this crazy light curve. What's not to love?

*V416 Dra*—Although there are no signs of any standstills in the light curve for this star, many Z Cams can go for years without a standstill while exhibiting very UGSS-like behavior. Coverage has begun to drop off a bit on this one, and I would like to encourage you to continue getting nightly snapshot data for at least another year. At 71 degrees declination, this is a circumpolar star for all northern observers. There shouldn't be any seasonal gaps. If it turns out to be a Z Cam it will be very interesting because it is an eclipsing system.

*NSV 14581*—This star (also known as HS 2325+8205) is interesting for many of the same reasons as V416 Dra. It is circumpolar (+82 degrees dec), not too faint, and a potential eclipsing Z Cam if it is a Z Cam. This one is getting plenty of attention. Please keep up the good work!

*SSS 120514:105640-312212*—This one is new for 2016. Discovered by the Catalina Real Time Survey, the CRTS light curve shows what looks like a possible standstill. This star does not have any data reported to the AID yet, but it does have an AUID and I just created a sequence for it, so you can observe and report your data to the AAVSO starting right now.



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## Z CAMPAIGN UPDATE CONTINUED...

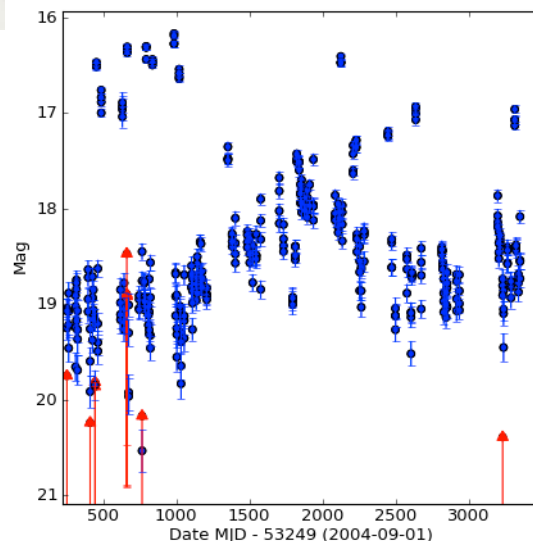
### Z Cam Challenges

These stars are all challenging targets and are not for the faint of heart.

*V433 Ara*—This is a faint system, not well covered at all. I have essentially been the lone wolf on this one, getting data from AAVSONet's OC61 whenever possible. In the publication P.A. Woudt, B. Warner, M. Spark, 2005, *MNRAS*, 364, 107, they saw it stuck around 16.8 for extended periods, which led them to believe it might be a Z Cam. Because it exhibits  $\sim 1.2$  mag eclipses, this and the other eclipsing Z Cams could provide an opportunity to study the structural changes among outburst, standstill, and quiescent states.

*V868 Cyg*—This one is in a very crowded field and extra care needs to be taken to correctly identify the star in quiescent and bright states. Some photometry software, including VPHOT, will misplace the aperture onto the nearest bright star in the image instead of leaving it where it should be. Coverage has fallen off dramatically in the last couple of years, possibly because it is such a difficult star to observe and has not shown any standstills since the beginning of the Z CamPaign in 2009.

*V1404 Cyg*—A faint CV in another crowded Milky Way field, this Z Cam suspect has an 18th-magnitude companion 4 arc seconds WSW that can be misidentified as the variable at or near quiescence. Coverage has dropped off lately for this pathological star also.



*CSS 100624:220031+033431*—Another candidate from the CRTS introduced last year as a potential Z Cam based on the Catalina team's light curve above, which seems to show a standstill around mag 18. Obviously, this one is very faint, varying from  $\sim 16$  to 20V. If you have access to a big scope and are looking for a project, this is one possibility.

*MN Lac*—Most of us dropped this star (at my suggestion) last year because it is so faint. The outburst cycle time looks too long to be a Z Cam (180 days), but I'm not positive we have that cycle time nailed down, due to the paucity of data. Bill Goff helped flesh out the range (14.5V–22.5CV). This is definitely a project star for big glass if you are looking for target suggestions. ★

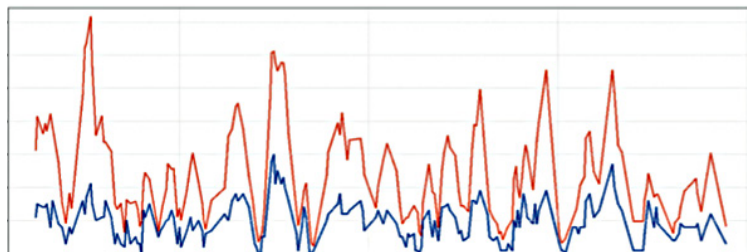
## TRACKING SUNSPOT NUMBERS

David Jackson (solar observer JDAC, Reynoldsburg, Ohio) counts sunspots with his Meade ETX125 Telescope and submits them to the American Association of Variable Star Observers (AAVSO) and the Solar Influences Data Center (SIDC). He writes:

"I do sunspot observations every 'sunny' day. I began submitting reports to the AAVSO (<https://www.aavso.org>) in November 2014 and sometime later to the SIDC (<http://www.sidc.oma.be/>)." He adds that "it's worth noting that anyone can register for free with these organizations and submit daily sunspot counts."

To create the plot shown below, David processed his observing data using the SpatialLite data manipulation tool, which works with SQL databases, matching the dates of his data to the average daily sunspot numbers (American Relative Sunspot Numbers, R<sup>a</sup>) compiled by the AAVSO, which are published monthly in the AAVSO Solar Bulletin (<https://www.aavso.org/solar-bulletin>). He comments:

"While I wasn't surprised that there would be a difference in counts between my numbers and the main database, I was (pleasantly) surprised to see how the two plot lines ran approximately in parallel."



The American Relative Sunspot Number data from the AAVSO are shown in red and the observer's data in blue. All observations were made with a Meade ETX125 and a Thousand Oaks filter.

Information on the AAVSO's Solar Section and solar observing programs may be found at <https://www.aavso.org/solar>. Software for digitizing sunspot data and submitting them to the AAVSO, as well as other useful solar observing-related software and spreadsheets, may be found at <https://www.aavso.org/solar-software>.

*Ed note:* This article incorporates the author's material from the Columbus Astronomical Society's newsletter The Prime Focus and is used with permission. ★

## AAVSO OBSERVING CAMPAIGNS UPDATE

ELIZABETH O. WAAGEN (WEO), AAVSO  
SENIOR TECHNICAL ASSISTANT (SCIENCE OPERATIONS)

Each campaign is summarized on the AAVSO Observing Campaigns page (<https://www.aavso.org/observing-campaigns>), which also includes complete lists of all *AAVSO Alert* and *Special Notices* issued for each campaign.

### Campaigns concluded since January 1, 2016

The campaign on the bright eclipsing system **b Per** (see below under Campaigns initiated; *Alert Notices 537* and *540*) was successfully concluded. AAVSO observers providing multicolor time series photometry detected the secondary eclipse predicted for around March 7 on March 10–11 UT (Figure 1). Their coverage before, during, and after the eclipse clearly showed the event. Dr. Donald Collins, Dr. Robert Zavala, and Jason Sanborn, campaign investigators, were very appreciative and are currently carrying out an analysis.

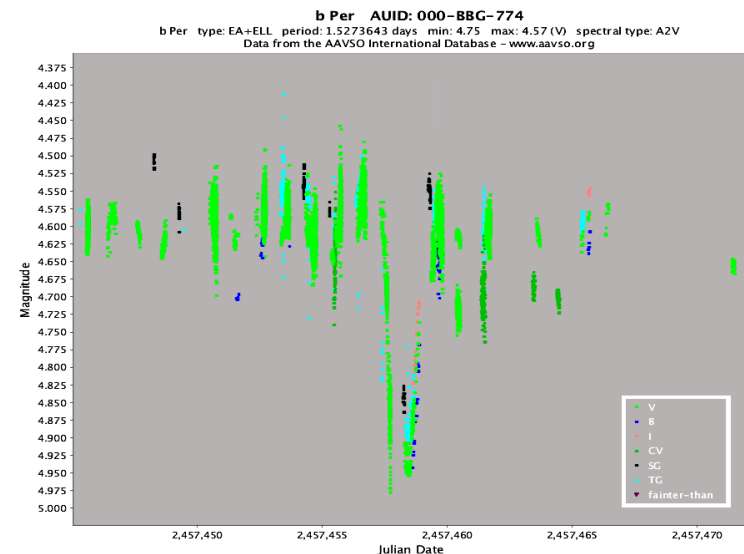


Figure 1. AAVSO light curve of the eclipsing system **b Per** JD 2457445–2457471 (26 February 2016–23 March 2016). 18 observers worldwide contributed 8,918 visual and multicolor observations to this light curve.

