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AAVSO Newsletter

FROM THE DIRECTOR'S DESK

STELLA KAFKA



The golden era of time-domain astrophysics

Gaia. LSST. JWST. TESS. These are some of the missions/surveys commonly discussed in professional astronomer circles, aiming at revealing the mysterious nature of dark energy and studying earth-like exoplanets around stars in our galaxy. They will also inevitably detect a plethora of variable objects—both known and new ones. Gaia scientists are quoting “1,000 alerts a day” for unidentified variable stars in the field of the satellite. LSST scientists predict 10^6 (this is a million) alerts a day of objects whose variable nature will need further investigation. The landscape in variable star astronomy seems to be changing; out of the plethora of “alerts,” there will be a need for immediate follow-up of the exploding ones, and more careful analysis of the interesting periodic ones. Professional astronomers worldwide are trying hard to prepare to respond to the challenge. New spectrographs are being built, polarimeters are being commissioned, new radio antennas are now being tested (ALMA, SKA, etc.), the future of x-ray astronomy is being discussed, astronomers are planning observations, proposals, collaborations....



INTERNATIONAL
YEAR OF LIGHT
2015

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.

Where do we belong in this picture? We are the ones to provide optical light curves! The best indication that a star is variable, and the nature of this variability, comes from changes in the star’s brightness in optical wavelengths. The professional astronomical community is eager to build the “biggest,” the “best,” the “highest resolution” in instruments, but the AAVSO data guide their observations of objects of interest. In order to understand the spectra, radio, x-rays, etc., etc. of a variable source, optical light curves are essential. And the only way to ensure that a light curve is obtained at all times is through a network of observers who are willing to obtain data on variable sources supporting the relevant science. It is through the AAVSO observers—it is through YOUR hard work.

This is where the AAVSO becomes a critical resource for variable star researchers. Our international network is ready to respond to observing requests and provide valuable data that will be part of scientific publications and press releases. When professional ground-based facilities are subject to weather, technical problems, scheduling issues, and Murphy’s laws, at least one AAVSO observer can likely obtain data under clear skies. We can observe bright and faint targets, capturing the early stages of outbursts, eclipse ingress/egress, pulsation periods, and microlensing events. We are in both the northern and the southern hemispheres,

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SINCE 1911...

PRESIDENT'S MESSAGE

JENO SOKOLOSKI



Investing in our Community

Recently, I saw a woman wearing a T-shirt that read, “Stand back! I’m going to try SCIENCE”, and showed a stick figure waving a bubbling beaker in one hand and a calculator in the other. I love this T-shirt because it plays with the notion that science is something that restrained professionals do far away, at a safe distance, in their pristine labs and ivory towers. I believe that it benefits society to have citizens that understand, embrace, and have direct access to scientific discovery. In fact, that is part of why I support the AAVSO. In this column—which is an unabashed fund-raising appeal—I list some reasons why you might also want to support, or to increase your support of, the AAVSO.

Like me, those who invest in the AAVSO are advocates for science. In my experience, most people like astronomy. How many times, after answering the question about what I do for a living (astronomy),

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

and we cover the full extent of the globe. Through the AAVSO, the astronomical community has access to more than a thousand individual “observatories” and a group of observers who are reliable.

The recent V404 Cyg outburst is a clear demonstration of what the AAVSO observers can do, and how a synergy between professional and non-professional astronomers leads to excellent science. The world’s larger ground-based telescopes are now observing the source and access to space-based facilities is being granted, all based on the peculiar behavior of V404 Cyg revealed in the AAVSO light curves.

At some point, I hope to see some of the science results published in our *Journal (JAAVSO)*. And I hope that this cooperative interaction between the two communities will continue and increase as more objects of interest emerge in the upcoming golden era of time-domain astronomy.

Thank you for all your hard work and for your support to the AAVSO!

Best wishes—clear skies,
—Stella. ★

Ed. note: the Spanish language version of Stella’s message can be found on page 15.

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

have I heard the responses, “Wow, cool,” and then, “When I was young, I wanted to be an astronomer/scientist”? Because I am part of the AAVSO, I can explain that one doesn’t need to spend years in graduate school to become an astronomer. Variations in the brightness of stars are crucial diagnostics of fundamental physics in the universe. So, observing variable stars enables anyone to make important contributions to cutting edge astronomical research. AAVSO 2nd Vice President Roger Kolman describes the scientific significance of amateur variable star observations this way:

“Think of the HR diagram as a static snapshot that becomes dynamic as our observations are contributed. We have seen stars change from long period variables to semi-regulars in the period of decades. We have seen the evolution of cataclysmic variables from one class to another as mass transfer occurs—the same for eclipsing variables. This is a remarkable achievement, and the AAVSO has done it!”

Emphasizing the scientific value of such observations, AAVSO Vice President Kris Larsen explains that, “Giving to the AAVSO is consistent with my values because I strongly feel that the pro-am collaboration in astronomy makes the field stronger.”

In addition, people who support the AAVSO typically prize education and the sharing of knowledge. One need look no further than the mentor program, capably headed by past councilor Donn Starkey, as well as the many active forums, to see that we are a fellowship of natural teachers and life-long learners. The time given by our devoted volunteers is a major component of what makes the AAVSO

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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 eowaagen@aavso.org. Photos in this issue courtesy of M. Cook, R. Kolman, R. Stephens, and J. Ulowetz.

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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strong. Financial donations, however, help staff provide structure and continuity for these wonderful volunteer efforts. They also allow staff to organize more formal educational materials such as observing manuals and CHOICE courses. In the words of past councilor Arlo Landolt, financial support of the AAVSO “will ensure that other observers have opportunities to enjoy the glory of the night sky as we have been able to enjoy.”

Moreover, an advantage of training and encouragement from the AAVSO is that it is there when you need it, in a variety of forms. The contrast with traditional classroom education can be particularly important for young people. At the recent membership meeting in Muncie, Indiana, long-time AAVSO member Ronald Kaitchuck relayed his own story:

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PRESIDENT'S MESSAGE CONTINUED...

“When I was in high school my teachers considered me to be a mediocre student at best. They kept chiding me for being an ‘underachiever.’ But what my teachers didn’t know was that on the weekends and evenings I was doing something exciting. I was doing actual science.

“Like many children I got excited about astronomy at an early age. By the time I was in middle school I had made my own telescopes. In high school I learned of an organization called the AAVSO. I quickly joined and started making visual variable star observations from my backyard on the west side of Chicago. Thanks to a book by Frank Bradshaw Wood and a photometry manual circulated by the AAVSO, I built a photoelectric photometer and a telescope designed to carry it. I was learning machine-shop skills, electronics, optics and the science of observational astronomy.

“I didn’t appreciate it at the time, but I had joined an elite group. A very important driver for me was the existence of an organization that valued what I was doing as real science and wanted my observations. In this way, the AAVSO was an inspiration and a cheerleader for a high-school boy in Chicago.

“The AAVSO does much more than collect data. By its very existence it inspires people of all ages to reach higher and to be stellar *over*-achievers.”

Director Stella Kafka plans to expand efforts to bring students into the AAVSO community. If you give to the AAVSO, you are a supporter of hands-on, life-long education outside of the classroom.

In a broad sense, the AAVSO is about science. At a more personal level, its goal is to foster a community that shares a love of the night sky, in all its beauty and vastness. For example, when discussing what the AAVSO means to him, Roger Kolman expounds, “For many of us, it has been submitting data to the AID and providing a database for future astronomers analyzing the evolution of stars. For others, it has been the friendships developed over many years or those under development.” When I asked Kris Larsen why she thought the AAVSO makes the world a better place, she emphasized the varied and global nature of our community. She also made the direct connection to her plan to remember the AAVSO in her will “to honor my support of the AAVSO and its people.”

As I discussed in my column in 2014 October, the reason that AAVSO needs your donations is that earnings from the endowment typically cover only half of our annual operating costs. Dues cover only about 6%. Staff at headquarters often apply for grants to pay some of the remaining costs, but grants are getting harder to obtain, and they usually involve new projects that take staff time. To continue our current level of services, we therefore rely on supporters like you. Although many of our tools, such as VSX, VPHOT, and AAVSONet, were generously provided by volunteers, maintaining these tools – and continuing all of the fabulous services that staff at headquarters deliver (such as finding charts, bulletins, the JAAVSO) – costs money. Ways that you can help include volunteering, opting for sustaining dues, sponsorship of dues for members from developing countries, end-of-year giving, contributing to the

annual campaign, donation of equipment, planned giving (bequests), or establishing a named fund to increase the endowment.

To sum up, just as donors on Kickstarter enjoy becoming patrons of the arts, donors to the AAVSO make the conscious decision to become patrons of citizen science and access to the night sky. According to past AAVSO Treasurer Gary Billings, no other amateur astronomy organizations “have quite the same mix of breadth of observing, permanent and freely accessible data, large number of participating professional astronomers, and funding (this is your part!) for the infrastructure (website, database, meetings) to make it all work.” And from the ever-eloquent past councilor Bob Stine, “Though we variable star enthusiasts are indeed a minuscule percentage of the population, I believe that humankind depends on us to be the developers and keepers/safeguards of the knowledge concerning variable stars, because variable stars are a portal through which a wider and deeper understanding of our beautiful and amazing universe is gained.” I hope that by supporting the AAVSO financially, you will be proud of your important contribution to this endeavor.

Stand back! We’re all going to try SCIENCE. ★

Ed. note: the Spanish language version of Jenó’s message can be found on page 15.

VSTAR VERSION 2.16.8 HAS JUST BEEN RELEASED!

SARA J. BECK (BSJ), AAVSO TECHNICAL ASSISTANT

If you already have `vstar.jnlp` on your computer, you will get this new version automatically next time you use VStar. If you do not yet have VStar, please visit the VStar Overview page (<http://www.aavso.org/vstar-overview>) and click “Download VStar Now.” There is also an excellent User’s Manual (<http://www.aavso.org/files/vstar/VStarUserManual.pdf>) available from the same place.

With this release, a number of bugs were fixed and some useful changes were made to the way the Plugin Manager works. There are also some new ways to launch VStar (available from the SourceForge website) which will help those of you who may have trouble with the Java Web Start version.

Please visit the VStar Forum (<http://www.aavso.org/vstar-2168-release>) to learn more about specific problems that have been addressed.

Many, many thanks to David Benn for all the great work he has done and continues to do in support of VStar! ★

2015 ANNUAL MEETING DATES

The 2015 Annual Meeting of the AAVSO will be held November 12–14 at the Hilton Hotel in Woburn, Massachusetts.

Thursday, November 12th—AAVSO Council Meeting

Friday and Saturday, November 13–14th—Sessions

Details will be posted on the AAVSO homepage and on the main meetings page (<http://www.aavso.org/meetings>) as they are available. ★



Attendees at the 2015 AAVSO Spring Meeting, held at Ball State University, Muncie, Indiana (photos courtesy of Roger Kolman)

A MEETING AT THE CROSSROADS

**MIKE SIMONSEN (SXXN), AAVSO HQ,
MEMBERSHIP AND DEVELOPMENT DIRECTOR**

The state motto for Indiana is “The Crossroads of America.” If you look at a road map of Indiana and its surrounding neighbors, it seems like every road leads to the capitol, Indianapolis, famous for the Indianapolis 500 race held every year.

The 2015 AAVSO Spring Meeting was held in Muncie, Indiana, this year, about 60 miles northeast of Indianapolis. This proved to be an excellent location, allowing people from the Midwest who don’t normally attend the annual meetings in the Boston area an opportunity to participate in an AAVSO meeting. There were new faces in the crowd from Indiana and the surrounding states of Illinois, Ohio, Michigan, Kentucky, Iowa, and Missouri.

The meeting venue was the newly christened Charles W. Brown Planetarium at Ball State University. The planetarium is a state of the art facility, and attendees were treated to an impressive demonstration Friday afternoon at the conclusion of the paper sessions.

I arrived early in the afternoon on Thursday. The 300 miles from my home in Michigan to Muncie can be driven in four hours or less if one drives enthusiastically with the protection of advanced police radar and laser detection equipment. The members of council had all arrived the night before and were in a meeting room in the hotel engaged in the business of leading the AAVSO with our new Director, Dr. Stella Kafka.

I checked into my room and then asked the concierge to ring up Andrew Pearce. I’ve known Andrew for more than fifteen years, but we had never met face to face. Andrew lives in Perth, Australia, and had never been to an AAVSO meeting before. I’ve never had the pleasure of visiting Australia, so at long last we were about to meet. Ironically, Kevin Paxson and I had already made plans to eat at Outback Steakhouse for dinner that evening, a choice that made for a good deal of laughter by all three of us on the car ride to and during our meal!

Thursday night we held a meet and greet ice cream social at the Hampton Inn. Meeting attendees picked up their registration materials and nametags, got to

meet new friends, visit with old ones, eat ice cream, and buy raffle tickets. We had gifts donated by Oceanside Photo and Telescopes, Orion Telescopes, Celestron, and *Sky & Telescope* magazine. Response to our raffle was so great I was concerned we were going to run out of tickets before the end of the night. Operations Director and Events Coordinator Rebecca Turner managed to procure another roll of tickets the next day so we could continue to sell them throughout the meeting. The drawing was scheduled for the night of the banquet.

Friday morning the meeting started with a friendly welcome and introduction by our host, Dr. Ronald Kaitchuck, after which the paper sessions began with a



Tending the raffle table are Gary Walker, Mike Simonsen, and Doug Welch

paper from Horace Smith, a leading expert in RR Lyrae, Cepheids, and pulsating stars of all flavors. This was followed by an interesting paper on CY Aqr by Dave Cowall. He showed us his analysis of data collected from several BSM telescopes.

A half dozen poster authors were then given the chance to introduce their posters before the first coffee break and poster viewing. Andrew Pearce displayed a poster on variable star projects currently under way and the observing methods employed by Variable Stars South. There were two papers discussing various aspects of transformation and the effects on data collected. The Solar Section was represented as well with papers from Kristine Larsen and George Silvis on Sunlight in the International Year of Astronomy and SID monitoring, respectively.

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MEETING CROSSROADS CONTINUED...

The morning paper sessions continued with my paper on Double Trouble stars, mostly Miras with very close companions that make observing them difficult, and a paper from Michael Joner on creating a H-alpha standard star catalog using spectroscopy. The hit of the morning session had to be Joe Ulowetz's talk on the construction of his roll-off observatory. It was delivered with a great deal of humility and humor and was followed by an enthusiastic Q&A session afterwards, mostly of people sharing similar trials in the construction of their own observatories.

Lunchtime offered the opportunity to see a bit of the Ball State campus, as everyone scattered in different directions to find food and drink. The weather was warm and sunny, so a walk around campus was a welcome distraction.

The afternoon paper session began with Roger Kolman and Kristine Larsen presenting a paper from Rodney Howe, who was unable to attend. It was a statistical analysis of sunspot numbers demonstrating the talents and keen eye of the late Tommy Cragg in solar observations over a long, storied career. Susan Oatney discussed her attempts to detect solar motion in the solar atmosphere with a slit interferometer. Matthew Knot presented data analysis of two beta Lyrae stars and his models of the systems using the Wilson-Devinney code. The final paper of the day was a discussion of finding exoplanets in eclipsing binary systems, given by our host Ronald Kaitchuck. After a short coffee break we were treated to a demonstration of the capabilities of the Charles W. Brown planetarium.



The Starkey Observatory

For many of us, this was not the end of the first day. AAVSO member and former councilor, Donn Starkey, and his wife Connie, had invited about two dozen members of the council and the AAVSO's most generous donors to an open house event at his home and observatory in Auburn, Indiana, about 90 miles north of Ball State. We met at the Hampton Inn at 7:30 p.m. and made the 90-minute

drive in a caravan of cars to the Starkeys' residence, where we were given a tour of Donn's observatory and treated to a wine and cheese tasting. At 10:30 we all piled back into our cars and drove back to Muncie, arriving around midnight. It was a bit of a whirlwind event, especially for those of us who were already weary from traveling the day before, but the opportunity to spend time together in the cars and at the Starkeys' was worth the long day. I slept like a stone that night.

