



## EPHEMERIS

The official newsletter of the Prescott Astronomy Club (PAC)  
*e-phem-er-is*: a time-based listing of future positions of solar system objects

## DECEMBER 2016

### UPCOMING EVENTS

Saturday, December 3 - Black Canyon City @ 6:30 PM in Heritage Park.

Wednesday, December 7 - Regular PAC meeting @ 6:30 PM in Rm 107, Bldg 74, Embry-Riddle Aeronautical University. Program TBD.

Wednesday, December 14 - Holiday Party @ 6:00 PM at Gabby's Grill, Prescott Valley.

Saturday, December 17 - Navy Precision Optical Interferometer @ 10:00 AM in Flagstaff. Details at regular meeting on Dec. 7. There is a maximum of 20 participants, although there is an option for a second tour guide. RSVP Corinne Shaw (cmshaw0430@aol.com) by Dec. 10.



### 2017 PAC OFFICERS

The slate of 2017 Prescott Astronomy Club officers were approved by club members at the November 2 regular club meeting. The 2017 club officers are:

President - Jeff Stillman

Director at Large - Pat Bledsoe

Vice-President - Joel Cohen

Director at Large - Bill McDonald

Secretary - Doug Tilley

Director at Large - Dick Lewis

Treasurer - Stephen Eubanks

Director at Large - John Baesemann

### STAR PARTY AND POTLUCK AT CAROL GIERMANN'S

A PAC potluck social event (star party was cancelled due to clouds) was held Saturday, November 19, 2016 at Carol Giermann's home. Carol's late husband Gene was a past president of the club. He held monthly star parties/social events at their house for several years. After he passed away, his wife Carol continued to host these monthly events. We had not had any star

parties there for the past several years. In the near future, Carol will be moving to Texas to be closer to family. So we held one final gathered to say goodbye and wish her all the best. Attendees included David Viscio, John Carter, Dick Lewis and his wife, Ray Fobes and his wife, Leah Cole and Jim McDowell; John Baesemann called in from Wisconsin.

## **HOLIDAY PARTY - DECEMBER 14, 2016**

The PAC Holiday Party will be held at Gabby's Grill in Prescott Valley December 14, 2016 at 6:00 PM.

A buffet will include entrees, dinner bread, Caesar salad, scalloped potatoes and asparagus, non-alcoholic beverages and dessert. Bar drinks are available, but are paid for separately for anyone wishing to do that.



The main entrees will be Chicken Marsala and Carved Pit Ham. Dessert will be Raspberry Cheesecake.

The cost is \$29.00 per person (tax & gratuity included). Anyone who has not already signed-up and prepaid can still come to the party and pay when you arrive.

The address is: Gabby's Grill  
2982 North Park Ave, Ste B  
Prescott Valley, AZ 86314  
(928) 277-1787

## **2017 SOLAR ECLIPSE BALLOON PROJECT**

On August 21, 2017, the moon's shadow will sweep eastward from Oregon to North Carolina across the United States during a rare total eclipse of the sun. During this eclipse, the moon's shadow will pass over Glendo State Park in Wyoming. The ASCEND! Project, funded by NASA Space Grant and headed by Jack Crabtree, will photograph the moon's shadow from a high altitude balloon. Members of the Prescott Astronomy Club have the opportunity to be part of this exciting project.



Arrival in Glendo State Park is scheduled for August 19, 2017, with departure no later than August 23.

The ASCENT! Team and members of the Prescott Astronomy Club will provide talks about the balloon project and telescope viewing during the eclipse and clear night observing at the

campground. If you are interested in participating or want additional information, contact Jerry and Corinne Shaw at [cmsshaw0430@aol.com](mailto:cmsshaw0430@aol.com) or (928) 772-0941.

## **DIMMING STARS, ERUPTING PLASMA, AND BEAUTIFUL NEBULAE**

By Marcus Woo

Boasting intricate patterns and translucent colors, planetary nebulae are among the most beautiful sights in the universe. How they got their shapes is complicated, but astronomers think they've solved part of the mystery—with giant blobs of plasma shooting through space at half a million miles per hour.



Planetary nebulae are shells of gas and dust blown off from a dying, giant star. Most nebulae aren't spherical, but can have multiple lobes extending from opposite sides—possibly generated by powerful jets erupting from the star.

Using the Hubble Space Telescope, astronomers discovered blobs of plasma that could form some of these lobes. "We're quite excited about this," says Raghvendra Sahai, an astronomer at NASA's Jet Propulsion Laboratory. "Nobody has really been able to come up with a good argument for why we have multipolar nebulae."

Sahai and his team discovered blobs launching from a red giant star 1,200 light years away, called V Hydrae. The plasma is 17,000 degrees Fahrenheit and spans 40 astronomical units—roughly the distance between the sun and Pluto. The blobs don't erupt continuously, but once every 8.5 years.