### Campaigns initiated since January 1, 2016

In January 2016, Dr. George Wallerstein (University of Washington) requested AAVSO coverage of the long period/symbiotic variable **R Aqr** in support of high-resolution spectroscopic observations (*AAVSO Alert Notice 535*). Optical and spectroscopic coverage was requested and recommended, respectively, to continue at least for the next several years to cover the eclipse predicted for 2022 (but which may come early and which may be about to begin). Several other astronomers are also studying R Aqr closely and will be carrying out multi-mode, multiwavelength observations in the near future. R Aqr, both a Mira and a symbiotic variable, is a close binary system consisting of a hot star and a late-type star (the Mira), both enveloped in nebulosity. Figure 2 shows recent data on R Aqr; a historical light curve dating from 1843 was shown as Figure 1 in the January 2016 issue of the newsletter (<https://www.aavso.org/aavso-newsletter>).

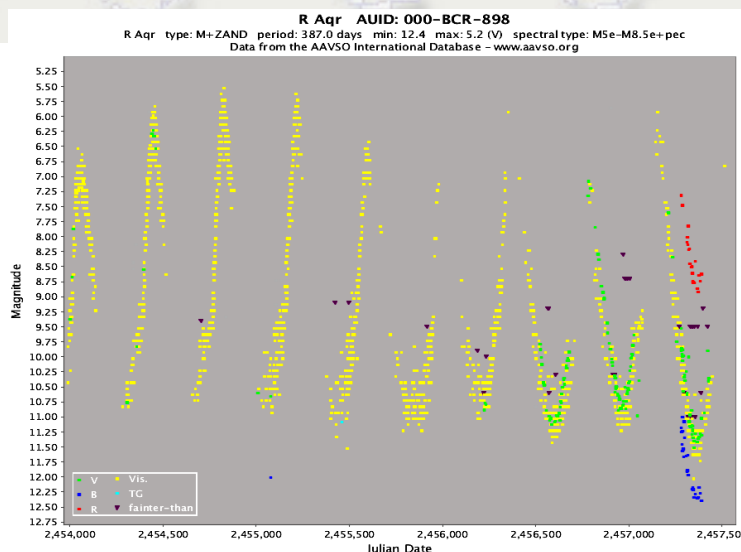


Figure 2: AAVSO light curve of the symbiotic Mira **R Aqr** JD 2453979–2457501 (1 September 2006–23 April 2016). 125 observers worldwide contributed 1,956 visual and multicolor observations to this light curve.

In early February, Dr. James Miller-Jones (International Centre for Radio Astronomy Research, Curtin University, Perth, Western Australia) and colleagues requested AAVSO assistance in monitoring the dwarf nova **SS Cyg** monitoring for a complex radio campaign. As in previous radio campaigns on SS Cyg with Dr. Miller-Jones and his colleagues, extremely close monitoring and immediate reporting is essential in order to catch the very start of an outburst in order to trigger radio observations, this time with the e-MERLIN radio array located across the UK and the Arcminute Microkelvin Imager—Large Array (AMI-LA; a radio telescope based in Cambridge, UK). NASA's Swift x-ray satellite was later added to the satellite mix! The duration of the campaign depends on when the next outburst of SS Cyg occurs, whether its onset occurs suitably timed for detection by AAVSO observers, and whether the type of outburst is suitable for the campaign (*AAVSO Alert Notice 536* and *AAVSO Special Notice #414*).

In late February, Dr. Donald Collins (Swannanoa, North Carolina), Dr. Robert Zavala (U.S. Naval Observatory, Flagstaff Station), and Jason Sanborn (Lowell Observatory) requested time series photometry of the bright eclipsing system **b Per** to detect a secondary eclipse of the third star of the system by the other two stars in the system. Coverage was requested before, during, and after the eclipse predicted for 2016 March 7  $\pm$  1 week (*Alert Notices 537* and *540*). See above under Campaigns concluded for results.

Also in late February, Dr. Jenő Sokolowski (Columbia University) and graduate student Adrian Lucy (Columbia University) requested multicolor time series observations of the jet-driving symbiotic star **V694 Mon (MWC 560)**, which was in outburst, in support of upcoming Chandra observations to investigate the state of the inner accretion disk during the outburst. Coverage was requested through April 30 (*AAVSO Alert Notice 538*). 49 observers worldwide contributed 40,183 multicolor and visual observations to this campaign.

In early March, Ms. Deanne Coppejans (Ph.D. candidate, Radboud University Nijmegen (Netherlands) and University of Cape Town) and colleagues requested monitoring of five Northern dwarf novae (**RX And**, **Z Cam**, **YZ Cnc**, **U Gem**, and **SU UMa**) through June 2016 in support of observations to be made with the Very Large Array VLA). AAVSO observations are needed to know the quiescence/outburst status of each target at time of VLA observations and to help schedule the VLA observations, as well as for correlation with the VLA data (*AAVSO Alert Notice 539*).

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## CAMPAIGNS UPDATE CONTINUED...

In early April the AAVSO issued a call to monitor the symbiotic recurrent nova **T CrB**, which has entered a super-active state, and is brighter and bluer than it has been since before its last outburst in 1946. Multicolor and visual ongoing observations are requested. Visual and multicolor observations in the AAVSO International Database show that the average magnitude of T CrB was  $V \sim 10.2\text{--}10.3$  until early February 2015. Its average magnitude then brightened to  $V \sim 10.0$  and remained there until early February 2016, when it began brightening again and has currently reached  $V \sim 9.2$  (Figure 3). T CrB has been observed twice in outburst, in 1866 and 1946. Each time it brightened rapidly to  $V \sim 2.0$ , then declined back to pre-outburst levels. Extremely interesting research by U. Munari et al. reveal an interesting correlation between the pre-outburst activity in previous outbursts and the current behavior. Please see *AAVSO Special Notice #415* for details.

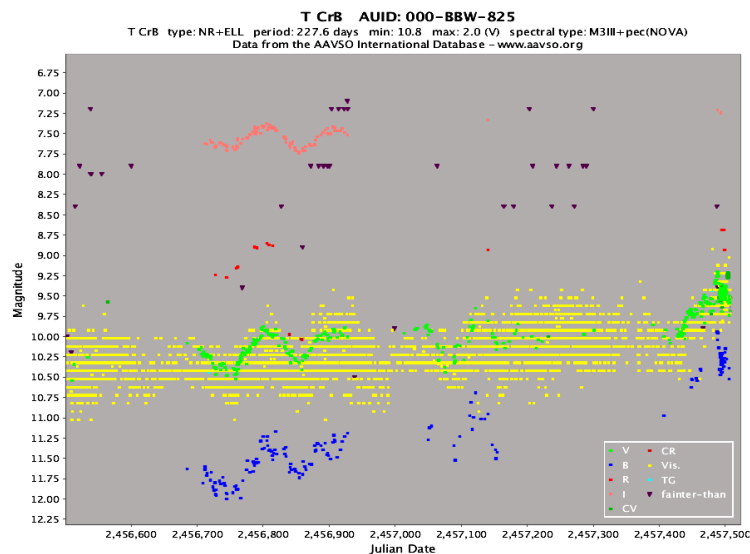


Figure 3. AAVSO light curve of the symbiotic recurrent nova T CrB JD 2456500–2457503 (26 July 2013–24 April 2016).

### Campaigns in progress

The campaign begun in October 2015 continues on the enigmatic variable object **KIC 8462852** (*AAVSO Alert Notices 532* and *542*). Filtered time-series observations (BVRI) are requested in order to study the variations occurring at all timescales. This interesting star shows aperiodic dips (cause unknown) of a few tenths of a magnitude, which can last for days but show variations on very short timescales, and is rotating. Not known to be a close binary or a young stellar object, and without infrared emission, it is a puzzle, and observations are needed to further characterize the star's variability. Since the campaign began October 20, 62 observers have submitted 16,646 visual and multicolor observations.

The campaign on the X-ray black hole binary **V404 Cyg** (*AAVSO Alert Notice 520*) was officially concluded once it returned to minimum by 2015 July 23–August 1 after its spectacular outburst on 2015 June 15. It has again returned to minimum after a subsequent shorter and fainter outburst December 30–January 3 (Figure 4). As its behavior following these outbursts is clearly unpredictable, AAVSO observers are asked to continue obtaining multicolor photometry as well as visual observations.