Saturday morning started with the AAVSO Membership Meeting. The Membership Meeting began with reports from AAVSO Secretary Gary Walker and AAVSO Treasurer Bill Goff, summarizing the meeting minutes and the organization's finances, respectively. Next came an historic moment as Dr. Kafka presented her first Director's Report to the membership and then handed out several variable star observing awards. This was well received by the people in attendance and those viewing remotely online.

After a short coffee break Donna Young gave an overview of the AAVSO's expansion in education and outreach, and how our efforts in these areas might impact educators, students, and the public involved in future Science Olympiads. The attendees then gathered outside the facade of the Charles W. Brown planetarium for a group picture, followed by a tour of the university's observatory before breaking for lunch. The first paper session of the second day of the meeting began with a talk on the nature of Z Cam standstills. My talk was an attempt to clarify the definition of standstills to aid in the classification of these dwarf novae. I was again followed by Michael Joner, who gave a talk on two variable stars in the same field of view in the constellation Lynx, offering the rare opportunity to obtain photometry on two interesting stars simultaneously. Before the break Richard Post presented results from his supernovae search efforts and the refinements being made to the software used to identify potential SNe candidates.

The final paper session began with Joe Patterson doing an impromptu show and tell, demonstrating the components of dwarf novae and their relative sizes. This served as an introduction to his talk on IM Nor, a recurrent novae very similar to T Pyx. His conclusion was that several other short orbital period "classical novae" may also be recurrent novae candidates. A quick change in the order of presentations led to Michael Cook's paper on the Lowell Amateur Research Initiative and his involvement in a program to monitor young stellar objects. Michael is another AAVSO member I have known for some time, but had yet to meet face to face. He gave an excellent talk and it was a pleasure to finally meet him and his lovely wife, Heather.

Doug Welch gave the final talk of the day on the challenges of identifying and observing variable stars in globular clusters and the efforts made using AAVSONet telescopes and tools being developed for analysis of cluster variables. Unfortunately, this presentation was nearly derailed by the culmination of AV technical difficulties that had appeared in earlier talks. Doug handled it all with his usual humor and poise and the important points were made in spite of the issues.

That evening, people filing into the banquet were given one last chance to enter the raffle drawing for prizes donated by our sponsors as they headed for the cash bar and their seats. It was impressive to see our new Director working the room and deliberately reaching out to everyone at each table. The food served was of very high quality and the service was excellent. After a few words of thanks and recognition from Dr. Kafka and Rebecca Turner, Rebecca read the questions for this year's trivia contest to the crowd. All the questions were taken from the talks, and many of them were quite challenging. While Rebecca tabulated the results we held the drawings for the raffle. It turned out to be quite a night for first-time meeting attendee Richard Glassner from Jefferson City, Missouri. He had the winning ticket three of four times, and walked away with some of the more valuable and coveted items in the drawings.

Driving home on Sunday morning, my impression was that that this was a very successful and satisfying meeting, and I will remember our meeting at the Crossroads of America fondly. I invite those of you who are not yet members to join in supporting this organization that offers such great opportunities for its members and observers, and if you have never attended a meeting, please come when you can—I think you will have a very good time. ★

AAVSO SPRING MEETING

FROM MICHAEL J. COOK (CMJA), NEWCASTLE, ONTARIO, CANADA

I have been a member of the AAVSO since 2010 when I realized that doing science with my telescope and CCD camera is much more rewarding than taking “pretty pictures.” In recent years, I had the privilege of participating in a Pro-Am collaboration, one of many initiated by Lowell Observatory. I had learned about Lowell’s Pro-Am initiatives at the Society for Astronomical Science (SAS) 2012 Symposium.

The Pro-Am collaboration involved monitoring Young Stellar Objects (YSOs). I, along with three other amateur astronomers, monitored a sample of YSOs in BVRI bands, while the professional obtained NIR data. Not long into the collaboration, I made a commitment to write a paper and present it at the 2015 SAS Symposium. When it was announced that the AAVSO was holding its 2015 Spring meeting in Muncie, Indiana, I decided that the Meeting would not only provide me the opportunity to present the same paper ahead of the SAS Symposium, but allow me to attend my first-ever AAVSO meeting. More importantly, I would get to meet other AAVSO members that I only knew through e-mail, social media, chat rooms, and discussion forums. By the way, my very supportive wife, Heather, came along to the AAVSO and SAS meetings. It was great to have her along as she socialized with AAVSO staff, other amateurs, and professional astronomers, and felt welcomed.

Registering for the Meeting and getting on the presenters’ agenda was a breeze thanks to the AAVSO staff and the comprehensive information on the AAVSO web site. I must admit that I was intimidated by the range of other presentations on the agenda (as well as the SAS agenda), but if I’m going to do this, I’m going to jump into the deep end. I noted that on both the SAS and AAVSO meeting agendas, I was the last speaker. Oh my gosh, those are going to be some tough acts to follow—or, as someone remarked to me, they saved the best for last. Right, think positive.



Michael Cook (L), Andrew Pearce (C), and Doug Welch (R) in Ball State Observatory at AAVSO 2015 Spring Meeting

One of the best parts of the Meeting was the first night “meet and greet.” This is a wonderful part of the Meeting that really helps one feel welcome. We introduced ourselves to Doug Welch, Department of Physics, McMaster University, (currently on AAVSO Council) and the only other Canadian at the Meeting. Heather and Doug bonded over ice cream. I had the pleasure of meeting Dr. Stella Kafka, the new Director of the AAVSO, as well as Mike Simonsen, Membership and Development Officer. I had previously met Arne Henden, former Director of AAVSO, and Rebecca Turner, Operations Director, when I attended the AAVSO CCD school in 2013, and it was great to see them again at the Spring Meeting. Heather and I were able to talk up a storm with Arne and his wife Linda about landscapes and sustainability (my other passion).



Joe Patterson (L) and Michael Cook (R) at AAVSO 2015 Spring Meeting

The paper sessions were wide-ranging and entertaining. It never ceases to amaze me the variety of work that amateurs undertake, and the interpretations of AAVSO observations that professionals make during the presentations. To see our collective AAVSO observational data “come to life” in the presentations makes being an AAVSO member so worthwhile.

The lunch breaks were long enough to seek out many culinary venues and have lengthy discussions with other AAVSO members. I had the pleasure of having lunch with Dr. Joe Patterson, Professor, Department of Astronomy, Columbia University, and currently on AAVSO Council. Of course the topic de jour was cataclysmic variables. What an education!

The meeting venue was a delight. Ball State University is a beautiful campus and the hosts thought of every detail that was not otherwise covered by AAVSO staff. Thanks to Ron Kaitchuck, Director, Department of Physics and Astronomy at Ball State, for the use and demo of the planetarium and tour of the unique, roof-mounted, roll-off roof observatory (housing multiple telescopes). Holding the paper sessions and other meetings within the planetarium could not be a better fit. Did I mention the drinks and snacks and morning and afternoon breaks? They were plenty! One of the logistical problems to be overcome for the Spring Meeting was the lack of parking at the venue—and it was too far to walk from the hotels. In the spirit of the gracious hosts becoming of Ball State, Dr. Paul Ferguson, President, made available two buses (because attendees were at two different hotels) to shuttle Meeting attendees between the Meeting venue and the hotels at no cost to us. Thank you, Dr. Ferguson!

To top off the Meeting, a banquet was held Saturday evening with Rebecca Turner as emcee. It was a lovely evening: great food; warm company at our table, great program! I look forward to attending future AAVSO meetings, and I hope to meet many more AAVSO members. ★



Michael Cook (L) and Bill Goff (R) in Ball State Observatory at AAVSO 2015 Spring Meeting

SPRING MEETING REFLECTIONS

JOE ULOWETZ (UJHA), NORTHBROOK, ILLINOIS

First off, although Muncie, Indiana, is relatively near to Chicago (I live in Northbrook, Illinois, on the northern edge of Chicago) as meeting locations go, it is one of those “you can’t get there from here” situations. I had to drive down to Indianapolis first, and from there to Muncie. It was either that or going almost all the way to Ohio and coming down through Fort Wayne. But the drive was certainly worth it to attend the meeting, and Muncie is a nice city, especially around the Ball State University campus where we met.

The weather for the meeting was wonderful, which was oddly a source of tension for me because I wanted to be home using my telescope to take advantage of the clear skies after all the rain I’ve had this spring. I suppose I wasn’t the only one to feel that way.

This was my first AAVSO meeting. It was great to be around other people who used words like “extinction” or “magnitude” without feeling the need to explain what the terms mean. And it was also great to meet people that I’ve been working with remotely for several years, especially the Center for Backyard Astrophysics group that I’ve been helping with, plus the AAVSO staff and other attendees.



Ulowetz Observatory

Before the conference there was a request for presentations and I offered to give one on building a roll-off roof observatory, an adventure of mine that had some “unusual” aspects and seemed to be enjoyed by everyone. Giving a presentation also gave me a chance to become known very quickly by everyone there, and many people came up to me during the rest of the conference to chat and share their own observatory construction stories with me.

I’m really glad I could come, and I’ll certainly attend future meetings when the opportunity presents itself again. ★

ANOTHER AAVSOER IN ASTEROID ORBIT

Longtime member and observer George W. Gliba (GLG), of Greenbelt, Maryland, has joined the ranks of AAVSO members and observers who are recognized in the sky with a minor planet.



George Gliba

Minor planet (4817) *Gliba* was announced in *Minor Planet Circ.* 94384 (D. W. E. Green, Ed.). The citation reads: “George Gliba (b. 1948) is co-founder of the Chagrin Valley Astronomical Society. He has worked at the NASA/Goddard Space Flight Center since 1979 on projects such as IUE, GRO and the Hubble Space Telescope. He is a life-long meteor observer, telescope maker and has seen over 100 comets visually.” Details regarding this main belt object (magnitude 17–19) may be found at http://minorplanetcenter.net/db_search/show_object?utf8=□&object_id=gliba

When we wrote to George to congratulate him, he replied: “Yes, I was surprised, but I have worked at NASA 35+ years, and have been very active as a meteor observer, and am a longtime AAVSO observer and member. Thank you for your additional recognition of my AAVSO association. I had a great visit to AAVSO...last September, and need to try to make an AAVSO meeting now that I am retired. The last AAVSO meeting I was at was in Spring of 1968, but I got to see and talk to Leslie C. Peltier, and that was awesome. It is time for me to come back into the fold more....”

Come back, George! Congratulations, and good orbiting!

For a list of AAVSO members, observers, and friends who “own” a minor planet, please see <http://www.aavso.org/minor-planet-names-honor-aavso-members-and-observers>. ★

from the AAVSO Archives

A RARE PRIVILEGE

CARLA. FEEHRER

compiled by Michael Saladyga, AAVSO Headquarters

“To further the pursuit of knowledge in its application to the noblest of the sciences.” This reason for being a variable star observer, which AAVSO founder William Tyler Olcott so eloquently expressed over a hundred years ago, has resonated with so many AAVSO members throughout its history, many of whom have expressed it in letters that can be found in our archives. Such expression is not just something that used to happen 80 or 100 years ago; it happens all the time, as can be seen in this letter from Carl E. Feehrer (1936–2012) to AAVSO Director Janet A. Mattei in October 1999. Carl, who was a solar observer, and would become Solar Division Chairman, had just joined the AAVSO in 1998 and volunteered to do work at Headquarters. He was eager to help in every way he could, and he explained his reasons why in a letter to Janet.

I’m occasionally asked by friends what I do at AAVSO and why I do it. Often they don’t understand that, in addition to whatever immediate rewards might be attached to stargazing, I regard the opportunity to contribute to a base of scientific knowledge that has been accumulating almost since the dawn of Man to be a rare privilege. And, for one like me who comes from outside the professional astronomy community, it remains so even when that “contribution” consists primarily of reworking a few data points, or preparing charts for dissemination, or attracting new observers to the fold, or whatever. I suspect that you *will* understand my perspective on the “gift” that I believe you, AAVSO, and, in the largest sense, amateur astronomy have given me, and that is why I tell you. ★



Carl Feehrer in 2004

ARLO U. LANDOLT RECIPIENT OF 2015 LESLIE C. PELTIER AWARD

ROGER KOLMAN (KRS), GLEN ELLYN, ILLINOIS

Leslie Peltier was one of my mentors when I joined the AAVSO in 1962. Our friendship continued until his death in May 1980.

At that time I was Secretary of the Astronomical League. At our annual meeting in Dallas, I proposed that the League establish an award named after Peltier to honor those who have provided observations of lasting value to astronomy. League Council gave me the okay provided I could put all of the details in place. I was named chair of the award committee and have retained that position since 1980. The first award was made to Peltier posthumously in the autumn of 1980 and was presented to his widow, Dorothy (Dottie) Peltier.

In 1981, the award was presented to Ed Halbach, one of the founders of the Astronomical League and a leading AAVSO member-observer. Through the years the AAVSO has been well represented by recipients of this award (see list at <http://www.aavso.org/astronomical-leagues-leslie-c-peltier-award>).

This year, the AAVSO is again represented by Dr. Arlo U. Landolt (LAL), who is the recipient of the 2015 Leslie C. Peltier Award. The award will be presented during ALCon 2015 (the Astronomical League Convention) in Las Cruces, New Mexico, at the organization's award banquet on July 11, 2015.

The sky first attracted Arlo's attention as a farm boy out on the prairies of southern Illinois. When it was too hot to sleep in the farmhouse, he would sleep on the hay frame wagon out in the barnyard. He would look up and watch the stars move across the sky as the night progressed. The different patterns, brightnesses, and colors were a wondering spectacle!

This led to a professional life both as a university professor and as an observational astronomer specializing in astronomical photometry. The detectors have changed over time, from photographic photometry in the early days to photoelectric photometry to modern CCD photometry. Observing and being able to watch the sky through the open slit always has been a source of wonderment and joy. The smell of the night air, following the stars as they wended their way across the sky through the night and throughout the year, has been shrouded in a kind of mysteriousness. This love of something defines the word "amateur."



Arlo Landolt

Arlo's observing has centered on standard star sequences, both distributed over the sky and for individual variable stars. These sequences in the Johnson UB_V and Johnson-Kron-Cousins UB_VRI photometric systems are of use to the entire astronomical observational community, since the standard stars range in brightness between 7th and 22nd magnitudes in V. The color range in the Johnson (B-V) is between -0.3 and +2.0, or so. These standards are adaptable to use with any detector in the amateur or professional community.

Over the years, Arlo has given dozens of lectures to groups at small institutions with no astronomers on staff. Many attendees were amateurs. These lectures allowed interaction with individuals interested in observational programs and techniques. The reprints from his publications had finder charts enabling unambiguous identification of his standard stars. The stars covered a range in brightness, so that there was a calibrating star for every need. Amateurs then could calibrate, could transform their data, to a standard photometric system, thereby making more reliable the inter-comparison of data with those of other observers. The sequences he established and published from his own data enable anyone to tie in their own measurements. The calibrated photometry of various variable stars Arlo observed should be able to aid in establishing the zero point of variable star light curves where such effort is of value.

In addition, these standard provide value for photometry of asteroid, minor planets, satellites, comets, and any other astronomical object needing accurate calibration.

This award is richly deserved and we offer congratulations to Arlo for his valuable contributions to astronomy! ★

AAVSO IN THE LONE STAR STATE

A few AAVSOers were seen whoopin' it up at the 38th Annual Texas Star Party, held last May at the Prude Ranch near Fort Davis, Texas, just 12 miles from the McDonald Observatory. Yeehaw! ★

Corralled for a photo at the Texas Star Party were (from left): Brad Walter (WBY) of Lockhart, Texas; Ed Wiley (WEY) of Georgetown, Texas; Sara Beck (BSJ), and John O'Neill (ONJ) of Topsfield, Massachusetts.