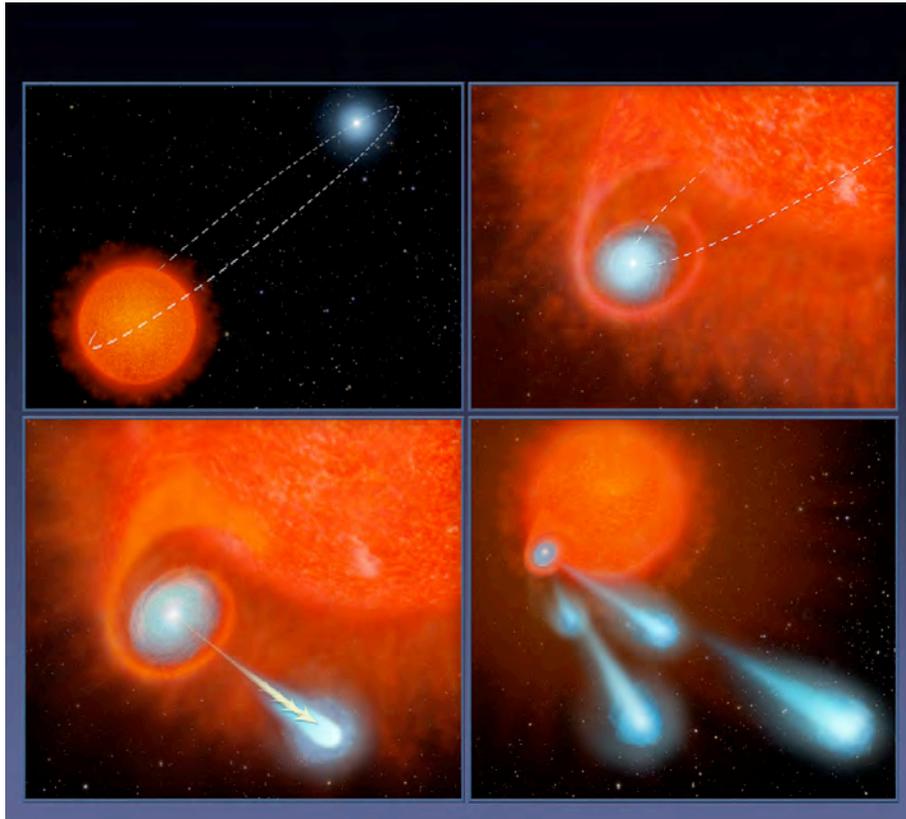
The launching pad of these blobs, the researchers propose, is a smaller, unseen star orbiting V Hydrae. The highly elliptical orbit brings the companion star through the outer layers of the red giant at closest approach. The companion's gravity pulls plasma from the red giant. The material settles into a disk as it spirals into the companion star, whose magnetic field channels the plasma out from its poles, hurling it into space. This happens once per orbit—every 8.5 years—at closest approach.

When the red giant exhausts its fuel, it will shrink and get very hot, producing ultraviolet radiation that will excite the shell of gas blown off from it in the past. This shell, with cavities carved in it by the cannon-balls that continue to be launched every 8.5 years, will thus become visible as a beautiful bipolar or multipolar planetary nebula.

The astronomers also discovered that the companion's disk appears to wobble, flinging the cannonballs in one direction during one orbit, and a slightly different one in the next. As a result,

every other orbit, the flying blobs block starlight from the red giant, which explains why V Hydrae dims every 17 years. For decades, amateur astronomers have been monitoring this variability, making V Hydrae one of the most well-studied stars.

Because the star fires plasma in the same few directions repeatedly, the blobs would create multiple lobes in the nebula—and a pretty sight for future astronomers.



*This four-panel graphic illustrates how the binary-star system V Hydrae is launching balls of plasma into space. Image credit: NASA/ESA/STScI*

## **IF IT'S CLEAR**

By Fulton Wright, Jr., PAC

Celestial events (from Sky & Telescope magazine, Astronomy magazine and anywhere else I can find information) customized for Prescott, Arizona. Remember, the Moon is 1/2 degree or 30 arcminutes in diameter. All times are Mountain Standard Time.



On Tuesday, December 6, the Moon is at first quarter phase and sets at 12:09 AM (Wednesday).

On Monday, December 12, at 8:06 PM, the nearly full Moon occults Aldebaran. The star reappears at 9:15 PM.

On Tuesday, December 13, at 5:35 PM, the full Moon rises, spoiling any chance of seeing faint fuzzies for the night.

On Tuesday, December 20, the Moon is at third quarter phase and rises at 12:39 AM (Wednesday).

On Wednesday, December 21, winter begins in the northern hemisphere.

On Thursday, December 22, about 2:30 AM, look for the Moon, Jupiter, and Spica rising in a line in the east-southeast.

On Wednesday, December 28, it is new Moon and you have all night to hunt for faint fuzzies.

On Saturday, December 31, you can see Mars and Neptune in the same field of view in your telescope. At about 6:00 PM, when it is dark enough to see them, they are 11 arc-minutes apart. At 10:10 PM, when they set, they are 3 and 1/2 arc-minutes apart. They go on to get only 1 arc-minute apart but are below the horizon at that time.