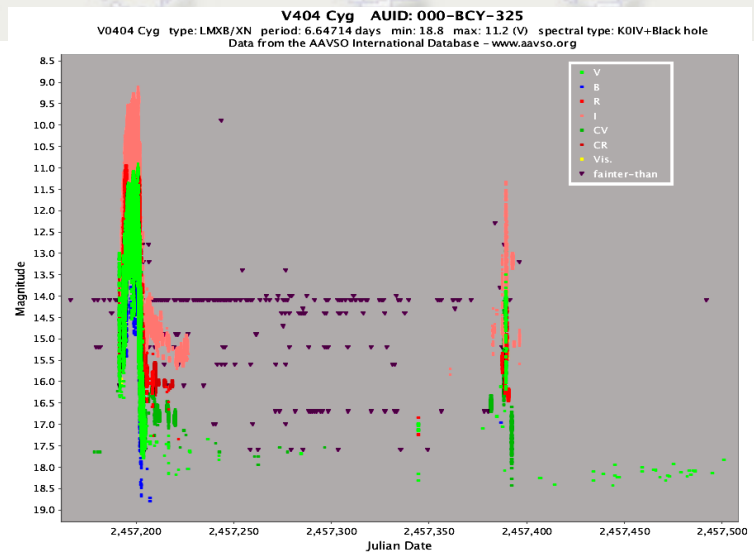


Figure 4. AAVSO light curve of the X-ray black hole binary V404 Cyg JD 2457154–2457499 (11 May 2015–21 April 2016).

Dr. Margarita Karovska's (Harvard-Smithsonian Center for Astrophysics) HST and Chandra campaign on **CH Cyg** (*AAVSO Alert Notice 454* and *AAVSO Special Notices #267, 294, and 320*) continues at least through the 2016 observing season. Please continue your visual and especially your V and B observations. **The V and B data are crucial** for detecting certain significant system changes key to her research. Visual observations are also important! See Figure 5.

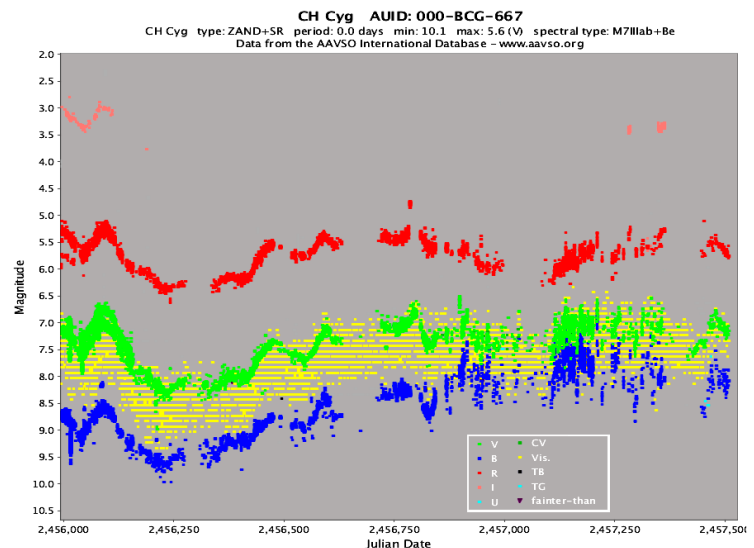


Figure 5. AAVSO light curve of the symbiotic star CH Cyg JD 2455988–2457420 (1 March 2012–April 2016). 233 observers contributed 28,140 visual and multicolor observations to this light curve.

Dr. Margarita Karovska and colleagues' request continues for AAVSO observer assistance in their campaign on the symbiotic variable **RT Cru** (11.2–12.6 visual magnitude). Chandra and Swift observations took place successfully in November (*AAVSO Special Notice #411*). Follow-up continuing weekly or more frequent monitoring (B and V photometry and visual observations) is requested. High-resolution spectroscopy around H $\alpha$  and the [OIII]5007 A line, as well as the spectrum of the full range (echelle, for example), would be very helpful and most welcome! Since this campaign began 2014 August 6, 19 observers have contributed 7,720 multicolor observations of this star.

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## CAMPAIGNS UPDATE CONTINUED...

Although the 2014–2015 campaign on **EE Cep** is officially concluded (*AAVSO Alert Notice 502*, *AAVSO Special Notice #387*), Dr. Cezary Galan (Nicolaus Copernicus Astronomical Center) writes that continuing observations, especially in I or even better in near-IR, would be very valuable and very much appreciated. Please continue to monitor EE Cep from now until at least April 2017.

This campaign on the rare FU Ori object **2MASS J06593158-0405277**, begun in April 2015 and concluded in July (*AAVSO Alert Notice 518*), continues after being re-activated by Dr. Fabienne A. Bastien (Hubble Postdoctoral Fellow, Pennsylvania State University). Please continue your observations at least through the 2016 observing season. Dr. Bastien writes: "... We have very few constraints on what causes [these rare objects] to undergo their eruptions... We would like to continue to monitor its behavior from the optical to the infrared (BVRIJHK and/or the equivalent Sloan filters) as it appears to be changing." After plateauing from its slow decline (that was underway when the campaign began) for a few months, the star has been more active and now appears to be resuming its slow decline (Figure 6). Since the campaign began, 21 observers have contributed 1,280 multicolor and visual observations.

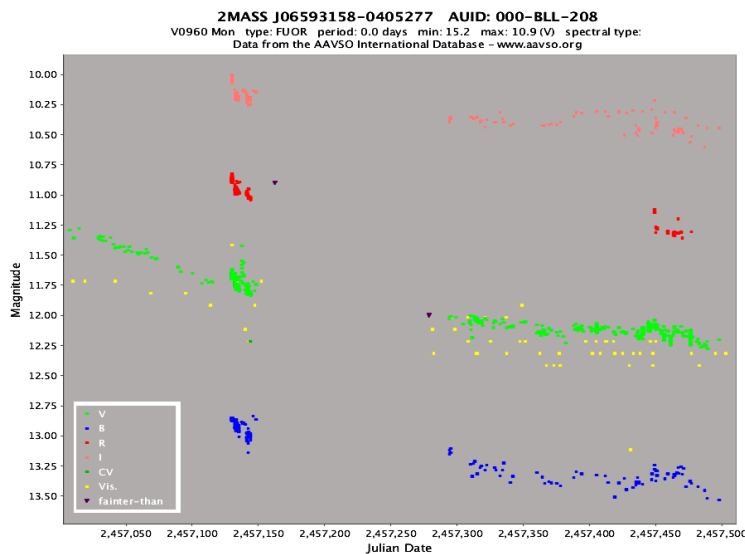


Figure 6. AAVSO light curve of the FU Ori object **2MASS J06593158-0405277** for JD 2457000–2457496 (9 December 2014–18 April 2016). 21 observers contributed 1,323 visual and multicolor observations to this light curve.

The outburst of the symbiotic variable **AG Peg** continues, and observations are strongly encouraged. It went into outburst in late May 2015 (*AAVSO Alert Notice 521*) for the first time since its only other known outburst, which occurred in 1860–1870 (it took about 10 years to reach maximum). It was unknown how this outburst would progress, and so far it has been very interesting! After declining to  $V=8.0$ , in mid-October it abruptly began to brighten again, reaching  $V=7.4$ , then began to decline again and is still declining slowly (Figure 7). AG Peg was visual magnitude 8.4 as of 2016 April 23.3896 UT (KMA, M. Komorous, London, Ontario, Canada), and  $8.391 V \pm 0.001$  as of April 21.4987 UT (SGEA, G. Stone, Auberry, California). The January issue of the newsletter (<https://www.aavso.org/aavso-newsletter>) contained an article on AG Peg by Dr. Gavin Ramsay et al.