REVITALIZING THE JOURNAL OF THE AAVSO

JOHN R. PERCY, EDITOR, *JAAVSO*
DEPARTMENT OF ASTRONOMY, UNIVERSITY OF TORONTO



John Percy

The *Journal of the AAVSO (JAAVSO)* is a vibrant, on-line, open-access journal which serves the AAVSO and the astronomical community well—even though its audience is very diverse. Papers are rigorously refereed, and carefully edited and formatted by our editorial and production staff. Nevertheless, it can always be improved. Our new Director

Dr. Stella Kafka comes to us with a strong background in both astronomy and publishing, so it is not surprising that one of her first priorities is to raise *JAAVSO* to a new level. Our goals are to achieve a high level of professionalism and impact as a research and education publication, and to better serve our unique audience of astronomy professionals, amateurs, teachers, and students. Impact is often measured by the number of citations to each paper, but citations are not the be-all and end-all for our papers. It certainly helps, though, to make sure that *JAAVSO* is brought to the attention of as many other researchers as possible.

One way is by making the journal more international. We took advantage of retirements from the *JAAVSO* Editorial Board to add six new international members; we welcome Drs. Zhibin Dai (Yunnan Observatories, China), Kosmas Gazeas (University of Athens, Greece), John B. Hearnshaw (University of Canterbury, New Zealand), Katrien Kolenberg (Universities of Antwerp, and of Leuven, Belgium), Ulisse Munari (Astronomical Observatory of Padua, Italy), and Nikolaus Vogt (Universidad de Valparaiso, Chile). We are glad that most of the present members of the Editorial Board are willing to stay on for a year or two, to provide continuity: Geoff Clayton, Ed Guinan, Laszlo Kiss, Paula Szkody, Matthew Templeton, Doug Welch (on leave), David Williams, Tom Williams, and Lee Anne Willson.

We also want to enhance our refereeing process. We need to expand our “stable” of referees, to make it more inclusive and international, and to ensure that we do not overload our present referees, who work tirelessly and voluntarily for the betterment of *JAAVSO*. We want to ensure that our refereeing system is fair to authors, especially amateurs and students. We are even considering trying “double-blind” refereeing, in which neither the author nor the referee knows the other’s identity. We also want to speed up the publication process, even though the papers have to go through a rigorous refereeing and editing process.

JAAVSO 2015

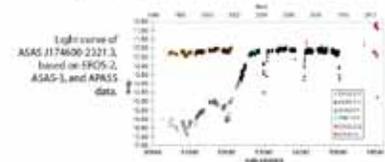
There’s a new look to *The Journal of the AAVSO* beginning with the current issue, Volume 43, Number 1 (June 2015). Its large page size, double column format not only enhances readability and eye-appeal, it also makes more efficient use of space for text, tables, and figures.

The improved format is just one of several new initiatives taken, “to better serve our unique audience of astronomy professionals, amateurs, teachers, and students,” as Editor John Percy notes in his statement above.

JAAVSO Volume 43
Number 1
2015

The Journal of the American Association
of Variable Star Observers

The Curious Case of ASAS J174600-2321.3:
an Eclipsing Symbiotic Nova in Outburst?



Also in this issue...

- The Early-Spectral Type W UMa Contact Binary V148 And
- The 6 Scott Rotation Periods in IC 519216
- UGRB Hunting among Algol Variables
- Early-Time Flux Measurements of SN 2014J Obtained with Small Robotic Telescopes: Extending the AAVSO Light Curve



The American Association of Variable Star Observers
49 Bay State Road, Cambridge, MA 02138, USA

At the same time, the AAVSO Headquarters staff has been working very hard to make *JAAVSO* more user-friendly. You will notice that the *JAAVSO* web page <http://www.aavso.org/apps/jaavso/> contains a list of all the accepted papers for the current issue, now classified by subject. There are also links to all the information that you would need to submit a paper to *JAAVSO*. There is even a search function, which you can use to search all published issues for papers on specific subjects.

One of our future goals—which is dear to my heart—is to encourage more papers with student authors or co-authors, especially undergraduate students, and even high school students. As well as contributing to research, such papers can provide guidance and models and inspiration to other students and their supervisors. This will require us to provide appropriate information for them on how to prepare papers, and also to identify referees who can provide constructive and respectful advice on both the scientific and the educational aspects of the paper.

So the bottom line is: whether you are a professional, amateur, or student, please consider submitting a paper to *JAAVSO*. We welcome original papers on observational studies, analysis of archival data, description of innovative observational techniques or instrumentation, novel and effective education or outreach activities, and historical and biographical studies related to variable star astronomy. Check our web page. If you have further questions, or suggestions about what kind of support we can provide, please let us know. And keep reading *JAAVSO*! It’s there for you! ★

Of special interest to AAVSO members and observers in the current *JAAVSO* is “Some Personalities from Variable Star History,” edited by Thomas R. Willams and Michael Saladyga. This is a collection of sixty-six biographical sketches, written by twelve contributors, of men and women who have contributed to the advancement of variable star astronomy and to the continuation of the good fellowship of AAVSO members.

Also remember that printed copies of *JAAVSO* are available through the AAVSO website: <http://www.aavso.org/order-journal-aavso>

We hope you will enjoy both the form and content of this *JAAVSO* issue and of those to come! ★

MY FIRST SKYPE PRESENTATION

ROGER KOLMAN (KRS), GLEN ELLYN, ILLINOIS

During my 53 years as a member of the AAVSO I have had many adventures. I have been an active visual observer, a member of the Mentor Program, a member of the Speakers' Bureau, and have the honor of serving membership as a member of Council.

As age has crept in, my observations have been reduced quite a bit, but my interest in public outreach and Council service remain strong.

I retired from my full time job in 2005 and shortly thereafter joined the faculty of Harper College teaching astronomy. This afforded me the chance to "spread the word" about our marvelous universe and the role the AAVSO plays in its understanding.

I always have enjoyed giving talks to local clubs. Mike Simonsen urged me to join the Speakers' Bureau and this has provided the opportunity to meet members of many organizations near my home. Mike is a most energetic and enthusiastic speaker who travels across the country to give his talks, but also gives talks on-line throughout the world. He encouraged me to give on-line talks, but I resisted.

This changed when I received an e-mail, in April 2015, from Ellen Seebacher, who teaches an astronomy course at Voyagers Home School Co-op in Massachusetts. She was looking for a culminating talk on cosmology. Her request piqued my interest, and following several discussions, we arranged for a SKYPE presentation to be given on May 4 of this year—her final class.

Her students ranged from a delightful eight-year old to high school students. We spent an hour on-line (the eight-year old wished it could have gone on longer). There were many good questions and it gave me the opportunity to present the AAVSO to a group of youngsters.

I sent my presentation to Ellen, so she showed the presentation on one computer while I viewed her class and they viewed me on another. My only regret was that the slides were not numbered. I plan to do this again in the future, but will number the slides so that we are sure of keeping in sync. This was a most rewarding experience and is one I will repeat. Mike was absolutely right.

If you are an experienced member of the AAVSO and a good public speaker, please consider joining the Speakers' Bureau, sharing your knowledge with others, and helping increase our membership.

For more information contact Donna Young at donna@aavso.org. ★

AAVSOER CHOSEN AS ASTRONOMY IN CHILE EDUCATOR AMBASSADOR

AAVSO member and observer Mike Prokosch (PMB, Huntsville, Texas) has been chosen to participate in the new Astronomy in Chile Educator Ambassadors Program (ACEAP), which is being headed by Dr. Tim Spuck (National Radio Astronomy Observatory and education officer for Associated Universities, Inc.).

To quote from the ACEAP website, "The Astronomy in Chile Educator Ambassadors Program (ACEAP) is a collaboration between AUI, the National Radio Astronomy Observatory, National Optical Astronomy Observatory, and Gemini Observatory, and is supported by the National Science Foundation (NSF 1439408). The program brings amateur astronomers, planetarium personnel, and K-16 (formal and informal) astronomy educators to US astronomy facilities in Chile. While at these facilities, ACEAP Ambassadors will receive extensive training about the instruments, the science, data products, and communicating science,

technology, engineering, and mathematics (STEM) concepts. When they return home, the Ambassadors will share their experiences and observatory resources with schools and community groups across the US."

Mike writes: "I am very excited. The actual trip starts June 20 and ends June 30. I am one of 9 that were chosen to participate in this adventure, including visits to CTIO, Gemini South, and ALMA including the high altitude site. I plan on observing as much as time allows while there, particularly attempting to knock out the 'southern hemisphere stars' I can not see from here in Texas.

"I will be blogging about my trip here while I am there and after:

<http://www.huntsvilleastronomy.org/seeing-stars-blog>

"I hope that when I do talk about variable stars that I am moderately accurate... Here are a few other relevant links:

More about ACEAP

<https://public.nrao.edu/look-deeper/aceap/about-aceap>

Press release from NRAO

<https://public.nrao.edu/news/pressreleases/aceap-2015-team>

Facebook page for ACEAP

<https://www.facebook.com/AstronomyAmbassadorsProgram?ref=hl> "

Congratulations, Mike! Have a wonderful adventure—and come give a presentation to us at an AAVSO meeting! ★



Mike Prokosch

IN MEMORIAM

MEMBERS, OBSERVERS, COLLEAGUES,
AND FRIENDS OF THE AAVSO



J. Robert Andress

J. ROBERT ANDRESS

(AJR, Green Valley, Arizona) died on May 11, 2015, at the age of 83. An AAVSO member 1971–1981, Bob contributed 3,790 variable star observations made September 1968–November 1998. A science teacher and planetarium operator with a special love for Questar telescopes,

Bob was a mentor to many interested in astronomy. In addition to variable stars, which he discussed with his friend, longtime AAVSO member and Past President Art Stokes, Bob enjoyed observing lunar grazing occultations with other longtime AAVSO members Robert Clyde and Chris Stephan. He also directed the Stephens Memorial Observatory of Hiram College for many years, and was a Past President of the Mahoning Valley Astronomical Society. In retirement years he was very active in the Sonora Astronomical Society. We extend sincere sympathy to Bob's wife Lois and their family, and to Bob's many friends.



Don Hurless

DON HURLESS

(Lima, Ohio) died June 15, 2015, at the age of 87. Don was not an AAVSO member or observer, but he was an avid amateur astronomer, and, as the husband of longtime AAVSO member/observer Carolyn Hurless (HR), he was well-known to many AAVSOers over the years.

Don was a very gifted professional musician, and played the piano and harpsichord beautifully. He

taught generations of students, many of whom went on to pursue musical careers, and was a generous and enthusiastic mentor to them; he continued his teaching until shortly before his death. Don's studies in composition and orchestration, as well as piano, led him to be an able composer of both instrumental and choral music that ranged in style from jazz to classical to popular and was often performed. He founded the Don Hurless Band and performed in the Don Hurless and the Notables group. He enjoyed performing jazz and lecturing in the northwestern Ohio region. Don was also an expert harpsichord builder, and lectured on the instrument. He sometimes entertained at AAVSO meetings, and it was a true delight to listen to all those astronomy-themed songs ripple from the keyboard under his skillful fingers. He was always grateful that the childhood polio that left him with difficult walking did not affect his hands or arms. Our sincere condolences go to Don's family, his beloved students, fellow members of the Lima Astronomical Society, and friends and colleagues.



Carolyn and Don Hurless, 1970

Thanks go to Paul Sventek and George Kelley for providing additional information used in this obituary.



Leroy F. Snyder

LEROY F. SNYDER

(SX, Carson City, Nevada) died March 29, 2015, at the age of 87. An AAVSO member/observer since 1986, he contributed 175,334 CCD and PEP observations made between September 1988 and December 2011 to the AAVSO International Database. He was

particularly interested in eclipsing binaries and published numerous papers on individual stars, and participated in several research collaborations with professional astronomers. Lee was among the leadership of the Western Wing of the International Amateur-Professional Photoelectric Photometry (IAPPP), which eventually became the Society for Astronomical Sciences (SAS); he was the SAS President for a number of years. A decorated veteran, Lee was a career U.S. Air Force officer, serving 25 years in the Strategic Air Command as a B-52 bomber pilot and retiring with the rank of Colonel. Minor planet (218692) *Leesnyder* was named in his honor. Lee was a frequent speaker about astronomy and was a mentor to many regarding observing and instrumentaion. His cheery and generous personality resulted in a great many friends who thought of him with affection (despite his persistent tendency towards corny or bad jokes). Our sincere condolences go to Lee's family and many friends.

Thanks go to Robert Stephens and Robert Buchheim for providing information for this obituary. Photo courtesy of Robert Stephens

—obituaries compiled by Elizabeth O. Waagen

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:

February 7, 2015—**John R. Percy** (Toronto, Ontario, Canada) gave a pre-concert lecture on “Astronomy, Music, and Art” for SpectrumMusic’s “Starry Night” concert of new music at the Alliance Française de Toronto.

February 26–March 19, 2015—**John Percy** gave an “Astronomical Potpourri” course for later-life learners which included a lecture on “The Birth, Life, and Bizarre Deaths of Stars,” Chang School of Continuing Studies, Ryerson University, Toronto.

March 4–25, 2015—John Percy gave his “Astronomical Potpourri” course for later-life learners including the lecture on “The Birth, Life, and Bizarre Deaths of Stars,” Jubilee United Church Later-Life Learning Program, Toronto.

April 25, 2015—**Roger S. Kolman** (KRS, Glen Ellyn, Illinois) gave a talk on “Mike Simonsen’s AAVSO ZCAMPaign” at Astronomy Day at Harper College, Palatine, IL.

April 29, 2015—**Gary Poyner** (PYG, Birmingham, UK) gave a talk on “Historical Novae” to the Chester Astronomical Society, Chester, UK.

May 4, 2015—**Roger Kolman** gave a Skype presentation on cosmology to the students of the Voyagers Home School Co-op in Massachusetts. See the article in this newsletter about this event.

May 5, 2015—**John Percy** gave the astronomical travelogue and commentary for an astronomy-themed concert of the Aslan Boys Choir of Toronto.

May 24–27, 2015—**John Percy** and **Joanna Huang** presented a poster paper titled “Studies of Pulsating Red Giants” (using AAVSO data) at the meeting of the Canadian Astronomical Society (the Canadian professional astronomical society) in Hamilton, Ontario.

June 17, 2015—**Frank Dempsey** (DFR, Locust Hill, Ontario, Canada) gave a talk titled “Aboriginal Constellations and Starlore” at the Barrie Public Library, Barrie, Ontario. Frank reports that this talk was well attended and had been announced by the public library as one of its “National Aboriginal week” activities. The audience was composed of people who were keen to hear about constellations of the native North Americans.

July 4, 2015—**Frank Dempsey** will give a talk titled “Studies of the Variable Star Betelgeuse using Observations from Amateur Astronomers” during the General Assembly of the Royal Astronomical Society of Canada, Halifax, Nova Scotia.

July 8, 2015—**Frank Dempsey** will give a talk titled “Solar Cycle 24 Update” at the Toronto Centre meeting of the Royal Astronomical Society of Canada, Toronto, Ontario.

September 1, 2015—**Roger Kolman** will give a talk on “Mike Simonsen’s AAVSO ZCAMPaign” to the Naperville Astronomical Association, Naperville, Illinois.

Chris Stephan (SET, Wooster, Ohio), who owns Classical Science, an interesting astronomy and antique science equipment store, is holding workshops on science, including astronomy and observing, over the next several months. The workshops are open to the public at no cost. Chris is using his decades of experience as a science teacher and as a well-rounded amateur astronomer and observer to help more people—especially young people—connect to and be excited by science and nature. The time is 7:30–9 p.m. Central Time (see www.OhioTelescopeandMicroscope.com for directions, etc.). The workshops are:

June 23—Choosing a telescope and how to use it

July 28—Microscopes

August 25—Binoculars and spotting scopes

September 29—Using antique scientific instruments

October 23—Astrophotography and imaging through telescopes (taught by Roy and Jodi McCullough of the Mahoning Valley Astronomical Society)

John Percy also reports that he published a paper titled “What My Students and I Have Learned About Pulsating Red Giants” (from AAVSO data) in the *Journal of the RASC*, **109**, 39–41 (2015). John and his students have been studying pulsating variables for many years and have used the data in the AAVSO International Database extensively. They have contributed many talks at AAVSO (and other) meetings on their researches and published many related papers in the *Journal of the AAVSO* and other scholarly publications. John is a true advocate of students learning by doing and of using variable stars in education, and has mentored dozens of students from high school on up in research on variables, often using AAVSO data. Thank you, John!

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 October 2015 *AAVSO Newsletter* (submission deadline September 15, 2015). Many thanks for your education and outreach efforts on behalf of the AAVSO and variable star observing! ★

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 2015 April 15 through June 30 on the arXiv.org preprint server and used AAVSO data or resources and/or acknowledged the AAVSO. To access these articles, type the preprint number into the “Search or Article-id” box at <http://www.arXiv.org>.

- M.R. Ghoreyshi, A.C. Carciofi, L.R. Rimulo et al., “Modeling the Complete Lightcurve of omega CMa” (arXiv:1506.8902)[Jun 29, 2015]
- U. Munari, R. Jurdana-Sepic, P. Ochner et al., “Outburst evolution, historic light curve and a flash-ionized nebula around the WZ Sge-type object PNV J03093063+2638031” (arXiv:1506.8526)[Jun 29, 2015]
- L. Izzo, M. Della Valle, E. Mason et al., “Early optical spectra of nova V1369 Cen show presence of Lithium” (arXiv:1506.8048)[Jun 26, 2015]
- Geza Kovacs, “Are the gyro-ages of field stars underestimated?” (arXiv:1506.6267)[Jun 20, 2015]
- Elia M. Leibowitz and Liliana Formiggini, “Periods in a 87 Years Light Curve of the Symbiotic Star MWC 560” (arXiv:1506.5584)[Jun 18, 2015]
- V. V. Neustroev, S. V. Zharikov, N. V. Borisov, “Voracious vortexes in cataclysmic variables. Multi-epoch tomographic study of HT Cassiopeiae” (arXiv:1506.4753)[Jun 15, 2015]
- G. Rau, C. Paladini, J. Hron et al., “Modelling the atmosphere of the carbon-rich Mira RU Vir” (arXiv:1506.3978)[Jun 12, 2015]
- Costantino Sigismondi, “Observational Accuracy of Variable Stars, Novae and Supernovae from Naked Eye to General Relativistic Standard: a Balance over Thousand SGQ Observations Sent to AAVSO” (arXiv:1506.3770)[Jun 11, 2015]
- A. S. Binks, R. D. Jeffries and P. F. L. Maxted, “A Kinematically Unbiased Search for Nearby Young Stars in the Northern Hemisphere Selected Using SuperWASP Rotation Periods” (arXiv:1506.3226)[Jun 10, 2015]
- V. P. Kozhevnikov, “Extensive photometry of the WZ Sge-type dwarf nova V455 And (HS2331+3905): detection of negative superhumps and coherence features of the short-period oscillations” (arXiv:1506.3217)[Jun 10, 2015]
- L. D. Matthews, M. J. Reid, K. M. Menten, “New Measurements of the Radio Photosphere of Mira based on Data from the JVLA and ALMA” (arXiv:1506.3075)[Jun 9, 2015]
- Deanne L. Coppejans, Elmar G. Koerding, James C.A. Miller-Jones et al., “Novalike Cataclysmic Variables are Significant Radio Emitters” (arXiv:1506.0003)[May 29, 2015]
- M.-S. Xiang, X.-W. Liu, H.-B. Yuan et al., “The evolution of stellar metallicity gradients of the Milky Way disk from LSS-GAC main sequence turn-off stars: a two-phase disk formation history?” (arXiv:1505.8063)[May 29, 2015]
- Krystian Ilkiewicz, Joanna Mikolajewska, Brent Miszalski et al., “LMC S63: a historical reappraisal of the outburst behaviour of a deeply eclipsing Magellanic symbiotic star” (arXiv:1505.7740)[May 28, 2015]
- Jeremy Shears, James Boardman, David Boyd et al., “Results of a campaign to observe outbursts of the dwarf nova CSS 121005:212625+201948” (arXiv:1505.7709)[May 28, 2015]
- Philip Massey, Kathryn F. Neugent, and Nidia Morrell, “A Modern Search for Wolf-Rayet Stars in the Magellanic Clouds. II. A Second Year of Discoveries” (arXiv:1505.6265)[May 23, 2015]
- Dongwon Kim, Helmut Jerjen, “Double Pendulum: a Second Ultra-faint Milky Way Satellite in the Horologium Constellation” (arXiv:1505.4948)[May 19, 2015]
- G. H. Schaefer, T. ten Brummelaar, D. R. Gies et al., “The Expanding Fireball of Nova Delphini 2013” (arXiv:1505.4852)[May 19, 2015]
- G. Zhou, D. Bayliss, J. D. Hartman et al., “A 0.24+0.18 Msun double-lined eclipsing binary from the HATSouth survey” (arXiv:1505.2860)[May 12, 2015]
- Adam Popowicz, Andrzej Malcher, Krzysztof Bernacki et al., “A passive FPAA based RF scatter meteor detector” (arXiv:1505.2366)[May 10, 2015]
- V. Nascimbeni, M. Mallonn, G. Scandariato et al., “An LBT view of the atmosphere of GJ1214b” (arXiv:1505.1488)[May 6, 2015]
- P. Mroz, A. Udalski, R. Poleski et al., “OGLE Atlas of Classical Novae I. Galactic Bulge Objects” (arXiv:1504.8224)[Apr 30, 2015]
- B. Poppe, T. Plaggenborg, W. Zheng et al., “Early-Time Flux Measurements of SN 2014J Obtained with Small Robotic Telescopes: Extending the AAVSO Light Curve” (arXiv:1504.6550)[Apr 24, 2015]
- M. Henze, J.-U. Ness, M. J. Darnley et al., “A remarkable recurrent nova in M 31: The predicted 2014 outburst in X-rays with Swift” (arXiv:1504.6237)[Apr 23, 2015]
- U. Munari, F. M. Walter, A. Henden et al., “Photometric evolution and peculiar dust formation in the gamma-ray Nova Sco 2012 (V1324 Sco)” (arXiv:1504.6031)[Apr 20, 2015]
- Jae Woo Lee, Jae-Hyuck Youn, Jang-Ho Park et al., “The Physical Nature and Orbital Behavior of the Eclipsing System DK Cygni” (arXiv:1504.3752)[Apr 15, 2015]

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 ★.

DONATING TO AAVSO VIA AMAZON.COM AND AMAZONSMILE

MIKE SIMONSEN (SXN), AAVSO HQ, MEMBERSHIP AND DEVELOPMENT DIRECTOR

The good news is—there is more than one way to donate to AAVSO via Amazon.com. The bad news is—it is not as straightforward or easy as it could be.



The links from our website that connect users to our Amazon Associates Program direct you to an Amazon home page via the URL:

<http://www.amazon.com/?tag=aavso-20>.

When you land there, 5% of your total purchase price on all eligible items (those shipped from Amazon.com, not a third party) is donated directly to the AAVSO, at no additional cost to you. Once we hit a certain level, the percentage donated goes up to 6%. **Simply put, for every \$100.00 you spend on Amazon.com purchases via the Associates program, the AAVSO receives at least \$5.00.**

This is a great program, it has been in place for years, and it has netted the AAVSO thousands of dollars in cash and goods. The one drawback of this program is the fact that you have to enter Amazon.com through the AAVSO-Amazon Associates portal for your purchase to be counted towards an AAVSO donation.

It is easy to forget to start at the AAVSO website to access this program. One simple solution is to create a bookmark in your browser. Mine is in a folder called “Online Shopping.” I still forget to begin my online shopping there sometimes, but I’m better at remembering now that I don’t have to specifically click on a link on the AAVSO website.

Now there is AmazonSmile. This is a newer service that works in a similar way to our associates program, however this application requires you to register and select the charitable organization of your choice to donate a percentage of your purchase price. You go to <http://smile.amazon.com/> to register and choose AAVSO as the organization of your choice.

The common misconception about this program is that once registered you will always be automatically directed to AmazonSmile whenever accessing Amazon.com from your computer or mobile device. This is not true. You still have to make the conscious decision to use the AmazonSmile app.

You can download a button for your Firefox or Chrome browser, but be sure it is the yellow/gold button for AmazonSmile, not the dark grey button for the Amazon 1Button App, referred to in the email you receive upon registering. The AmazonSmile bar at the top of the page in Chrome looks like the image at the bottom of the page.

You can also download a button for your Android or Mac mobile device. You’ll know you have the right one if the AmazonSmile logo is displayed prominently at the top of the page when you open it.



The other important difference between AmazonSmile and our existing associates program is the amount donated. **AmazonSmile donates 0.5% of your purchase price to the AAVSO, or 50 cents per \$100.00.** Even though the AAVSO loses \$4.50 per \$100.00 of purchases, 50 cents per \$100 via AmazonSmile is better than nothing.

If you’d like to donate through Amazon, but you just can’t trust yourself to remember to go through the AAVSO site, a bookmark, or a shortcut, there are third-party programs that will automatically redirect all Amazon URLs to AmazonSmile. Googling “Redirect Amazon Smile” will find most of them. These redirect programs are not supported by Amazon.com or the AAVSO, so buyer beware.

Donating to the AAVSO through Amazon—whether through AmazonSmile or contributing 10 times as much by going through the Amazon Associates Program—is a great way to support the AAVSO. Thank you! ★



Ed. note: following is the Spanish language text of Stella's Director's message.

MENSAJE DEL DIRECTOR STELLA KAFKA

La era dorada de la astrofísica de dominio temporal

Gaia. LSST. JWST. TESS. Estas son algunas de las misiones/relevamientos de los cuales habitualmente se habla en los círculos de los astrónomos profesionales, que tienen como objetivo revelar la misteriosa naturaleza de la energía oscura y que estudian exoplanetas parecidos a la Tierra alrededor de estrellas de nuestra galaxia. Inevitablemente también detectarán una enorme cantidad de objetos variables—tanto conocidos como nuevos. Los científicos de Gaia hablan de “1000 alertas por día” de estrellas variables no identificadas en el campo del satélite. Los científicos del LSST predicen 10^6 (es decir, un millón) de alertas por día de objetos cuya naturaleza variable requerirá de investigación adicional. El paisaje de la astronomía de estrellas variables parece estar cambiando; a partir de toda esa cantidad de “alertas,” habrá una necesidad de seguimiento inmediato de las explosivas y un análisis más cuidadoso de las periódicas interesantes. Los astrónomos profesionales de todo el mundo están poniendo mucho empeño en prepararse para responder al desafío. Se están construyendo nuevos espectrógrafos, se están encargando polarímetros, se están probando nuevas antenas de radio (ALMA, SKA, etc.), se está discutiendo el futuro de la astronomía de rayos

x, los astrónomos están planeando observaciones, propuestas, colaboraciones....

¿Dónde encajamos nosotros en este panorama? ¡Somos quienes proveeremos de curvas de luz ópticas! El mayor indicador de que una estrella es variable y de la naturaleza de esta variabilidad, proviene de los cambios de brillo de la estrella en longitudes de onda ópticas. La comunidad de astrónomos profesionales siempre está ansiosa por construir el “más grande,” el “mejor,” “el de mayor resolución,” en cuanto a instrumentos, pero los datos de la AAVSO son una guía para sus observaciones de objetos interesantes. Para poder entender los espectros, ondas de radio, rayos X, etc., etc., de una fuente variable, las curvas de luz ópticas son esenciales. Y la única forma de asegurarse de que una curva de luz se obtenga continuamente es a través de una red de observadores que estén dispuestos a tomar datos de fuentes variables en apoyo de esa ciencia. Es por medio de los observadores de la AAVSO. Es gracias a VUESTRO duro trabajo.

Es aquí donde la AAVSO se vuelve un recurso vital para los investigadores de estrellas variables. Nuestra red internacional está lista para responder a pedidos de observación y a proveer datos valiosos que serán parte de publicaciones científicas y comunicados de prensa. Cuando las instalaciones profesionales terrestres están condicionadas por el clima, problemas técnicos, problemas de calendario o por las leyes de Murphy, al menos un observador de la AAVSO probablemente pueda obtener datos

bajo cielos despejados. Podemos observar tanto objetos brillantes como débiles, capturar las etapas iniciales de erupciones, el ingreso o egreso de eclipses, períodos de pulsación y eventos de microlentes. Estamos tanto en el hemisferio norte como en el sur y cubrimos el mundo por completo. A través de la AAVSO, la comunidad astronómica tiene acceso a más de un millar de “observatorios” individuales y a un grupo de observadores que son confiables.

La reciente erupción de V404 Cyg es una demostración clara de lo que los observadores de la AAVSO pueden hacer y cómo la sinergia entre astrónomos profesionales y no-profesionales da como resultado ciencia de calidad. Los telescopios más grandes de la Tierra están observando esta fuente ahora mismo y se está consiguiendo acceso a los observatorios espaciales, todo en base al comportamiento peculiar de V404 Cyg que se reveló gracias a las curvas de luz de la AAVSO. En algún momento, espero ver alguno de los resultados científicos publicados en nuestro *Journal (JAAVSO)*. Y espero que esta interacción y cooperación entre ambas comunidades continúe y se incremente a medida que más objetos de interés emerjan en esta era dorada de la astronomía de dominio temporal que está llegando.

¡Gracias a todos por su gran trabajo y por su apoyo a la AAVSO!

Saludos—cielos claros,

—Stella. ★

Ed. note: following is the Spanish language text of Jenó's President's message.

MENSAJE DEL PRESIDENTE JENO SOKOLOSKI

Invirtiendo en nuestra comunidad

Recientemente, vi a una mujer que llevaba una remera que decía: “¡Hazte a un lado! Voy a intentar hacer CIENCIA”, y mostraba una figura de palitos que agitaba un vaso de precipitados burbujeante en una mano y una calculadora en la otra. Me encanta esta camiseta porque juega con la idea de que la ciencia es algo restringido a profesionales que lo hacen muy lejos, a una distancia segura, en sus laboratorios de aguas cristalinas y torres de marfil. Creo que la sociedad se ve beneficiada al tener ciudadanos que entienden, abrazan y tienen acceso directo a los descubrimientos científicos. De hecho, eso es parte de por qué apoyo a AAVSO. En esta columna—que es una descarada convocatoria para recaudar fondos—enumero algunas de las razones

por las que usted también querría apoyar o aumentar su apoyo a AAVSO.

Al igual que yo, quienes invierten en AAVSO son defensores de la ciencia. En mi experiencia, a la mayoría de la gente le gusta la astronomía. ¿Cuántas veces, después de responder a la pregunta acerca de qué hago para ganarme la vida (astronomía), he escuchado las respuestas, “¡Eh, qué bueno!”, y luego, “Cuando era joven, quería ser astrónomo/científico”? Porque soy parte de AAVSO puedo explicar que uno no tiene que pasar años en cursos de posgrado para convertirse en un astrónomo. Las variaciones en el brillo de las estrellas son diagnósticos cruciales para la física fundamental en el Universo. Por lo tanto, la observación de estrellas variables permite a cualquier persona hacer importantes contribuciones a la vanguardia de la investigación astronómica. El segundo vicepresidente de AAVSO, Roger Kolman, describe la importancia científica de las observaciones de estrellas variables por parte de los aficionados de esta manera:

“Piense en el diagrama HR como una imagen estática que se convierte en dinámica a medida que aportamos nuestras observaciones. Hemos visto estrellas cambiar de variables de largo período a semi-regulares en décadas. Hemos visto evolucionar a las variables cataclísmicas de una clase a otra a medida que se produce la transferencia de materia. Lo mismo para las variables eclipsantes. Este es un logro notable, y ¡AAVSO lo ha conseguido!”