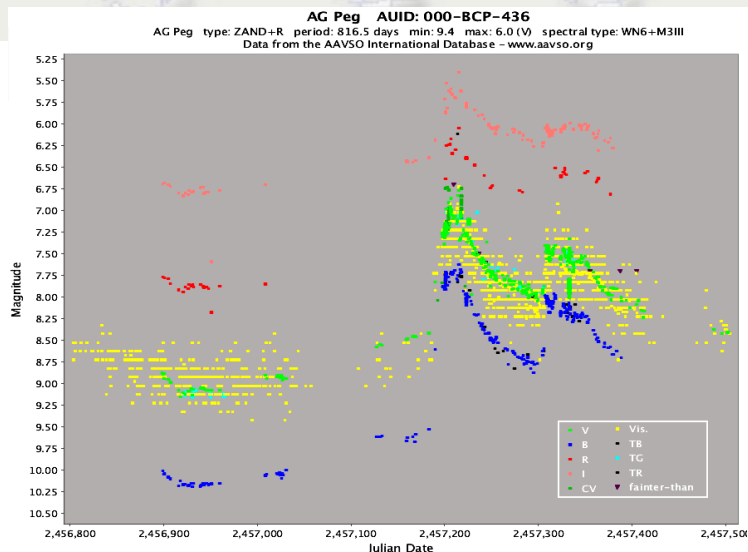


Figure 7. AAVSO light curve of the symbiotic variable **AG Peg** JD 2456800–2457501 (22 May 2014–23 April 2016). 145 observers contributed 3,292 visual and multicolor observations to this light curve.

The campaign continues on the symbiotic nova candidate **ASAS J174600-2321.3** initiated in January by S. Otero, P. Tisserand, K. Bernhard, and S. Hümmerich (*AAVSO Alert Notice 510*). The predicted eclipse has occurred, but the nova is still at maximum at  $12.276 V \pm 0.007$  on 2016 April 12.382 UT (DKS, S. Dvorak, Clermont, Florida). Otero writes that knowing when the eruption starts to fade will be very important, and that ongoing data are essential. Observers are requested to continue visual and instrumental monitoring. Since this campaign began 2015 March 5, 16 observers have contributed 1,654 multicolor and visual observations to the AID.

The campaign organized by Dr. George Rieke (University of Arizona) and colleagues on four stars with developing planetary systems (*AAVSO Alert Notice 511*)—**RZ Psc**, **HD 15407A**, **V488 Per**, and **HD 23514**—continues. The Spitzer Space Telescope observations have been completed, but your observations throughout the 2016 observing season will be appreciated. Since this campaign began 2015 March 13, 40 observers have contributed 5,766 multicolor and visual observations to the AID.

**RW Aur** continues to surprise! The campaign on this classical T Tauri star (component A) organized by Dr. Hans Moritz Guenther (Massachusetts Institute of Technology) continues but **at a less intense level** (*AAVSO Alert Notice 514*). Dr. Guenther wrote: "RW Aur continues to be an exciting target. How long does the dimming last? Will it come back up to the usual brightness? ... Does the color change, when (if?) RW Aur comes back to normal?..." Since RW Aur emerged from behind the Sun in August, its brightness, which had been increasing, plateaued and is now increasing again (Figure 8).

Dr. Robert Stencel's (University of Denver Astronomy Program) request to monitor **epsilon Aur** (*AAVSO Alert Notice 504*) continues and **has been modified**. Dr. Stencel writes that studies of the system are continuing and ground- and space-based observations are being carried out and proposed. "For these studies, a reasonable coverage of the light curve is important. Furthermore, we are approaching quadrature in a few years, and detailed studies like these are likely to continue, albeit less frequently... If skilled observers each could obtain good photometry ONCE A MONTH, we should see a reasonably complete light curve continuing, benefiting the long term studies." Observers are asked to carry out

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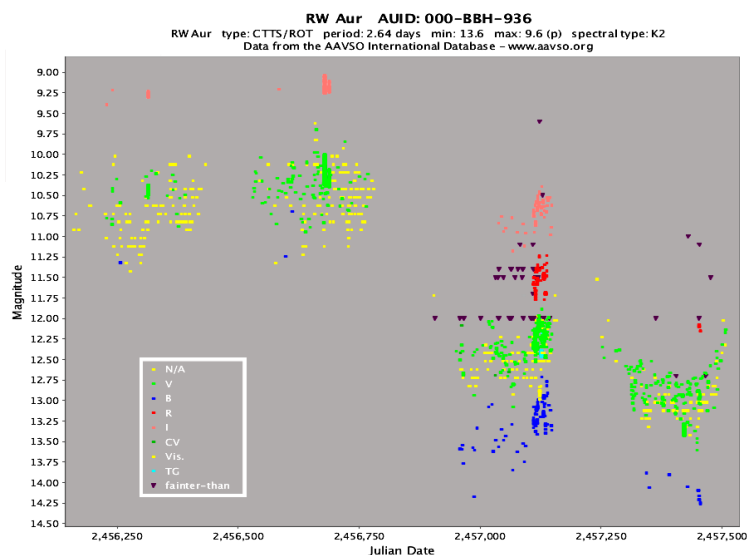
CAMPAIGNS UPDATE  
CONTINUED...

Figure 8. AAVSO light curve of the T Tauri star RW Aur JD 2456156–2457503 (16 August 2012–25 April 2016). 79 observers contributed 3,175 visual and multicolor observations to this light curve.

CCD, DSLR, or PEP photometry (V, B, R, U; no time series) once a month. Since this post-eclipse campaign began 2014 September 17, 84 observers have contributed 1,637 multicolor and visual observations.

Dr. Eric Mamajek's campaign on **V1400 Cen = J1407 (1SWASP J140747.93-394542.6)** (*AAVSO Alert Notice 462*) continues through 2016. Since the campaign began in July 2012, AAVSO observers have continued to provide excellent coverage in search of the eclipse. Please continue your observations, as they are extremely important in helping to solve the puzzle of this interesting and possibly complex system (*AAVSO Alert Notice 462*). 3 observers have contributed 2,177 multicolor observations to date.

Ernst Pollmann's campaign on **P Cyg**, an S Dor (= Luminous Blue Variable) variable (*AAVSO Alert Notice 440*), continues at least through the 2016 season and likely "for several more years." Since May 2011, 112 observers have contributed 5,687 observations to this campaign ideally suited to PEP and DSLR observers. See Alert Notice 440 for comparison and check star information. Many thanks for your observations, and please keep on observing P Cyg!

Since Dr. Arne Henden suggested the very interesting and faint Mira variable **QX Pup** to AAVSO observers in 2008 as an observing exercise (<http://www.aavso.org/qx-pup>), 5+ cycles have been observed in I, along with a smattering of fainter-thans and a few R and two V observations, and the period in Ic has been determined by Sebastian Otero at 551.0 days. A single V observation at/near the minimum shown in I shows the V minimum may be 18.2 or fainter (MZK, K. Menzies, Framingham, Massachusetts). **QX Pup is now approaching maximum. I have been challenging you to obtain a V range for QX Pup, which is embedded in a reflection nebula (the Rotten Egg Nebula). The nebula obscures the Mira itself, and there is a close companion, so making positive observations in V is complicated and very difficult. If you want to try V observations, be sure to read the information and instructions on the webpage referenced above.**

**HMXBs and SFXTs**—High-Mass X-ray Binaries and Super Fast X-ray Transients, Dr. Gordon Sarty's list (*AAVSO Alert Notices 348, 354, and 377, AAVSO Special Notices #118, #129, #143, #213, and #220*, and description of research program in *JAAVSO*, Vol. 35, p. 327; article viewable at <http://adsabs.harvard.edu/abs/2007JAVSO..35..327S>)

**Blazars**—Dr. Markus Boettcher's list (*AAVSO Alert Notice 353* at <http://www.aavso.org/aavso-alert-notice-353>)

**Novae and R CrB**

One galactic nova has been discovered since January 1. Also, several recent novae continue to provide good observing opportunities, and R CrB continues to decline at minimum.

**V3661 Oph (Nova Oph 2016 = PN 17355050-2934240)** was discovered independently on 2016 March 11.8 UT by Minoru Yamamoto (Okazaki, Aichiken, Japan) and by Yuji Nakamura (Kameyama, Mie, Japan) at magnitude ~10.6. It faded to  $17.3 V \pm 0.5$  on April 4.6781 UT (NLX, P. Nelson, Ellinbank, VIC, Australia), and as of April 18.5774 UT it was  $15.822 V \pm 0.020$  (DANF, A. Debackere, Monistrol sur Loire, France).

Older novae that are still within observing range include:

**V2949 Oph (Nova Oph 2015 No. 2 = TCP J17344775-2409042)**, also a faint, highly reddened classical nova, was independently on 2015 October 11 (*AAVSO Alert Notice 531*), has faded. As of 2016 April 2.775 UT it was <15.0 visual (PEX, A. Pearce, Nedlands, W. Australia).

**V5669 Sgr (Nova Sgr 2015 No. 3 = PN 18033275-2816054)**, discovered on 2015 September 27 UT at unfiltered magnitude 9.9–10.5 (*AAVSO Alert Notice 528*), continues to fade, and as of 2016 April 8.651 UT it was  $14.52 V \pm 0.09$  (NLX, P. Nelson, Ellinbank, VIC, Australia). 36 observers have contributed 276 observations to date.