Haciendo hincapié en el valor científico de tales observaciones, la vicepresidente de AAVSO, Kris Larsen, explica que “Donar a AAVSO es consistente con mis valores, porque creo firmemente que la colaboración amateur-profesional en astronomía hace que el campo sea más fuerte”.

Además, las personas que apoyan a AAVSO valorizan la educación y el intercambio de conocimientos. Sin ir más lejos, tanto el programa de mentores, hábilmente dirigido por el ex consejero Donn Starkey, como los muchos foros activos, muestran que somos una

MENSAJE DEL PRESIDENTE CONTINUED...

comunidad de maestros naturales y de aprendices de por vida. El tiempo donado por nuestros dedicados voluntarios es un componente importante de lo que hace fuerte a AAVSO. Las donaciones financieras, sin embargo, ayudan al personal a proporcionar estructura y continuidad a estos maravillosos esfuerzos de los voluntarios. También permiten que el personal organice materiales educativos más formales tales como los manuales de observación y los cursos CHOICE. En palabras del ex consejero Arlo Landolt, el apoyo financiero a AAVSO “aseguraré que otros observadores tengan la oportunidad de disfrutar de la gloria del cielo nocturno como nosotros lo hemos podido disfrutar”.

Además, una ventaja de la formación y el aliento de AAVSO es que está ahí cuando lo necesite, en una variedad de formas. El contraste con la educación tradicional, en el aula, puede ser particularmente importante para los jóvenes. En la reciente reunión de miembros en Muncie, IN, el desde hace mucho tiempo miembro de AAVSO Ronald Kaitchuck transmitió su propia historia:

“Cuando estaba en la secundaria, mis profesores me consideraban como un estudiante mediocre, en el mejor. De los casos Siempre me reprendían por ser un alumno de “bajo rendimiento”. Pero lo que mis profesores no sabían era que en los fines de semana y al anochecer estaba haciendo algo emocionante. Estaba haciendo ciencia real.

“Al igual que muchos otros niños, me emocioné con la astronomía a una edad temprana. Cuando estaba en la escuela secundaria ya me había hecho mis propios telescopios. En la escuela secundaria me enteré de una organización llamada AAVSO. Rápidamente me incorporé y comencé a hacer observaciones de estrellas variables visuales desde mi patio trasero, en el lado oeste de Chicago. Gracias a un libro de Frank Bradshaw Wood y un manual de fotometría distribuido por la AAVSO, he construido un fotómetro fotoeléctrico y un telescopio diseñado para soportarlo. Estaba aprendiendo el manejo de máquinas de taller, electrónica, óptica y la ciencia de la astronomía observacional.

“No lo percibí en aquel momento, pero me había unido a un grupo de élite. Un incentivo muy importante para mí era la existencia de una organización que

valorase que estaba haciendo ciencia real y que quisiese mis observaciones. De esta manera, la AAVSO fue inspiradora y animadora para un chico de secundaria en Chicago.

“La AAVSO hace mucho más que recopilar datos. Por su propia existencia que inspira a la gente de todas las edades a llegar más alto y ser *más* triunfadores”.

La directora, Stella Kafka, tiene previsto ampliar los esfuerzos por acercar estudiantes a la comunidad de AAVSO. Si usted le dona a AAVSO, es partidario de la educación y la práctica fuera de las aulas para toda la vida.

En un sentido amplio, AAVSO está dedicada a la ciencia. A un nivel más personal, su objetivo es fomentar una comunidad que comparte el amor por el cielo nocturno, en toda su belleza y su inmensidad. Por ejemplo, cuando Roger Kolman habla de lo que significa AAVSO para él, dice: “Para muchos de nosotros, ha significado poder presentar observaciones a la base de datos AID y así tenerlos disponibles para que futuros astrónomos analicen la evolución de las estrellas. Para otros, ha significado amistades desarrolladas durante muchos años o aquellas en desarrollo”. Cuando le pregunté a Kris Larsen por qué pensaba que AAVSO hace del mundo un lugar mejor, hizo hincapié en la naturaleza variada y global de nuestra comunidad. Ella también hizo la conexión directa con su plan para recordar a AAVSO en su testamento “para honrar mi apoyo a AAVSO y su gente”.

Como dije en mi columna de octubre de 2014, la razón por la cual AAVSO necesita sus donaciones es que el rendimiento de nuestros fondos de capital cubren, normalmente, sólo la mitad de nuestros costos anuales de operación. Las cuotas cubren sólo un 6%. El personal de la sede a menudo solicita subvenciones para pagar algunos de los costos restantes, pero las subvenciones son cada vez más difíciles de obtener y, por lo general, implican nuevos proyectos que toman tiempo personal. Para continuar con nuestro nivel actual de servicios, por lo tanto, dependemos de gente como usted que aporte. Aunque muchas de nuestras herramientas, como VSX, VPHOT y AAVSONet, fueron generosamente proporcionadas por voluntarios, el mantenimiento

de estas herramientas—y la continuidad de todos los fabulosos servicios que el personal de la sede entrega (como las cartas buscadoras, boletines, el JAAVSO)—cuesta dinero. Las formas en que puede ayudar incluyen ofrecerse para voluntariado, optar por cuotas de sostenimiento, patrocinar las cuotas para miembros de países en desarrollo, realizar donaciones de fin de año, que contribuyen a la campaña anual, donar equipos, hacer donaciones planificadas (legados) o establecer un fondo con nombre para aumentar el fondo de capital.

En resumen, al igual que los donantes en Kickstarter disfrutaban al convertirse en mecenas de las artes, los donantes a AAVSO toman la decisión consciente de convertirse en mecenas de la ciencia ciudadana y del acceso al cielo nocturno. Según el Tesorero de AAVSO, Gary Billings, ninguna otra organización de aficionados a la astronomía “tiene exactamente la misma mezcla de amplitud de observación y datos permanentes y de libre acceso, gran número de astrónomos profesionales participantes y la financiación (¡esta es tu parte!) para la infraestructura (sitio web, base de datos, reuniones) para hacer que todo funcione”. Y del siempre elocuente ex consejero Bob Stine, “A pesar que nosotros, los entusiastas de las estrellas variables somos, de hecho, un porcentaje minúsculo de la población, creo que la humanidad depende de que seamos los desarrolladores y cuidadores/salvaguardas de los conocimientos relativos a las estrellas variables, porque las estrellas variables son un portal a través del cual se obtiene una comprensión más amplia y profunda de nuestro hermoso y sorprendente Universo”. Espero que al apoyar financieramente a AAVSO estará orgulloso de su importante contribución a este esfuerzo.

¡Hazte a un lado! Todos vamos a intentar hacer CIENCIA. ★

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.

MY MOST SUCCESSFUL MENTEE —IGOR YATSEKOV (YIGA)

ROGER KOLMAN (KRS), GLEN ELLYN, ILLINOIS

The AAVSO Mentoring program has been in place for several years. Through this initiative new candidates/members are able to take advantage of experienced observers in developing their observing programs.

We have had mixed success in this program—some mentees have become active members, while some have decided that observing variable stars is not for them.

I would like to share with you my most successful mentee—Igor Yatsenkov.



Igor was born March 9, 1964. He lives in Novokuznetsk, in the Kemerovo region of the Russian Federation. He has higher education, as an engineer as a Metallurgist. He has worked as a welder in a research institute and has scientific publications as a chief technologist at the factory.

Since 2000, he has developed a small business, associated with medical equipment.

He has been interested in astronomical observations since 1978 and has made a 120-mm telescope. For several years he has been engaged in visual observations and astrophotography in an urban observatory using a Karl Zeiss telescope 150/2250 System Coude.

Igor started out observing the Sun, moon, planets, bright comets, double stars, objects, Messier objects, and NGC objects. He says that in these pursuits, scientific goals were not in mind.



Igor then purchased a Meade 16-inch LightBridge Dobsonian telescope. He now observes with it on an observation post (HILL 230) located on the remote outskirts of a small town. His observation point is located at a height of 30



Igor Yatsenkov

meters above sea level. His observatory on HILL 230 consists of a relaxation room, workshop, and garage. His telescope is stored in a special shelter; for monitoring it is rolled out to the site.

Mike Simonsen connected me with Igor last year. Our connection became most productive. Igor has produced excellent visual observations and is now involved in the DSLR program.

We correspond often and he has become a valuable member of the AAVSO. In addition to being a mentee, I consider him a good friend and look forward to a long relationship.

To all those who are looking forward to observing variable stars but need help in developing a program, please consider the Mentoring Program of the AAVSO. There are experienced observers who are more than willing to be of assistance to you.

Contact Donn Starkey of the AAVSO [mentor@aaavso.org] and he will connect you with a mentor. This is your chance to do scientific research in your own back yard. ★

MONITORING OF NORTHERN DWARF NOVAE FOR RADIO JETS CAMPAIGN—UPDATE

DEANNE COPPEJANS (DEPT. OF ASTROPHYSICS/IMAPP, RADBOD UNIVERSITY, NIJMEGEN, THE NETHERLANDS, AND UNIVERSITY OF CAPE TOWN)

Background

Very few Cataclysmic Variables (CVs) have been detected at radio wavelengths, even though many observations have been taken. This has led to the idea that CVs do not launch jets, which has been used to put limits on jet launching models for other objects.

By comparing the outburst pattern of CVs to other similar stellar systems, Koerding et al. (2008, *Science*, **320**, 1318) predicted that CVs should show radio emission (light at radio wavelengths) from a jet during the rise to outburst. In a project together with the AAVSO, they detected radio emission from SS Cyg on the rise to outburst and concluded that the properties of the radio detection were best explained as radio emission from a jet.

In this AAVSO campaign we aim to show that SS Cygni is not unique and that other CVs in outburst launch jets. If we find that this is the case, it will help answer one of the basic questions in modern astrophysics, namely “is there a universal link between accretion and ejection?” When material settles (is accreted) onto a star, it needs to lose energy first and an efficient way of doing that is to eject matter (launch a jet). Up to now, however, CVs have been the only compact objects that accrete matter, but do not launch jets.

AAVSO campaign

In order to test this, we needed radio observations of a sample of dwarf novae (DN, CVs that show outbursts) during the rise to outburst. As DN do not show regular, predictable outbursts and they normally take only 1 day to rise to maximum, the targets would need constant monitoring—which is difficult/impossible at professional observatories as it would require months of telescope time. The AAVSO, however, excels at this type of campaign.

AAVSO Alert Notice 505 (<http://www.aavso.org/aavso-alert-notice-505>) called for monitoring of U Gem, EX Dra, Z Cam, RX And, EM Cyg, AB Dra, SY Cnc, SU UMa, and YZ Cnc, with fast notifications of outbursts in order to trigger radio observations with the Very Large Array (VLA) in New Mexico (USA).

Preliminary results

Thanks to all the observations and fast outburst notifications from the AAVSO, we were able to get radio observations of five DN (RX And, SU UMa, U Gem, YZ Cnc, and Z Cam) in outburst and the timing was ideal to look for jets.

The V-band AAVSO observations of these outbursts, along with the times of the VLA observations, are shown for all five of the targets (Figures 1–5).

In each case we took three VLA observations. For RX And, YZ Cnc, and Z Cam, the first was taken as close to the peak of the outburst rise as possible. The second and third were taken on two consecutive days in order to observe how the radio emission changes over time. SS Cygni showed bright radio emission during the rise to outburst, after which it quickly became fainter. We expect to see the same behavior in these observations.

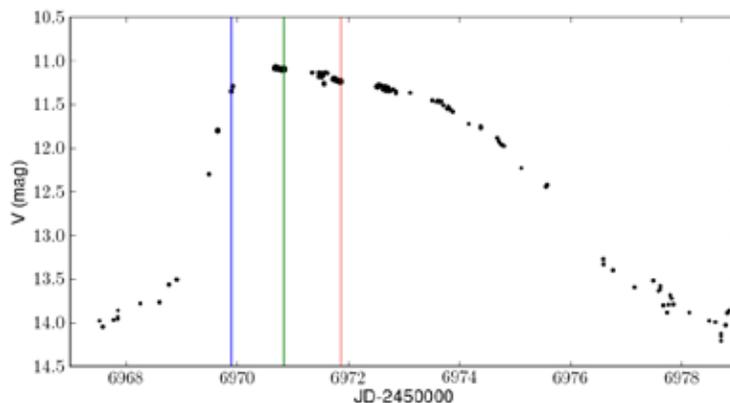


Figure 1. RX And, JD 2456967–2456978. Observations from the AAVSO International Database, with VLA observation times marked.

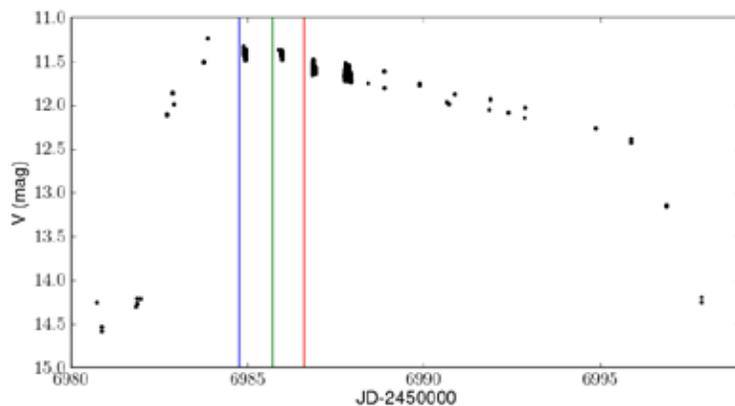


Figure 2. YZ Cnc, JD 2456980–2456997. Observations from the AAVSO International Database, with VLA observation times marked.

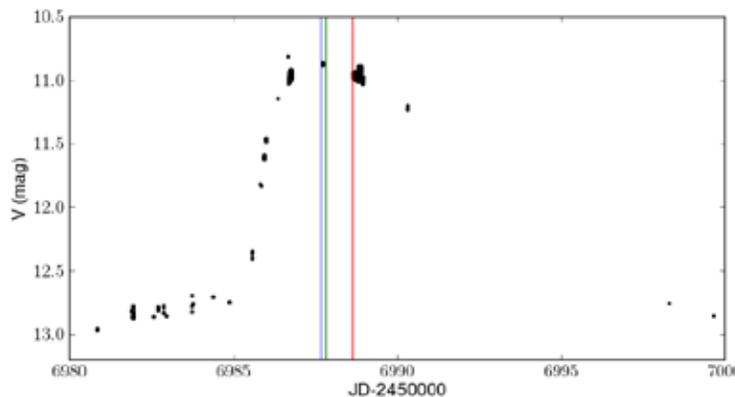


Figure 3. Z Cam, JD 2456980–2456999. Observations from the AAVSO International Database, with VLA observation times marked.

CONTINUED ON NEXT PAGE

RADIO JETS CAMPAIGN CONTINUED...

The observation times for SU UMa and U Gem differed from this pattern. In the case of SU UMa, we needed to catch it during a superoutburst (brighter outburst). As it is only possible to differentiate outbursts from superoutbursts well into the rise, we had to wait longer before triggering the radio observations. We expect that the radio emission will be stronger in superoutbursts and it might even show different behavior compared to that of normal outbursts, so the different timing information may prove to be a useful diagnostic tool. For U Gem, the VLA were only able to schedule the second observation a few days after the initial observation. This will give us a longer timeline over which to monitor the radio emission, and the second and third observations can be combined to detect fainter emission.