**V5667 Sgr (Nova Sagittarii 2015 = PN 18142514-2554343)**, discovered on 2015 February 12 UT (*AAVSO Alert Notice 509*), continues to fade. As of 2016 April 20.9028 UT it was visual magnitude 13.2 (PEX, A. Pearce, Nedlands, W. Australia). 18 observers worldwide have contributed 419 multicolor observations through April 20.

**V5668 Sgr (Nova Sagittarii 2015 Number 2 = PN 18365700-2855420)**, discovered on 2015 March 15 UT (*AAVSO Alert Notice 512*), having recovered from its dust event, continues to fade. As of 2016 April 20.8361 UT it was visual magnitude 9.7 (PEX, A. Pearce, Nedlands, W. Australia). 138 observers worldwide have contributed 4,004 multicolor observations through April 20.

**V2944 Oph (Nova Ophiuchi 2015 = PN 17291350-1846120)** was discovered in March and reached maximum on April 14 at magnitude  $V=9.2$ . After fading with oscillations to about magnitude 12, it plateaued for about three months before brightening slightly and then continuing to fade. As of 2016 April 9.404 UT it was  $15.189 V \pm 0.068$  (DKS, S. Dvorak, Clermont, Florida). 37 observers worldwide have contributed 1,065 multicolor observations through April 9.

**V2659 Cyg (Nova Cygni 2014 = PN 20214234+3103296)**, a highly reddened classical Fe II-type nova which had been very active as it declined, continues

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## CAMPAIGNS UPDATE CONTINUED...

to fade steadily. As of 2016 April 9.4178 UT it was 15.257 V  $\pm$  0.022 (DKS, S. Dvorak, Clermont, Florida). 81 observers worldwide have contributed 3,834 multicolor observations through April 9.

**V1369 Cen (Nova Centauri 2013 = PNV J13544700-5909080)** continues to decline slowly. As of 2016 April 14.7197 UT it was visual magnitude 11.0 (PEX, A. Pearce, Nedlands, W. Australia). 71 observers worldwide have contributed 13,369 multicolor observations through April 14.

**V339 Del (Nova Delphini 2013 = PNV J20233073+2046041)** continues to fade. As of 2016 April 20.147 UT it was visual magnitude 13.6 (PYG, G. Poyner, Birmingham, UK). 550 observers worldwide have contributed 77,794 multicolor observations through April 20.

## R CrB

Since July 2007, when it began fading from its maximum visual magnitude of 6.0, the prototype variable **R CrB** has been in some state of minimum. In July 2015 it appeared to be brightening, but it turned around again and has been slowly but steadily fading (Figure 9). As of 2016 April 20.96 UT it was visual magnitude 14.0 (PYG, G. Poyner, Birmingham, England) and as of April 17.4163 UT it was 13.993 V  $\pm$  0.005 (CMP, R. Campbell, Inverness, FL). Keep on watching R CrB – how will it behave next?

## UXOR CAMPAIGN BEARS FRUIT ALREADY!

Mike Poxon (POX, Great Plumstead, Norfolk, England), AAVSO Young Stellar Objects Section leader, has been very involved in the hunt for UXORs as possible sources of solar systems in the process of forming. UXORs (UX Ori variables) are a subgroup of YSOs whose characteristics include showing irregular variations ranging in amplitude from almost nothing to over four magnitudes in V, with changes in polarization of light and in color. Mike writes:

“At the [AAVSO Annual Meeting in Woburn, MA, in November 2015, in my presentation]...I said that I quite honestly didn’t expect to find many UXORs from the list I presented. (In fact I didn’t expect to find any). Well, I was wrong bigtime. We have one confirmed UXOR and about a dozen potential ones, thanks to some excellent ‘filtering’ by Sebastian Otero (OSA, Buenos Aires, Argentina), who, rather than looking at the stars on the list, did the sensible thing instead! He looked at those stars showing Infrared excess—one of the signatures of YSOs—and filtered out, or more accurately, filtered in, those cases where  $J-K > B-V$  magnitudes. This was the whole idea; start with a master list which we all knew was too large (but you have to start somewhere) and then pare it down to ever smaller and more likely lists. The final list consists of 14 stars, including the confirmed UXOR, V730 Sco (see figure). Sebastian was working with a previous list that contained just over 100 stars, so that’s about a 10% success rate—a whole step up from the zero percent I was expecting! I give the list here, but it can also be found on the YSO section website under “The UXOR hunt campaign.”

“The next step is to get charts made for these 14 stars and to get you people out there following them. The objects in question are: IR Aur, IT Aur, V1244 Cyg,

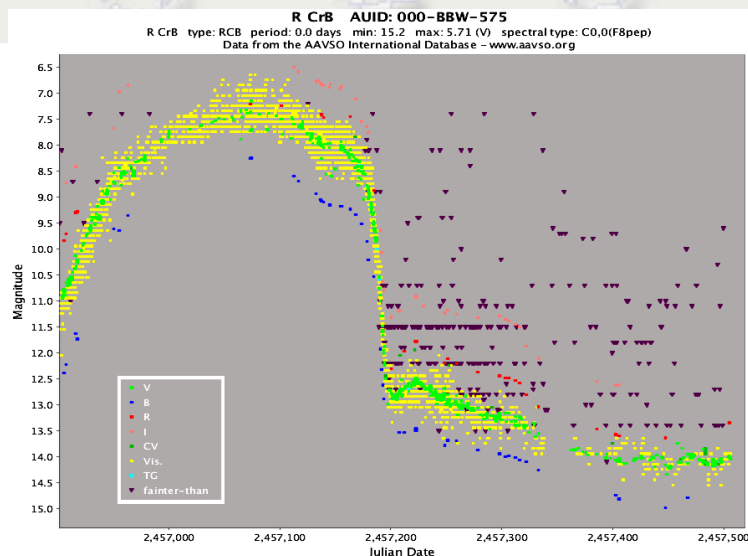
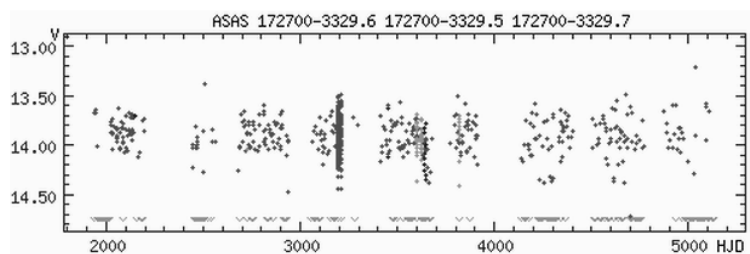


Figure 9: AAVSO light curve of R CrB JD 2456900–2457499 (30 August 2014–20 April 2016). 229 observers contributed 4,963 visual and multicolor observations to this light curve.

Please keep observing and participating in as many campaigns as your schedule and equipment permit. The astronomers and we at AAVSO Headquarters are grateful to all of you who are participating in AAVSO Observing Campaigns, and we thank you for your contributions. You have been and continue to be a vital part of variable star research! ★



ASAS V-band light curve of V730 Sco. Note the heightened period of activity around HJD+3200 that suggests a non-periodic phenomenon.

IZ Gem, HH Lac, MN Per, V344 Per, FH Pup, V603 Sco, V698 Sco, V699 Sco, V730 Sco, HI Sct, and GW Vul.

“Most of these are quite faint and/or with smallish amplitudes and would be best followed by CCD observers.”

Mike’s interest in and work with UXORs was recently showcased in a video news item from Norwich television <http://www.mustardtv.co.uk/browse/norfolk-astronomers-delight-as-stargazing-project-discovers-new-solar-systems/> and in a print article in the Eastern Daily Press (<http://www.edp24.co.uk/news/great-plumstead-astronomer-s-joy-as-project-finds-new-solar-systems-1-4471472>).

For more information on YSOs, the AAVSO YSO Section, and the UXOR hunt campaign, please see the section webpage at <http://www.starman.co.uk/ysosection/>. ★

## PHOTOELECTRIC PHOTOMETRY PROGRAM UPDATE

JIM KAY, AAVSO PEP SECTION LEADER

### Observations

The section continues to provide high accuracy photometry of bright stars with eight observers making 255 observations of 53 stars in 5 bands (B, V, R, H, J).

Charles Calia (CCB, Ridgefield, Connecticut) contributed a total of 12 V band observations of EG And, CE Tau, RZ Ari, Eta Gem, RS Cnc.