We are making images for each observation from the radio data collected at the telescope. Using the light curves and other properties obtained from the images, we can then determine if SS Cygni is unique or if CVs can launch jets.

—Deanne Coppejans (Dept. of Astrophysics/IMAPP, Radboud University, Nijmegen, the Netherlands, and University of Cape Town), Elmar Koerding (Radboud University), James Miller-Jones (International Centre for Radio Astronomy Research, Curtin University, Australia), Michael Rupen (National Research Council of Canada, Herzberg Astronomy and Astrophysics Programs, Dominion Radio Astrophysical Observatory), Christian Knigge (School of Physics and Astronomy, Southampton University), Gregory Sivakoff (Dept. of Physics, University of Alberta), and Paul Groot (Dept. of Astrophysics/IMAPP, Radboud University) ★

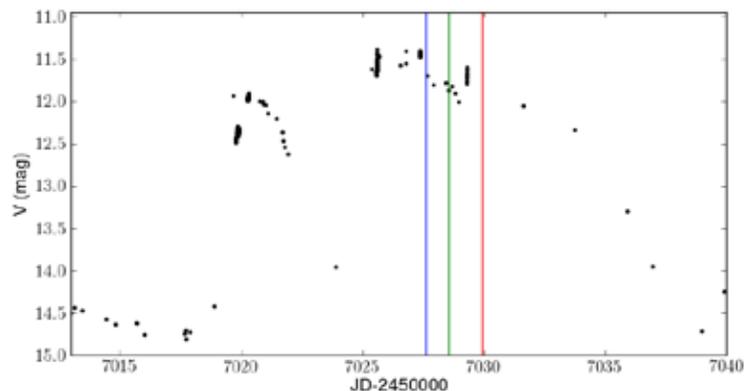


Figure 4. SU UMa, JD 2457012–2457039. Observations from the AAVSO International Database, with VLA observation times marked.

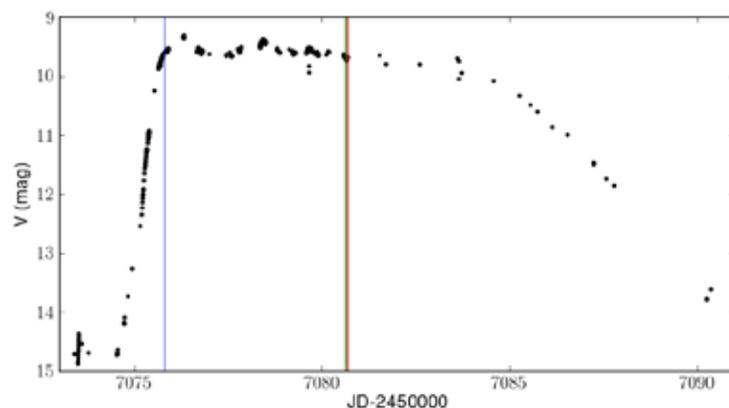


Figure 5. U Gem, JD 2457073–2457090. Observations from the AAVSO International Database, with VLA observation times marked.

Note to the observers

Thank you so much for all your observations. This project would not have been possible without your prompt outburst notifications and optical light curves. I have really enjoyed working with you and I am excited about this data.

I will send you an update on the results. Clear skies and good luck with all your other projects!

—Deanne Coppejans

THE AMERICAN SUNSPOT NUMBER

DR. JAMIE RIGGS, LYONS, COLORADO

[This article is excerpted from a 2011 paper by the author on sunspot number correction factors and the author's presentation given at the 2012 AAVSO Annual Meeting. Download links to the paper and presentation may be found at the end of this article.]

The American sunspot number, R_a , is a relative index of daily and monthly sunspot activity, and the American Association of Variable Star Observers (AAVSO), Solar Division's program of data gathering and analysis has been active since its inception in 1944. Shapley (1949), Taylor (1985), and Schaefer (1993) provide descriptions of the method of sunspot numbers data reduction. Schaefer (1997) and Foster (1997) discuss enhancements and remedies to the data reduction needed for time based changes in the reduction outcomes.

AAVSO observer raw data are submitted monthly to the Solar Division as sets of date- and time-stamped values which are converted according to R. Wolf such that $R = 10g + f$; (1) where g is the number of sunspot groups reported by an observer, and f is the total number of observer-reported spots. Taylor (1985) states that the grouping scheme is the evolutionary system outlined by M. Waldmeier in 1962. Individual sunspots with an area of 0.04 solar degrees and larger are counted.

Reduction to actual sunspot numbers requires the calculation of two constants, k_i and w_i (k -factor and weight, respectively), for each potential contributor. From Taylor, early in each month following observation, after (usually) thirty or more reports have been received and initially processed, the computation of provisional sunspot numbers proceeds through application of the relation from Shapley (1949), $R_a = \text{Sum of } N_{i=1} (w_i * k_i * R_i) / \text{Sum of } N_{i=1} (w_i)$ for each day of the computational month. Note the use of k_i and w_i . The derivation of these two parameters is discussed below.

According to Taylor, the number of observers, N , per day, is expected to exceed eighteen. However, this number depends upon the phase of the sunspot cycle, on prevailing observer-local weather conditions, and on observer confidence, especially during periods of minimal sunspot activity. Final American sunspot numbers are reduced when reports have been received.

The mean of the final values allows the calculation of the statistic, RSM, the smoothed mean relative sunspot number. This number is computed from Waldmeier (1962) as reproduced in Taylor: $RSM = 1/24 (N_{i-6} + N_{i+6} + 2 * 5 - 5 N_i)$; (3) In Equation 3, N is set equal to the final mean of the month under analysis,

and other mean values are taken accordingly. Thus, RSM lags approximately six months behind the most recent sunspot determinations. This is a weighted, Simple Linear Regression.

We now examine how the correction parameters k_i and w_i are derived. Taylor (1985), with reference to a statement by Shapley (1949), repeats that the data reduction method for determining the correction parameters comes from Wald (1940). Wald developed a model relating two random variables, where a random variable is considered to be variable that is sampled from a larger population. His method is now known as weighted, simple linear regression or SLR.

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Download links:

—Author's 2011 paper on sunspot number correction factors
<http://www.aavso.org/sites/default/files/PoissonGLM00.pdf>

—Author's 2012 Annual Meeting presentation
http://www.aavso.org/sites/default/files/AAVSO20121101_0.pdf

Note: The author is Principal Statistician for the Statistics for Physical and Engineering Sciences Institute. Their website includes a section on solar research that contains extensive presentations, articles, plots, tables, etc.:
<http://www.spannedolutions.com/home/research/astronomy/solar-research>



PHOTOELECTRIC PHOTOMETRY PROGRAM UPDATE

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

The second quarter of 2015 (ending June 30) was another productive one for AAVSO PEP observers, with five observers making 445 observations of 42 different stars.

Gerald Persha (PGD) continued to be very active, with intensive monitoring of RS CVn (78V/9B/78R), and BVRc photometry of 25 other stars as well; he submitted a total of 385 observations.

PEP section chair Jim Fox (FXJ) contributed 31 V-band observations of 14 different stars.

Carl Knight (KCD), who is using one of the AAVSO's SSP-4 IR photometers at his observatory in New Zealand, submitted a total of 4 J- and H-band observations of alpha Ori (Betelgeuse).

Charles Calia (CCB) contributed a total of 19 V-band observations of FS Com, RS Cnc, and TV UMa.

AAVSO Councilor John Martin (UIS01) contributed a total of 6 B- and 6 V-band observations of alpha Ori, kappa Dra, and theta CrB.

The thirteen most-observed stars this quarter were: RS CVn (165), TU CVn (24), Y CVn (24), TV UMa (21), X Cnc (13), FX Cnc (12), RT Vir (12), ST Her, T Cnc, and X Her (12 apiece), and BK Vir, g Her, and RT Cnc (10 apiece).

Other notable stars include: AG Peg (8), RS Cnc (8), FS Com (7), alpha Ori, epsilon Aur, P Cyg, R Lyr, and XY Lyr (6 apiece), EU Del, GK Com, HK Lyr, U Del, V2119 Cyg, and V636 Her (4 apiece), and FH Vir, FP Vir, SW Vir, and W Boo (3 apiece).

The other stars observed were: BL Cnc, BP Cnc, FZ Cnc, kappa Dra, RV Mon, SX Mon, theta CrB, and V398 Lyr (2 apiece), and FZ Com, tau4 Ser, and U Mon (1 apiece).

The observing campaign that began in March to study dust production in developing planetary systems is on hiatus until the targets become observable again. The target suitable for PEP observing, HD 15407A ($V=6.95$), is located at R.A. 02 30 50.66, Dec. +55 32 54.2 (2000.0). The Spitzer observations will take place November 7–December 28, but please resume observing this star as soon as your location permits. Please see *AAVSO Alert Notice 511* for details on the campaign and observing instructions. The multi-year campaigns on CH Cyg, eps Aur, and P Cyg continue—your ongoing observations of these stars are important to following and understanding the behavior of these unpredictable stars. Please see *AAVSO Special Notices #320* and *#131* for details and instructions on CH Cyg and eps Aur, respectively. *AAVSO Alert Notice 440* discusses the PEP campaign on P Cyg (that notice covers the 2011 season but the campaign is continuing for at least the next few years).

Thanks go to everyone for your contributions, particularly to those of you who contributed to observing campaigns this quarter. We encourage you to observe these campaign stars and all others in the AAVSO PEP Program.

As noted by Dr. Matthew Templeton, errors in the values of delta (B–V) [var-comp] were corrected for W Boo and lambda And. Observers using PEPObs on the AAVSO website do not need to adjust any data submitted, but observers who reduce their own data may need to recalculate their transformed magnitudes. Also, please make sure you are using the current comparison stars for these objects: SAO 83427 for W Boo and SAO 53355 for lambda And. Contact Matthew by email (matthewt@aavso.org) with any questions.

Opportunities for online discussion about PEP continue with the AAVSO's online photometry forum:

<http://www.aavso.org/forums/variable-star-observing/photometry>

and Tom Calderwood's community mailing list (to which the AAVSO subscribes and is participating in) hosted on his personal server:

<http://lists.cantordust.net/listinfo.cgi/peptalk-cantordust.net>

Clear skies, and Good observing! ★

NEW PEP DATA STUDIES UNDERWAY

TOM CALDERWOOD (CTOA), BEND, OREGON

I have started two projects on the topic of PEP data quality. The first is a historical study of the check stars in the PEP program. There are 31 check stars with 400+ observations over the years. The idea is to compare how well the measured check star magnitudes match their catalog magnitudes, using this metric as a proxy for the accuracy of PEP program star measurements.

The second project is an evaluation of the red/blue calibration pairs for transformation. In the past, I have noticed considerable variation in the eV derived from different pairs. CCD observers are establishing their transformation coefficients by observing a cluster of stars that have a wide variety in color index. These clusters are too dim for the typical PEP observer's equipment. However, I have access to a 24-inch telescope, which puts the stars of cluster IC 4665 in Ophiuchus within reach. The plan is to calibrate eV on this cluster and see how well it compares with values from the various red/blue pairs. Stay tuned. ★

NOTE FROM JIM FOX (FXJ)

CHAIR, AVSO PEP SECTION, MAYHILL, NEW MEXICO

Like much of the country, PEP observers have been plagued by abnormal weather conditions this spring—or is this the “new normal”? Still, PEP observers have continued to contribute observations to the database and are starting to return to the ongoing P Cygni and CH Cygni campaigns since the “season” for those stars has begun. In addition to an early start to our summer monsoon season in the southern mountains of New Mexico, I find that lightning from towering cumulus clouds as far away as Roswell and Carlsbad (90–100 miles) often light up the sky in an irregular fashion so as to make PEP observation impossible even when local skies are clear. ★

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/aavsolpsection/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.

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 $N(con)$).

Top seventeen best-covered stars of the LPV Legacy program, as measured (mainly) by number of nights observed (both visual and CCD observing considered), 2015 March 16 through June 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	$N(vo)$	$N(von)$	$N(co)$	$N(con)$
U Ori	Ori	05:55:49.16	+20:10:30.6	55	48	5	39
R Cnc	Cnc	08:16:33.82	+11:43:34.5	19	28	9	21
R Leo	Leo	09:47:33.48	+11:25:43.7	91	84	11	20
ST UMa	UMa	11:27:50.37	+45:11:06.7	33	78	2	9
Z UMa	UMa	11:56:30.22	+57:52:17.6	69	90	3	17
RY UMa	UMa	12:20:27.32	+61:18:34.6	37	79	2	5
T UMa	UMa	12:36:23.46	+59:29:12.9	63	88	6	17
S UMa	UMa	12:43:56.67	+61:05:35.4	63	81	4	11
V CVn	CVn	13:19:27.77	+45:31:37.7	30	84	3	10
V Boo	Boo	14:29:45.27	+38:51:40.6	36	75	2	8
g Her	Her	16:28:38.54	+41:52:53.9	22	75	3	11
R Dra	Dra	16:32:40.22	+66:45:17.8	35	71	3	6
CH Cyg	Cyg	19:24:33.06	+50:14:29	48	88	6	58
AF Cyg	Cyg	19:30:12.84	+46:08:52	41	79	1	4
T Cep	Cep	21:09:31.78	+68:29:27.1	48	89	1	4
W Cyg	Cyg	21:36:02.49	+45:22:28.4	32	81	1	2
miu Cep	Cep	21:43:30.49	+58:46:48	36	82	2	6

$N(vo)$ = 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

Eighteen least-observed stars of the LPV Legacy program (both visual and CCD observing considered), 2015 March 16 through June 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	$N(vo)$	$N(von)$	$N(co)$	$N(con)$
R And	And	00:24:01.94	+38:34:37.3	14	26	0	0
U Per	Per	01:59:35.1	+54:49:19.9	8	31	0	0
R Ari	Ari	02:16:07.1	+25:03:23.6	1	2	0	0
W And	And	02:17:32.95	+44:18:17.7	3	3	0	0
omi Cet	Cet	02:19:20.78	-02:58:39.5	7	5	1	1
S Per	Per	02:22:51.7	+58:35:11.4	10	19	0	0
R Tri	Tri	02:37:02.33	+34:15:51.4	12	30	0	0
W Per	Per	02:50:37.89	+56:59:00.3	3	7	0	0
Y Per	Per	03:27:42.38	+44:10:36.5	14	26	0	0
W Tau	Tau	04:27:57.18	+16:02:36.1	12	15	0	0
R Lep	Lep	04:59:36.34	-14:48:22.5	17	27	1	1
TZ Cyg	Cyg	19:16:04.06	+50:09:36.6	8	29	0	0
TU Cyg	Cyg	19:46:10.67	+49:04:24.4	3	7	1	1
Z Cyg	Cyg	20:01:27.46	+50:02:32.6	4	8	0	0
S Del	Del	20:43:04.87	+17:05:17.3	7	18	1	1
R Vul	Vul	21:04:22.5	+23:49:18	6	12	1	2
R Peg	Peg	23:06:39.17	+10:32:36	2	6	1	4
R Aqr	Aqr	23:43:49.45	-15:17:04.1	3	11	0	0

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...

Top twenty-three 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 March 16 through June 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
BX Pup	Pup	07:54:15.55	-24:19:36.3	1	3	4	81
U Gem	Gem	07:55:05.21	+22:00:04.7	32	67	12	36
Z Cha	Cha	08:07:28.21	-76:32:01.3	4	22	1	34
YZ Cnc	Cnc	08:10:56.63	+28:08:33.2	16	63	6	32
Z Cam	Cam	08:25:13.18	+73:06:39	43	89	7	48
AT Cnc	Cnc	08:28:36.89	+25:20:02.9	12	47	10	50
SY Cnc	Cnc	09:01:03.31	+17:53:56	12	43	8	29
T Pyx	Pyx	09:04:41.5	-32:22:47.7	5	45	3	25
X Leo	Leo	09:51:01.41	+11:52:30.2	23	64	7	22
V442 Cen	Cen	11:24:51.95	-35:54:37	5	70	0	0
AL Com	Com	12:32:25.9	+14:20:43.5	6	54	7	31
TX CVn	CVn	12:44:42.05	+36:45:50.6	10	68	3	49
T CrB	CrB	15:59:30.16	+25:55:12.6	49	90	4	11
AG Dra	Dra	16:01:41.01	+66:48:10.1	31	75	5	43
HP Nor	Nor	16:20:49.56	-54:53:22.8	0	0	3	43
AH Her	Her	16:44:10.01	+25:15:02	19	58	12	54
V426 Oph	Oph	18:07:51.68	+05:51:47.8	6	29	7	45
UZ Ser	Ser	18:11:24.85	-14:55:34.1	1	4	7	47
AM Her	Her	18:16:13.33	+49:52:04.1	8	68	24	33
BF Cyg	Cyg	19:23:53.51	+29:40:29.2	23	67	6	38
CH Cyg	Cyg	19:24:33.06	+50:14:29.1	48	88	6	58
EM Cyg	Cyg	19:38:40.11	+30:30:28.4	12	39	9	47
SS Cyg	Cyg	21:42:42.78	+43:35:09.8	51	86	5	42

Stars in CV Legacy list with no visual or CCD observations (both visual and CCD observing considered), 2015 March 16 through June 15:

Name	Con	R.A.(J2000)	Dec.(J2000)	N(vo)	N(von)	N(co)	N(con)
LS And	And	00:32:10.21	+41:58:11.6	0	0	0	0
FN And	And	01:11:57.54	+35:17:24.2	0	0	0	0
FO And	And	01:15:32.09	+37:37:34.2	0	0	0	0
TY Psc	Psc	01:25:39.35	+32:23:09.2	0	0	0	0
SV Ari	Ari	03:25:03.34	+19:49:52.8	0	0	0	0
AH Eri	Eri	04:22:38.04	-13:21:30.3	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
V803 Cen	Cen	13:23:44.53	-41:44:29.6	0	0	0	0
V504 Cen	Cen	14:12:49.18	-40:21:37.5	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
MU Ser	Ser	17:55:52.77	-14:01:17.1	0	0	0	0
V1830 Sgr	Sgr	18:13:50.65	-27:42:21	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
V4021 Sgr	Sgr	18:38:14.88	-23:22:47.1	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
V1819 Cyg	Cyg	19:54:37.44	+35:42:16	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
QU Vul	Vul	20:26:46.02	+27:50:43.2	0	0	0	0
V1500 Cyg	Cyg	21:11:36.6	+48:09:02.4	0	0	0	0
CP Lac	Lac	22:15:41.15	+55:37:01.4	0	0	0	0
IP Peg	Peg	23:23:08.59	+18:24:59.6	0	0	0	0
V630 Cas	Cas	23:48:51.95	+51:27:39.3	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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AAVSO OBSERVING CAMPAIGNS UPDATE

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

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

Campaigns concluded since April 1, 2015

The campaign by Deanne Coppejans (PhD candidate, Radboud University Nijmegen (Netherlands) and University of Cape Town) and colleagues on searching for radio jets in several **Northern dwarf novae** (*AAVSO Alert Notice 505*, *AAVSO Special Notice #391*) concluded in mid-March. Coppejans is now analyzing all the data. Please see her article in this issue of the *Newsletter*.

The campaign by Dr. Fabienne A. Bastien (Hubble Postdoctoral Fellow, Pennsylvania State University) to monitor the rare FU Ori object **2MASS J06593158-0405277** as part of a campaign to observe this T Tauri star through May from the optical to the infrared has concluded. Dr. Bastien will be gathering and analyzing the multiwavelength data, including those from the AAVSO. 15 AAVSO observers contributed 416 multicolor and visual observations—thank you! If you have data for this campaign that you have not submitted to the AAVSO International Database, please do so as soon as possible.

The campaign on the classical T Tauri star **RW Aur** (component A) organized by Dr. Hans Moritz Guenther (Massachusetts Institute of Technology) is officially concluded. Its purpose was to learn the cause of the sudden 3-magnitude dimming that occurred in 2014—suspected to be mass pulled out of the disk surrounding RW Aur A by RW Aur B as it passed by—and the nature of this mass (*AAVSO Alert Notice 514*). RW Aur will be coming back into view in August, and, although the campaign is over, observers are requested to continue their efforts but at a less intense level—nightly observations are sufficient—in order to learn what RW Aur does next. Will it come back up to its usual brightness, and when? Will the color change when this happens? 43 observers have contributed 815 visual and multicolor observations to this campaign during its official run. A light curve of AAVSO observations was shown in the April 2015 *AAVSO Newsletter* (page 23, Figure 3).

Campaigns initiated since April 1, 2015

The X-ray black hole binary **V404 Cyg** had a spectacular outburst on 2015 June 15, its first X-ray and optical outburst since 1989 (*AAVSO Alert Notice 520*). Observations obtained by the professional and amateur communities across the spectrum from X-ray to radio have shown it varying dramatically in all wavelengths and on timescales from seconds to hours to days. Multiwavelength, multi-site observations are continuing; multiple satellite observations are scheduled for July 10, 11, and 12 (*AAVSO Alert Notice 522*; HST observations will not take place but those using several other orbiting telescopes will). AAVSO observers have been obtaining excellent multi-color photometry as well as visual observations (Figures 1, 2). Current data in the AAVSO International Database show V404 Cyg at 16.792 V \pm 0.082 on 2015 July 7.2673 UT (GFB, W. Goff, Sutter Creek, California).

The symbiotic variable **AG Peg** went into outburst in late May 2015 (*AAVSO Alert Notice 521*) for the first time since its only other known outburst, which

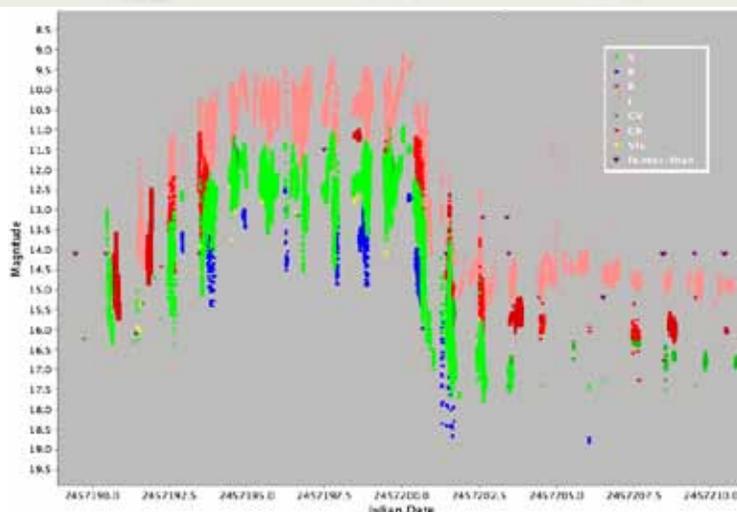


Figure 1: AAVSO light curve of the X-ray black hole binary V404 Cyg JD 2457189–2457211 (15 June–7 July 2015). 64 observers contributed 73,395 visual and multicolor observations to this light curve.

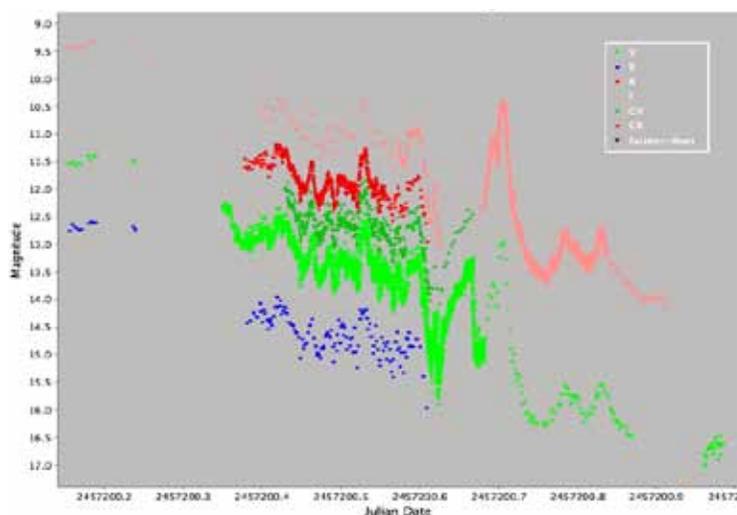


Figure 2: AAVSO light curve of the X-ray black hole binary V404 Cyg JD 2457200–2457201 (night of 2015 June 26–27), showing substantial variations on short timescales. 16 observers contributed 9,940 visual and multicolor observations to this light curve.

occurred in 1860–1870. That outburst took about 10 years to reach maximum, and AG Peg has been slowly declining since then, for 145 years. How this outburst will progress is unknown. The current outburst, as well as the 0.4-magnitude variations (P~825 days) which have been present since the 1920s, may be seen in Figure 3. Currently AG Peg is visual magnitude 7.0 as of July 7.45 UT (ASA, S. Aguirre, Hermosillo, Mexico).

Campaigns in progress

The campaign continues on the symbiotic nova candidate **ASAS J174600-2321.3** initiated in January by S. Otero, P. Tisserand, K. Bernhard, and S. Hummerich. The campaign is an extension of the research program discussed in Hummerich et al. (2015, *JAASO*, 43, 14). Both visual and instrumental monitoring have been requested for before, during, and after the eclipse of this system which was predicted to begin in mid-March and last approximately 115 days. As Figure 4

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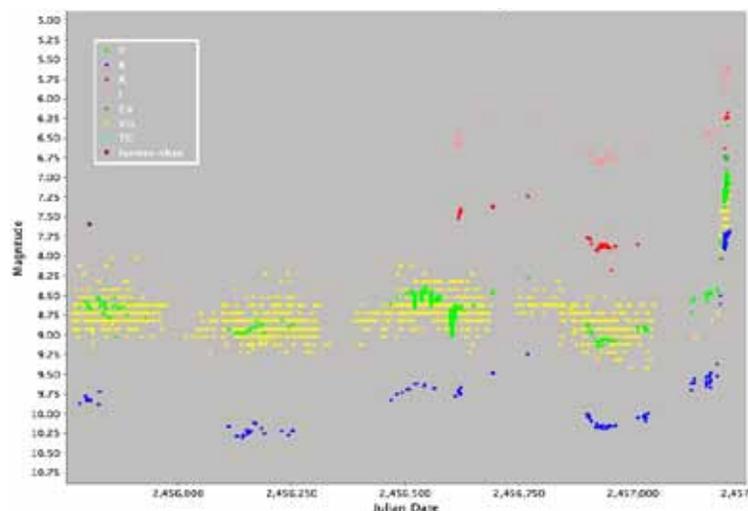
CAMPAIGNS UPDATE
CONTINUED...

Figure 3: AAVSO light curve of the symbiotic variable AG Peg JD 2455765–2457211 (22 July 2011–7 July 2015). 120 observers contributed 3,002 visual and multicolor observations to this light curve.

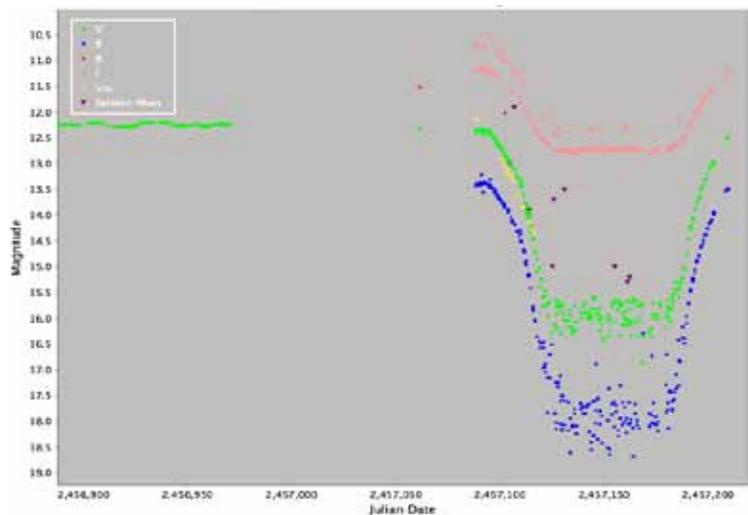


Figure 4: AAVSO light curve of the symbiotic nova candidate ASAS J174600-2321.3 JD 2456857–2457209 (19 July 2014–5 July 2015). 12 observers have contributed 982 visual and multicolor observations to this light curve.

shows, the eclipse appears to be nearly over. Observers are recommended to observe this system at least through August to be sure the post-eclipse behavior is well documented.

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 next set of observations with the Spitzer Space Telescope will take place beginning in October and November, but observers are requested to continue their observations throughout the coming months. As Dr. Rieke writes: “A key part of our program is to obtain optical photometry of the same stars that we

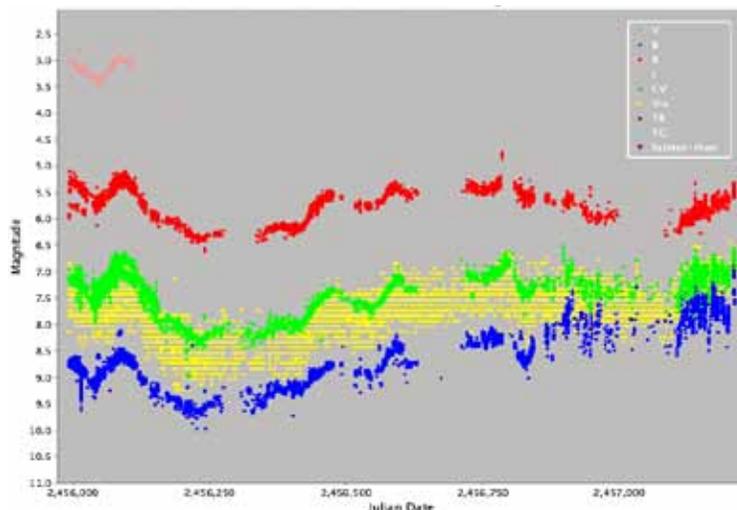


Figure 5: AAVSO light curve of the symbiotic star CH Cyg JD 2455988–2457211 (1 March 2012–7 July 2015). 208 observers contributed 5,035 visual and multicolor observations to this light curve.

are observing in the infrared under the Spitzer program. The optical data are needed to verify that any changes we see in the infrared are not just driven by changes in the brightness of the star, but are truly due to changes in the structure or dust content of the debris disk...” Since this campaign began 2015 March 13, 8 observers have contributed 530 multicolor and visual observations to the AID.

Dr. Robert Stencel’s (University of Denver Astronomy Program) request to monitor **epsilon Aur** (*AAVSO Alert Notice 504*) continues through the end of the observing season. Observers are asked to carry out nightly CCD, DSLR, or PEP photometry (V, B, R, U; no time series) to monitor the coherent pulsation that was expected and is occurring. Visual observations are not really feasible in this campaign because of the very small amplitude of the variations (0.1 magnitude in U, 0.05 in V, timescale 60–100 days). Ongoing photometric data can help deduce whether these pulsations are internal to the F star, or externally driven by tidal interaction with the companion star. To date 56 observers have contributed 968 multicolor and visual observations.

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 2015 observing season. Dr. Karovska expresses her gratitude for your ongoing observations, and asks observers please to continue, especially in V and B. **The V and B data are crucial** for detecting certain significant system changes key to her research. Visual observations are also important! Thank you for your efforts (Figure 5) and please keep on keeping on!

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), which is a fascinating member of a new class of hard X-ray emitting symbiotic binaries. Your observations are very important to learning more about this star! Weekly or more frequent monitoring (B and V photometry and visual observations) is requested in support of upcoming Chandra observations still to be scheduled (*AAVSO Alert Notice 503*). Since this campaign began in August 2014, 16 observers have contributed 5,623 multicolor observations of this star through 2015 July 5.