Former PEP Section Chair Jim Fox (FXJ, Mayhill, New Mexico) submitted a total of 65 V observations of GK Com, TV UMa, IN Hya, U Mon, RS Cnc, X Cnc, BP Cnc, NZ Gem, V614 Mon, BQ Gem, CE Tau, RZ Ari, FZ Cnc, BL Cnc, BC CMi, RR Eri, V442 And, TV Psc, XZ Psc, TX Psc.

Carl Knight (KCD, New Zealand) submitted 14 near IR observations of alpha Ori, 7 H and 7 J.

Gerald Persha (PGD, Lowell Michigan) submitted a total of 138 observations in the V, B, R bands. Stars included b Per, X Cnc, T Cnc, FX Cnc, RV Mon, SX Mon, eps Aur, RT Cnc, CK Ori, W Ori, HD 23514, RV Mon.

Jim Kay (KJMB) contributed 24 observations of b Per (12 V, 12 B).

Erwin van Ballegoij (BVE, Netherlands) contributed 2 observations of rho Cas, 1 each in V and B.

Thanks go to everyone for a productive quarter.

### Campaigns

The PEP Section contributed a total of 106 observations of b Per. Weather prevented observation of the secondary eclipse of the third star in the system by the PEP group, but the eclipse was captured for the first time by a number of CCD observers (*AAVSO Alert Notice 537*, <https://www.aavso.org/aavso-alert-notice-537>). Details of this campaign have been posted in the forum section of the AAVSO website (<https://www.aavso.org/b-persei-campaign>). Epsilon Aur continues to be well placed for observations with 3 B and 3 V observations contributed this quarter. Please consider adding this star to your observing program.

### PEP Survey

A PEP survey was sent out in January to sixteen active and former PEP observers to determine common interests and to facilitate collaboration within the group. Inputs from the 11 respondents were analyzed and a summary sent out to the participants. Questions focused on coordination of observations, PEP accuracy, communication within the section, and PEP section support. In general there was a desire to promote communication and community within the group, as well as a subset of observers who would like to collaborate on specific observations. Based upon these inputs the following activities have been initiated.

### Communication and community

A videoconference was held on JD 2457447.5 with four observers during which the survey results were discussed, and Tom Calderwood gave a presentation on PEP accuracy. The teleconference was well received and the section plans to hold these at least once a quarter. Upcoming conferences will be scheduled using our mailing list, and observers are encouraged to use these calls to present ideas and concerns.

### PEP Manual

Tom Calderwood has developed a draft of a beginner's PEP manual (replacing the very old *AAVSO PEP Handbook* which is obsolete and no longer distributed), which he will be sending out shortly for review. Although the manual was written for PEP, it contains a great tutorial on photometry in general. Thanks to Tom for a great product.

### Stars of common interest

We maintain a master list on the web site of stars suitable for PEP observation. This is a great resource, as it provides standard comparison and check stars for each variable, and covers those stars accessible to most PEP setups. However, this list is quite long, and several beginning PEP observers have asked for recommendations on a smaller set of stars to begin their observing program, and some more experienced observers have expressed interest in using a small set of stars to determine our overall observer-to-observer agreement. Using the results of the survey and discussions with several observers, the following list of four stars is proposed both to beginners looking to get started, as well as to those observers wishing to compare their systems. These stars are both astrophysically interesting as well as providing a good test of PEP system performance. The stars selected are CH Cyg, rho Cas, XY Lyr, and W Boo. These will be well placed in the coming months for northern hemisphere observers. If there are any southern hemisphere visible light PEP observers who express interest we will add some stars more accessible to southern latitudes (although currently our southern hemisphere observers are doing IR observations). CH Cyg was chosen both to support an ongoing campaign, as well as to test out how well our systems perform on a star that has rapid brightness variations; rho Cas was added due to interest from professional astronomers as well as its being circumpolar for many observers allowing year-round observations; XY Lyr was chosen as a good test for red leak issues in our systems; and W Boo was chosen for its small amplitude variations, which will be a good test of absolute accuracy observer-to-observer. In order to meet our dual science and system performance measurement goals it is recommend that time series be taken for CH Cyg, and that the other stars be measured at least twice each night they are observed, and observed in both the V and B bands if possible. We hope to use data from these stars to quantify our section's absolute accuracy, which will enable us to work closely with researchers to identify campaigns that use the specific capabilities of PEP.

We encourage participation from PEP observers of all levels. Additional information is available at the AAVSO PEP webpages at: <https://www.aavso.org/aavso-photoelectric-photometry-pep-program>. ★

## LOOKING AT LEGACY STARS

### STARS OBSERVED RECENTLY AND RECOMMENDATIONS FOR THE NEXT FEW MONTHS

ELIZABETH O. WAAGEN (WEO), AAVSO SENIOR TECHNICAL ASSISTANT (SCIENCE OPERATIONS)

SARA J. BECK (BSJ), AAVSO TECHNICAL ASSISTANT

This column, introduced in AAVSO Newsletter 54 (October 2012), is a quarterly summary of popular and important targets of the previous quarter as observed by the AAVSO community. This will help keep observers up to date on the observations being submitted to the AAVSO archives, and more importantly on what stars may need improved coverage by the community.

We encourage observers to keep a smaller subset of variables at the top of their observing planning via the Legacy and Program lists for LPVs and CVs (see <https://sites.google.com/site/aavsolpvsection/Home/lpv-files> for the LPV lists, and <https://sites.google.com/site/aavsovcvsection/aavso-legacy-cvs> for the CV list). These lists were established to provide guidance on which stars had the best-observed light curves and thus had greatest potential for science if those stars continued being observed. There are thousands of other stars that are still regularly observed, and many objects not on the lists above remain worthy targets for variable star observers, visual and CCD alike.

Twenty best-covered stars of the LPV Legacy program, as measured (mainly) by number of nights observed (both visual and CCD observing considered), 2015 December 15 through 2016 March 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
T Cas	Cas	00:23:14.27	+55:47:33.2	24	54	5	16
W Cas	Cas	00:54:53.85	+58:33:49.2	20	51	5	14
R Ari	Ari	02:16:07.1	+25:03:23.6	31	57	9	17
omi Cet	Cet	02:19:20.78	-02:58:39.5	44	75	5	15
R Tri	Tri	02:37:02.33	+34:15:51.4	41	69	8	16
Y Per	Per	03:27:42.38	+44:10:36.5	21	48	6	15
W Tau	Tau	04:27:57.18	+16:02:36.1	15	34	7	29
RX Lep	Lep	05:11:22.84	-11:50:57.1	35	75	2	11
alf Ori	Ori	05:55:10.3	+07:24:25.4	52	83	1	7
U Ori	Ori	05:55:49.16	+20:10:30.6	43	64	10	69
eta Gem	Gem	06:14:52.66	+22:30:24.5	53	77	3	3
R Gem	Gem	07:07:21.27	+22:42:12.7	46	63	9	17
R Leo	Leo	09:47:33.48	+11:25:43.7	58	68	6	13
Z UMa	UMa	11:56:30.22	+57:52:17.6	58	82	4	9
RY UMa	UMa	12:20:27.32	+61:18:34.6	30	76	2	5
CH Cyg	Cyg	19:24:33.06	+50:14:29	42	74	5	31
R Cyg	Cyg	19:36:49.38	+50:11:59.4	31	57	2	19
khi Cyg	Cyg	19:50:33.91	+32:54:50.6	21	34	3	21
miu Cep	Cep	21:43:30.49	+58:46:48	47	74	5	17
rho Cas	Cas	23:54:23.03	+57:29:57.8	41	75	4	11

*N(vo)* = number of observers making visual observations

*N(von)* = number of nights with visual observations

*N(co)* = number of observers making CCD observations

*N(con)* = number of nights with CCD observations

Target lists for observers vary throughout the year, and the number of observations received changes depending upon a star's observability in a given season as well as whether there is special interest—for example, an observing campaign or recent notable activity. Quarterly totals also help to highlight what new and interesting data sets the AAVSO now holds.

Below are the most- and least-observed stars of the LPV and CV Legacy lists, showing the number of visual and CCD observers (*N(vo)* and *N(co)*) along with the total number of nights observed (*N(von)* and *N(con)*).

Twenty least-observed stars of the LPV Legacy program (both visual and CCD observing considered), 2015 December 15 through 2016 March 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
SS Vir	Vir	12:25:14.4	+00:46:10.9	17	23	3	3
V CrB	CrB	15:49:31.31	+39:34:17.9	7	18	1	1
R Ser	Ser	15:50:41.73	+15:08:01.1	4	8	1	1
SX Her	Her	16:07:27.24	+24:54:29.8	7	23	0	0
RU Her	Her	16:10:14.52	+25:04:14.3	6	11	0	0
W Her	Her	16:35:12.31	+37:20:43	8	25	0	0
S Her	Her	16:51:53.91	+14:56:30.6	5	11	0	0
alf Her	Her	17:14:38.85	+14:23:25.1	2	9	0	0
RS Her	Her	17:21:42.35	+22:55:15.9	5	17	0	0
T Her	Her	18:09:06.2	+31:01:16.2	7	15	0	0
W Lyr	Lyr	18:14:55.87	+36:40:13.1	9	20	0	0
X Oph	Oph	18:38:21.12	+08:50:02.7	6	21	0	0
R Aql	Aql	19:06:22.24	+08:13:48	10	17	1	1
TZ Cyg	Cyg	19:16:04.06	+50:09:36.6	7	19	0	0
TU Cyg	Cyg	19:46:10.67	+49:04:24.4	4	6	0	0
Z Cyg	Cyg	20:01:27.46	+50:02:32.6	6	10	3	3
S Aql	Aql	20:11:37.47	+15:37:14.5	6	8	0	0
S Del	Del	20:43:04.87	+17:05:17.3	10	15	1	1
R Vul	Vul	21:04:22.5	+23:49:18	8	11	2	3
R Peg	Peg	23:06:39.17	+10:32:36	7	13	5	5

Observations are strongly encouraged as these stars become observable. Observers should consider adding any of these stars to their observing programs to improve coverage of the legacy stars.

CONTINUED ON NEXT PAGE

LEGACY STARS  
CONTINUED...

Twenty best-covered stars of the CV Legacy program, as measured (mainly) by number of observers and nights observed (both visual and CCD observing considered), 2015 December 15 through 2016 March 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
EG And	And	00:44:37.19	+40:40:45.6	26	72	5	27
RX And	And	01:04:35.52	+41:17:57.8	29	79	16	54
TT Ari	Ari	02:06:53.09	+15:17:41.7	18	54	8	28
GK Per	Per	03:31:12	+43:54:15.4	27	78	11	44
CN Ori	Ori	05:52:07.79	-05:25:00.5	14	59	8	40
SS Aur	Aur	06:13:22.47	+47:44:25.6	37	84	7	37
HL CMa	CMa	06:45:17.21	-16:51:34.7	9	51	4	70
BX Pup	Pup	07:54:15.55	-24:19:36.3	2	3	4	76
U Gem	Gem	07:55:05.21	+22:00:04.7	54	76	20	34
YZ Cnc	Cnc	08:10:56.63	+28:08:33.2	25	62	13	46
SU UMa	UMa	08:12:28.27	+62:36:22.2	30	67	18	26
Z Cam	Cam	08:25:13.18	+73:06:39	39	80	14	53
AT Cnc	Cnc	08:28:36.89	+25:20:02.9	9	51	10	58
SY Cnc	Cnc	09:01:03.31	+17:53:56	18	49	11	60
TX CVn	CVn	12:44:42.05	+36:45:50.6	8	17	3	58
T CrB	CrB	15:59:30.16	+25:55:12.6	26	62	4	32
AG Dra	Dra	16:01:41.01	+66:48:10.1	16	44	3	31
AH Her	Her	16:44:10.01	+25:15:02	6	13	4	38
CH Cyg	Cyg	19:24:33.06	+50:14:29.1	42	74	5	31
SS Cyg	Cyg	21:42:42.78	+43:35:09.8	51	81	17	44

Stars in CV Legacy list with no visual or CCD observations (both visual and CCD observing considered), 2015 December 15 through 2016 March 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
MU Cen	Cen	12:12:53.91	-44:28:15.8	0	0	0	0
V485 Cen	Cen	12:57:23.28	-33:12:06.5	0	0	0	0
NN Cen	Cen	13:14:15.6	-60:52:46.5	0	0	0	0
V504 Cen	Cen	14:12:49.18	-40:21:37.5	0	0	0	0
AE Cir	Cir	14:44:51.29	-69:23:34.5	0	0	0	0
EK TrA	TrA	15:14:00.43	-65:05:35.5	0	0	0	0
BR Lup	Lup	15:35:53.09	-40:34:05	0	0	0	0
IK Nor	Nor	16:25:28.86	-55:20:02.7	0	0	0	0
AT Ara	Ara	17:30:33.8	-46:05:58.8	0	0	0	0
MM Sco	Sco	17:30:45.24	-42:11:41.7	0	0	0	0
FV Ara	Ara	17:35:10.05	-63:02:50.3	0	0	0	0
BF Ara	Ara	17:38:21.33	-47:10:41.4	0	0	0	0
V723 Sco	Sco	17:50:05.29	-35:23:57.9	0	0	0	0
V618 Sgr	Sgr	18:07:56.9	-36:29:36.9	0	0	0	0
V1830 Sgr	Sgr	18:13:50.65	-27:42:21	0	0	0	0
V533 Her	Her	18:14:20.51	+41:51:22.6	0	0	0	0
FM Sgr	Sgr	18:17:18.25	-23:38:27.8	0	0	0	0
V441 Sgr	Sgr	18:22:08.09	-25:28:47.3	0	0	0	0
CH Her	Her	18:34:46.32	+24:48:01.6	0	0	0	0
V4021 Sgr	Sgr	18:38:14.88	-23:22:47.1	0	0	0	0
V446 Her	Her	18:57:21.59	+13:14:29	0	0	0	0
DM Lyr	Lyr	18:58:44.45	+30:15:33.3	0	0	0	0
FO Aql	Aql	19:16:38.11	+00:07:37.4	0	0	0	0
PW Vul	Vul	19:26:05.04	+27:21:57.7	0	0	0	0
DH Aql	Aql	19:26:10.81	-10:15:28.9	0	0	0	0
NQ Vul	Vul	19:29:14.75	+20:27:59.7	0	0	0	0
LV Vul	Vul	19:48:00.7	+27:10:19.5	0	0	0	0
V725 Aql	Aql	19:56:45.03	+10:49:32.6	0	0	0	0
UU Aql	Aql	19:57:18.6	-09:19:19.8	0	0	0	0
V476 Cyg	Cyg	19:58:24.47	+53:37:06.7	0	0	0	0
AW Sge	Sge	19:58:37.07	+16:41:27.8	0	0	0	0
RR Tel	Tel	20:04:18.54	-55:43:33.2	0	0	0	0
QU Vul	Vul	20:26:46.02	+27:50:43.2	0	0	0	0
KK Tel	Tel	20:28:38.46	-52:18:45.2	0	0	0	0
TU Ind	Ind	20:33:10.55	-45:26:00.8	0	0	0	0
VY Aqr	Aqr	21:12:09.19	-08:49:36.9	0	0	0	0
VZ Aqr	Aqr	21:30:24.59	-02:59:17	0	0	0	0

As above, observations are strongly encouraged as these stars become observable and observers should consider adding any of these stars to their observing programs to improve coverage of the legacy stars. ★

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Sign up for the AAVSO online forums to read about or contribute to discussion on observing campaign targets. Postings will be sent to you by email and will also be available for viewing online. Visit <http://www.aavso.org/forums>

## JULIAN DATE / MOON PHASE CALENDARS

2,450,000 plus the value given for each date

### APRIL 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1 7480	2 7481
3 7482	4 7483	5 7484	6 7485	7 7486	8 7487	9 7488
10 7489	11 7490	12 7491	13 7492	14 7493	15 7494	16 7495
17 7496	18 7497	19 7498	20 7499	21 7500	22 7501	23 7502
24 7503	25 7504	26 7505	27 7506	28 7507	29 7508	30 7509

### MAY 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 7510	2 7511	3 7512	4 7513	5 7514	6 7515	7 7516
8 7517	9 7518	10 7519	11 7520	12 7521	13 7522	14 7523
15 7524	16 7525	17 7526	18 7527	19 7528	20 7529	21 7530
22 7531	23 7532	24 7533	25 7534	26 7535	27 7536	28 7537
29 7538	30 7539	31 7540				

### JUNE 2016

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 7541	2 7542	3 7543	4 7544
5 7545	6 7546	7 7547	8 7548	9 7549	10 7550	11 7551
12 7552	13 7553	14 7554	15 7555	16 7556	17 7557	18 7558
19 7559	20 7560	21 7561	22 7562	23 7563	24 7564	25 7565
26 7566	27 7567	28 7568	29 7569	30 7570		

Moon calendars courtesy StarDate online  
<http://stardate.org/nightsky/moon/>

### THE AAVSO MENTOR PROGRAM

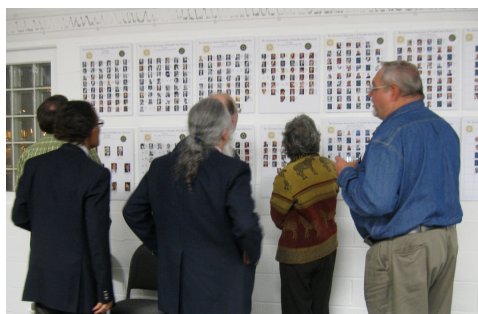
Since the earliest days of the AAVSO, experienced observers have helped new observers by corresponding, answering questions, and even providing personal guidance at the telescope.