CONTINUED ON NEXT PAGE

CAMPAIGNS UPDATE CONTINUED...

Dr. Eric Mamajek's campaign on **J1407 (1SWASP J140747.93-394542.6)** (*AAVSO Alert Notice 462*) continues through 2015. Since the campaign began in July 2012, AAVSO observers have continued to provide excellent coverage and no eclipse has been observed. It is possible that an eclipse occurred during the seasonal gap—it is almost exactly the same length as the 52-day eclipse—but it seems unlikely one would have occurred so precisely placed. 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*). Three observers have contributed 1,921 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 2015 season and likely "for several more years." Since May 2011, 102 observers have contributed 4,385 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 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 thanans and a few R and two V observations. A single V observation at/near the minimum shown in I shows the V minimum is 18.2 or fainter (MZK, K. Menzies, Framingham, Massachusetts). *Wouldn't some observer like to take on QX Pup as a challenge to determine the V range?* The excellent I band coverage continues—thank you! Arne's page on QX Pup gives a lot of information about this variable embedded in a reflection nebula (the Rotten Egg Nebula). A phase plot by Sebastián Otero using the AAVSO I data shows that the period of QX Pup is not the GCVS value of 648: days but rather is 551 days. 19 observers have contributed 2,047 multicolor and visual observations to date.

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 *JAASO*, 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, Supernovae, and R CrB

No novae have been discovered this quarter, but the stars continue to keep everyone very busy. In addition to V404 Cyg and AG Peg (see above), R CrB is keeping us guessing, and recent novae continue to provide good observing opportunities.

The prototype variable **R CrB** has been in some state of minimum since July 2007 (Figure 6), when it began fading from its maximum visual magnitude of 6.0. From 2014 until February 2015 it was brightening but began to plateau around 7.3, and then turned around and faded again, reaching 13.0 by late June. However, it appears to have plateaued again and is brightening—as of 2015 July 6.9688 UT it is visual magnitude 12.6 (PTFA, T. Papadimitriou, Alepou, Corfu) (Figure 7). Keep watching R CrB, that most unpredictable of unpredictable stars!

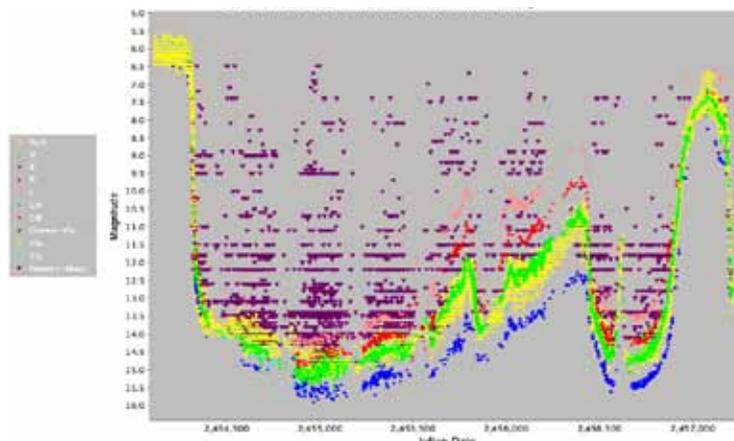


Figure 6: AAVSO light curve of the prototype variable R CrB JD 2454101-2457211 (1 January 2007–7 July 2015). 528 observers contributed 29,869 visual and multicolor observations to this light curve.

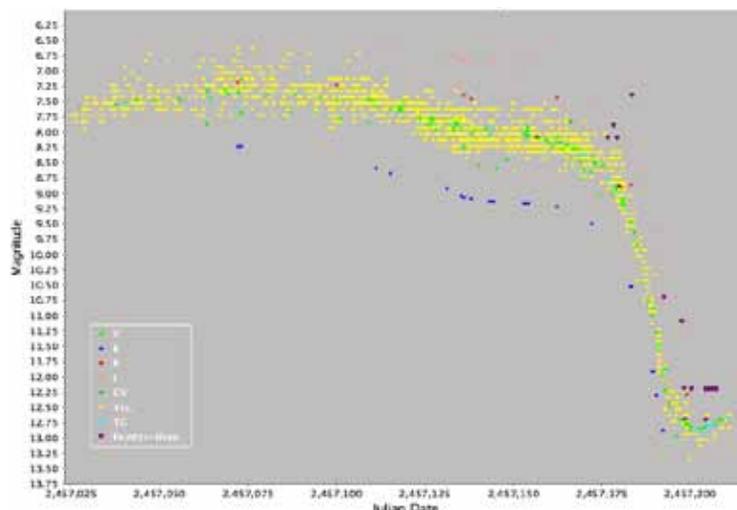


Figure 7: AAVSO light curve of the prototype variable R CrB JD 2457024–2457211 (1 January–7 July 2015). 141 observers contributed 1,598 visual and multicolor observations to this light curve.

Nova Scorpii 2015 (PNV J17032620-3504140) was discovered by Tadashi Kojima (Gunma-ken, Japan) on 2015 February 11.837 UT (*AAVSO Alert Notice 508*). Multiwavelength observations made in February by T. Nelson et al. (*ATel #7085*) suggest that the object may be a recurrent nova similar to RS Oph, V407 Cyg, and V745 Sco. The nova continues to fade and as of July 6.1881 UT was 14.796 V +/-0.083 (HMB, J. Hamsch, Mol, Belgium).

Nova Sagittarii 2015 (PNV J18142514-2554343), a classical Fe II nova, was independently discovered by Hideo Nishimura (Shizuoka-ken, Japan) and by Koichi Nishiyama (Kurume, Japan) and Fujio Kabashima (Miyaki, Japan) on 2015 February 12 UT (*AAVSO Alert Notice 509*). It is continuing its oscillations as it declines (Figure 8). As of July 5.4173 UT it was 12.549 V +/-0.142 (HKEB,

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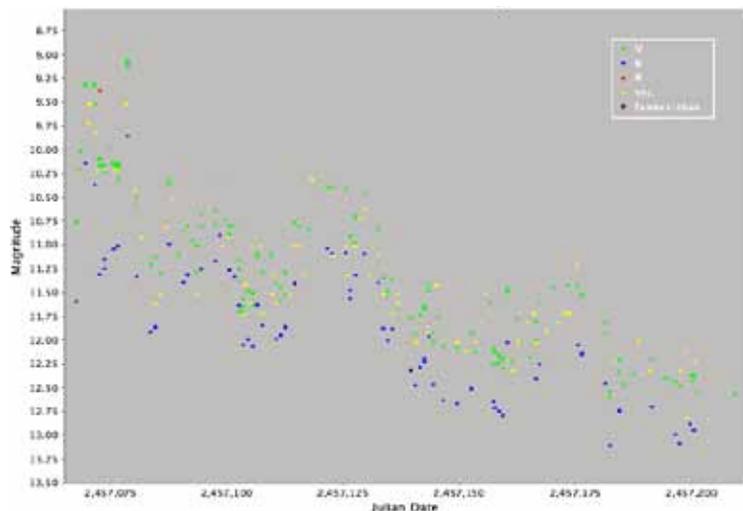
CAMPAIGNS UPDATE
CONTINUED...

Figure 8: AAVSO light curve of Nova Sgr 2015 (PNV J18142514-2554343) JD 2457066–2457209 (12 February–5 July 2015). 17 observers contributed 342 multicolor observations to this light curve.

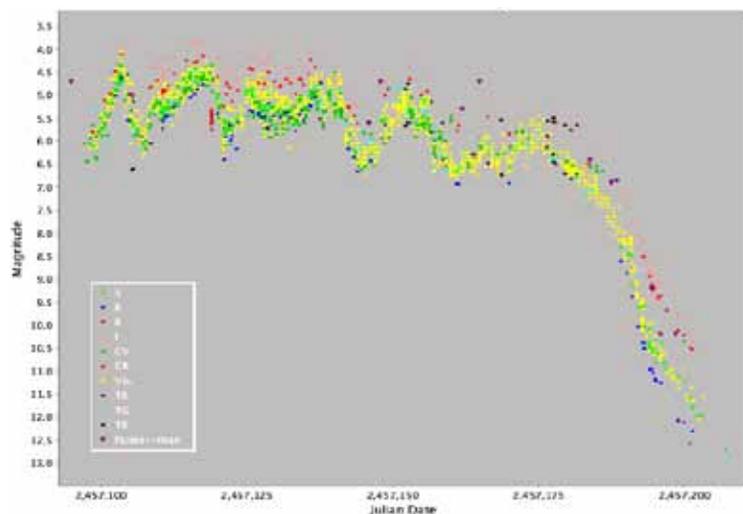


Figure 9: AAVSO light curve of Nova Sgr 2015 Number 2 (PNV J18365700-2855420) JD 2457094–2457209 (12 March–5 July 2015). 114 observers contributed 2,315 multicolor observations to this light curve.

K. Hills, Hartford, Cheshire, UK) and June 26.7188 visual magnitude 12.2 (PEX, A. Pearce, Nedlands, Western Australia).

Nova Sagittarii 2015 Number 2 (PNV J18365700-2855420), also a classical Fe II nova, was discovered by John Seach (Chatsworth Island, NSW, Australia) on 2015 March 15 UT (*AAVSO Alert Notice 512*). Since the last newsletter update on this star in April/May, when it was visual magnitude 5.2 and rising towards its fifth maximum, dust production has begun (*AAVSO Alert Notice 519*) and its magnitude has plummeted (Figure 9). As of July 7.4653 UT it was 12.562 V ± 0.015 (ATE, T. Arranz, Navas De Oro, Spain).

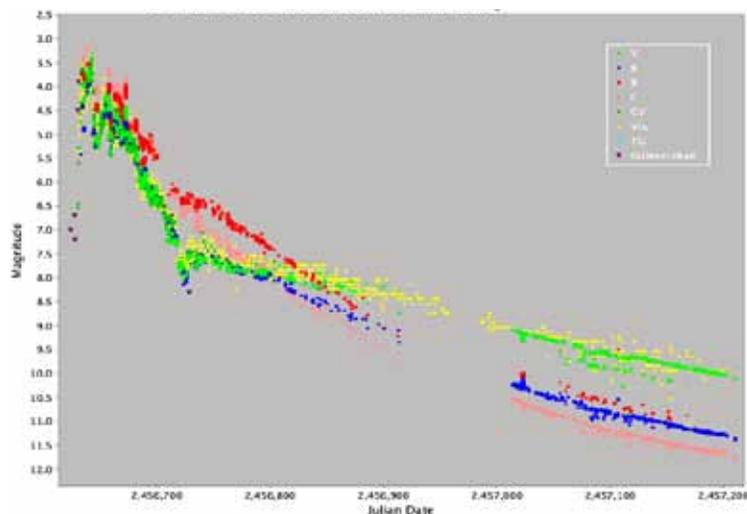


Figure 10: AAVSO light curve of V1369 Cen JD 2456624–2457209 (27 November 2013–5 July 2015). 71 observers contributed 12,880 multicolor observations to this light curve.

SN 2015F (PSN J07361576-6930230) in NGC 2442 is a Type-Ia supernova discovered before maximum light by Libert A. G. Monard (MLF, Calitzdorp, Western Cape, South Africa) on 2015 March 9 (*AAVSO Alert Notice 515*). It continues to decline, and as of May 31.9686 UT was 15.915 V ± 0.099 (HMB, J. Hamsch, Mol Belgium). 6 observers have contributed 123 multicolor and visual observations to date.

Older novae that are still within observing range include:

V2659 Cyg = Nova Cygni 2014 (PNV J20214234+3103296)—This highly reddened classical Fe II-type nova, which had been very active as it declined, is now fading slowly without much variation. As of July 5.9717 UT it was V magnitude 14.127 (BDG, D. Boyd, Wantage, Oxfordshire, UK), and as of 2015 July 6.017 UT, it was visual magnitude 13.8 (PYG, G. Poyner, Birmingham, UK). 79 observers worldwide have contributed 3,523 observations through 2015 July 7.

V1369 Cen = Nova Centauri 2013 (PNV J13544700-5909080) continues to decline slowly (Figure 10). As of June 28.5653 UT it was visual magnitude 9.9 (PEX, A. Pearce, Nedlands, WA, Australia), and as of 2015 July 5.9778 UT it was 10.189 V ± 0.026 (HMB, J. Hamsch, Mol, Belgium).

V339 Del = Nova Delphini 2013 (PNV J20233073+2046041)—This very fast classical nova (class NA) continues to fade. As of 2015 July 7.1236 UT it was 13.323 V ± 0.055 (BPO, D. Barrett, St. Leger Bridereix, France). 541 observers worldwide have contributed 76,338 multicolor observations through 2015 July 7.

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! ★

JULIAN DATE / MOON PHASE CALENDARS

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

JULY 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 	2 	3 	4
5 	6 	7 	8 	9 	10 	11
12 	13 	14 	15 	16 	17 	18
19 	20 	21 	22 	23 	24 	25
26 	27 	28 	29 	30 	31 	

AUGUST 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2 	3 	4 	5 	6 	7 	8
9 	10 	11 	12 	13 	14 	15
16 	17 	18 	19 	20 	21 	22
23 	24 	25 	26 	27 	28 	29
30 	31 					

SEPTEMBER 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 	2 	3 	4 	5
6 	7 	8 	9 	10 	11 	12
13 	14 	15 	16 	17 	18 	19
20 	21 	22 	23 	24 	25 	26
27 	28 	29 	30 			

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, Mike Simonsen. Just send us an email (mentor@aavso.org), or call 617-354-0484 to let us know you are interested in this program.

Ideally, Mike 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 2015 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 [†]	(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 [†]	\$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.

[†]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: _____

2015 MEMBERSHIP RENEWAL

On this page is a copy of the AAVSO membership renewal form for 2015. You may also renew your membership online. Safe and secure online payments are possible by visiting <http://www.aavso.org/membership-renew>. If your postal or email address has changed, please also take a minute to update your personal profile online. Simply click "User login" at the upper right of the home page, then go to "My account." In addition to your dues, your contributions to the AAVSO further support the organization's activities and are very much appreciated. Also, on the next page you will find descriptions of the various funds to which you may contribute. *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.*



AAVSO
Membership and Subscriptions
 49 Bay State Rd
 Cambridge, MA 02138-1203

Name _____
 Address _____
 City _____
 State/Province _____
 Zip/Postal Code _____
 Country _____

Payment and Contact Information

My **check** for \$ _____ is enclosed. *Checks must be in US funds and made payable to AAVSO.*

For payment by **credit card** please complete the section below. *All fields are required.*

__ Visa __ Mastercard Card Number _____ Exp Date: ____ / ____

Card Security Code (3-digit number on the back of your card): ____ Total to be charged: \$ _____

Name on card: _____ Signature: _____

If the billing address for this credit card is different from your address above, please provide it here:

Billing Address _____ City _____

State/Province _____ Zip/Postal Code _____ Country _____

Please make any changes necessary to correct and complete your membership contact information below:

Name: _____

Address: _____

City: _____ State/Province: _____

Zip/Postal code: _____ Country: _____

Phone: _____ Email: _____

2015 Membership Dues Renewal Form

Membership Type *(please check one)*

Annual \$75 Sustaining \$150

Associate (under 21) \$37.50

Pension/Limited Income \$37.50

Developing Country \$25

Contributions *(see next page for descriptions)*

AAVSO Building Fund \$ _____

Janet A. Mattei Research Fellowship \$ _____

Margaret Mayall Assistantship \$ _____

Solar Fund \$ _____

AAVSONet Fund \$ _____

Member Sponsorship Fund \$ _____

AAVSO General Fund \$ _____

The Endowment Fund \$ _____

Contributor-Specified Restricted Funds \$ _____

TOTAL ENCLOSED \$ _____

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.

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

The 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.

The 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!