If you would like to talk with an experienced variable star observer, contact the AAVSO and we will put you in contact with the mentor program coordinator, Donn Starkey. Just send us an email ([mentor@aavso.org](mailto:mentor@aavso.org)), or call 617-354-0484 to let us know you are interested in this program.

Ideally, Donn will be able to provide you with names, addresses, and phone numbers of active AAVSO observers near you. If there are none located in your area, he can at least provide you with more distant contacts. A simple phone chat with an experienced observer may provide all the feedback you need to continue progressing as an AAVSO observer.

Visit the AAVSO mentor program webpage:

<http://www.aavso.org/mentor-program>



### BY POPULAR DEMAND!

A set of twenty pdf centennial posters exhibited at AAVSO Headquarters is available for downloading from our ftp site.

The posters show portraits of the AAVSO's Directors, Presidents, Secretaries, Treasurers, Council members, and Staff from 1911 to 2011, and the top Visual, CCD, PEP, and Photographic/Photovisual observers. For more information go to: <http://www.aavso.org/aavso-100th-anniversary-commemorative-posters>

or use this link:

<http://tinyurl.com/cge9t9s>

### THE AAVSO WALTER A. FEIBELMAN SUITE

The Feibelman Suite at AAVSO Headquarters is available to guests who are in the Boston/Cambridge area to perform an AAVSO-related task, that is, the purpose of their visit is to do something for or related to the AAVSO. For details about the suite or making a reservation, please visit

<http://www.aavso.org/walter-feibelman-guest-suite>



*See the following pages for important information about membership renewals and contributions.*

# JOIN THE AAVSO!

## AAVSO 2016 New Member Form

Please send application, first year's dues, and application fee to:

AAVSO, 49 Bay State Road  
Cambridge, MA 02138, USA

Date: \_\_\_\_\_  
 Full Name: \_\_\_\_\_  
 Full Address: \_\_\_\_\_  
 \_\_\_\_\_  
 Telephone 1: \_\_\_\_\_ Telephone 2: \_\_\_\_\_  
 E-Mail: \_\_\_\_\_  
 Birth Date: \_\_\_\_\_ Vocation: \_\_\_\_\_  
 Telescopic Equipment: \_\_\_\_\_  
 \_\_\_\_\_  
 Astronomical Experience (if any): \_\_\_\_\_  
 \_\_\_\_\_  
 How did you learn about the AAVSO? \_\_\_\_\_

### Types of Membership Offered and Dues

Annual:	Adult	US \$75.00 per year
	Associate (Under 21)/Pension/Limited Income	US \$37.50 per year
Sustaining:		US \$150.00 per year
Developing country <sup>†</sup>	(for members residing in low income countries):	US \$25.00 per year

Membership is prorated through the end of the year, starting with the current month.

**All applicants also add a one-time, \$10.00 application fee.**

Please consult the following table to find out how much to pay, including application fee.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept*	Oct*	Nov*	Dec*
Annual	\$75.00	\$68.75	\$62.50	\$56.25	\$50.00	\$43.75	\$37.50	\$31.25	\$100.00	\$93.75	\$87.50	\$81.25
A/P/LI	\$37.50	\$34.38	\$31.25	\$28.13	\$25.00	\$21.88	\$18.75	\$15.63	\$50.00	\$46.88	\$43.75	\$40.63
Sustaining	\$150.00	\$137.50	\$125.00	\$112.50	\$100.00	\$87.50	\$75.00	\$62.50	\$200.00	\$187.50	\$175.00	\$162.50
Developing Country <sup>†</sup>	\$25.00	\$22.92	\$20.83	\$18.75	\$16.67	\$14.58	\$12.50	\$10.42	\$33.33	\$31.25	\$29.17	\$27.08

\*Please note that if joining in September-December, the following year's dues are already being collected, so we request that you pay for the end of this year and for the following year.

<sup>†</sup>Developing countries EXCLUDE Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, the Korean Republic, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, the United States.

**Dues (see chart):** US \$ \_\_\_\_\_ **Application fee:** US \$ 10 \_\_\_\_\_

**Donation (optional):** US \$ \_\_\_\_\_ to \_\_\_\_\_ fund (see box on right)

**Total payment (dues + fee + donation):** US \$ \_\_\_\_\_

Contributions (see last page for descriptions):	
AAVSO General Fund	\$ _____
The Endowment Fund	\$ _____
Annual Campaign Fund	\$ _____
Building Fund	\$ _____
Janet A. Mattei Research Fellowship	\$ _____
Margaret Mayall Assistantship Fund	\$ _____
Solar Fund	\$ _____
AAVSONet Fund	\$ _____
Member Sponsorship Fund	\$ _____
Student Meeting Scholarship Fund	\$ _____
Contributor-Specified Restricted Funds	\$ _____

\_\_\_\_\_ I have enclosed a check / money order \_\_\_\_\_ Please charge my credit card (Visa or Mastercard)

Credit card #: \_\_\_\_\_ Exp. Date: \_\_\_\_\_ Security Code (on back of card): \_\_\_\_\_

Cardholder's Name (as on card): \_\_\_\_\_

Billing address (if different from above): \_\_\_\_\_

Signature: \_\_\_\_\_





# SUPPORT THE AAVSO

In order to sustain the AAVSO and its operations, we rely on the generous support provided by members, sponsors, donors, and staff. Together we are the AAVSO. Your gift is a way for you to say that you believe in what we are doing and that you want it to continue moving forward. Every dollar given and membership purchased benefits the AAVSO in a necessary and unique way.

**AAVSO Funds** The following is a list of the specific funds to which you may contribute. If you do not wish to specify how you would like your donation to be used, the AAVSO will determine the fund where it is needed most and place it there.

## **AAVSO General Fund**

This fund is an unrestricted one and supports the general operations of the Association.

## **Endowment Fund**

This is a professionally managed fund, invested for the perpetuity of the AAVSO. From time to time, transfers from this fund into the General Fund are made as necessary to meet operating deficits of the Association.

## **AAVSO Building Fund**

This fund is dedicated to replenishing the Endowment Fund for the cost of purchasing the new headquarters building (49 Bay State Road, Cambridge, MA 02138), to provide funds to refurbish the building, and to cover other costs incurred with the purchase.

## **Janet A. Mattei Research Fellowship Program**

This fund enables a visiting scientist, postdoctoral researcher, or student to perform research at AAVSO Headquarters with the goal of disseminating the results throughout the astronomical community.

## **Margaret Mayall Assistantship Fund**

This fund helps finance a summer student at AAVSO Headquarters who works on variable star-related projects and research while learning about the AAVSO and variable stars in general. Only the accumulated interest and not the principal may be used.

## **Solar Fund**

This fund helps to pay the staff costs of running the section, publishing the *Solar Bulletin*, and travel expenses for visiting solar researchers.

## **AAVSONet Fund**

This fund pays for refurbishment and maintenance of telescopes, cameras, mounts, computers, software, and hardware required to operate the AAVSO's robotic telescope network.

## **Member Sponsorship Fund**

Funds donated to this program pay the membership dues for those active variable star observers who want to become members of the Association but cannot afford the dues.

## **Student Meeting Scholarship Fund**

Donations to this fund pay for up to 10 student registrations per annual meeting of the AAVSO.

## **Contributor-Specified Restricted Funds**

These are gifts and contributions made to the Association for restricted purposes as specified by the donor thereof. All such restricted funds of the Association shall be administered in strict accordance with the instructions of the donor. The Association is not obliged to accept any assets so offered.

If you wish to contribute to one or more of these funds please fill in the amount on the appropriate line on your renewal form and include it in the total. *All contributions are tax-deductible in the USA.*

You may also donate online at: <http://www.aavso.org/support-aavso>

**Thank you for your support of the AAVSO!**