## **TELESCOPES FOR MEMBERS' USE**

The club has 3 telescope systems that are available for temporary long-term use and possession by a club member with the understanding that the scopes are club property and the user is also willing to bring them to the club's public star parties and private events at schools, camps, etc. The two scopes are as follows:

8-inch Celestron Nexstar with alt-az GoTo mount, tripod, red dot finder, hand controller, diagonal, several eyepieces, color filters, Nexstar Users Guide, Celestron manual, DC power cord, level, Orion case, and lens cleaner. It can run on internal batteries but not for long. A 12-volt AC/DC power source would be recommended.



8-inch Meade LX200 Classic with alt-az GoTo mount, tripod, finder scope, diagonal and several eyepieces.



If any member is interested in using either of these scopes, please contact Pat Birck.

## **GUIDELINES FOR PAC EQUIPMENT STORAGE SHED USE**

The PAC board has recently completed an inventory of astronomy systems and equipment belonging to the club. The club has installed a small storage shed at Pat Birck's home to hold some of the equipment. Three club members have keys to access the shed: Pat Birck, Doug Tilley and John Baesemann. If club members want to obtain club equipment for temporary use or store equipment in the shed, please contact one of the 3 key holders. The following rules for obtaining and storing equipment are applicable:



### **Items stored**

- Only property belonging to the Prescott Astronomy Club.
- No items containing hazardous materials or that may be flammable.
- Only items of use to the PAC as determined by the Board – i.e. no junk.

### **Records**

A ledger will be kept in the shed containing the following information:

- A description of each item stored, the date it was entered into storage, the identity of the person putting it into storage, and the person from whom the item was received.
- A record of each item withdrawn from storage, the date it was withdrawn and the identity of the person taking custody.
- A copy of the ledger shall be given upon request to the custodian of PAC records.

Use of an item for longer than “temporary” requires Board approval.

## **BOOKS AND MAGAZINES**

Over the years astronomy books have been donated to PAC. Boxes of these books will be available at the regular meetings. For a donation to PAC of \$1 per book, anyone can have a book. Books that are not purchased at a regular meeting will be available at the following Third Thursday programs. Any remaining unsold books will be donated to the Friends of the Prescott Public Library. We also have copies of past Sky and Telescope magazine. These will be available to any member wishing to take them. Unclaimed magazines will be recycled.



## FOR SALE

Please visit the Classified Ads section of the club website to view the items posted there for sale:

<http://prescottastronomyclub.org/classified-ads/>

New items are added now and then, so don't miss out on something that you would like to get for yourself...or a friend.



## PAC MENTORS

If you need advice on the purchase of astronomy equipment, setting up equipment, astrophotography, etc., contact a PAC mentor.

John R. Carter Sr. - General - 928-458-0570

Jeff Stillman - Astrophotography - 928-379-7088

David Viscio - General - 928-775-2918

Greg Lutes - Visual Observing - 928-445-4430



## OBSERVING LISTS

Observing lists are available on the PAC website to provide guidance and goals for visual and astrophotography programs. Current lists are:

Astroleague Lunar 100

Bright Nebulae

Dunlop 100

Globular Clusters

Herschel II

Messier

Planet Maps

Royal Astronomical Society of Canada Finest NGC

Saguaro Astronomy Club Best NGC

Telescope Showpieces

Binocular Showpieces

Caldwell

Face-On Spiral Galaxies

Herschel 400

Hidden Treasures

Open Clusters

Planetary Nebulae

S&T Lunar 100

The Secret Deep



The lists are in PDF format and can be downloaded and printed for use.

## PAC WEBSITE & YAHOO GROUPS

Website: <http://www.prescottastronomyclub.org>

E-mail: <mailto:pacinfo@prescottastronomyclub.org>

Astrophotography special interest group:

<https://groups.yahoo.com/neo/groups/pacastrophotography/info>



## BOARD OF DIRECTORS

President: David Viscio

Vice President: Open

Secretary: Doug Tilley

Treasurer: Stephen Eubanks

At Large: Joel Cohen

At Large: Dick Lewis

At Large: Fred Arndt

At Large: John Baesemann



## PAC COORDINATORS

Astronomical League Coordinator: Pat Birck

Facebook: Jeff Stillman & Pam Shvak

Highland Center Coordinator: David Viscio

Hospitality: Corinne Shaw & Dick Lewis

Magazine Subscriptions: Stephen Eubanks

METASIG: Marilyn Unruh

PAC Affiliate Partner w/ NAU Space Grant Program – Jerry & Corinne Shaw

PAC Store Sales: Dick Felgenhour

Property Records: Fred Arndt

Schools & Camps Outreach: Pat Birck

Third Thursday Coordinator: Corinne Shaw & Pat Birck

Membership: Stephen Eubanks

Newsletter: David Viscio

Refreshments: Janie Thompson

Publicity: Stephen Eubanks

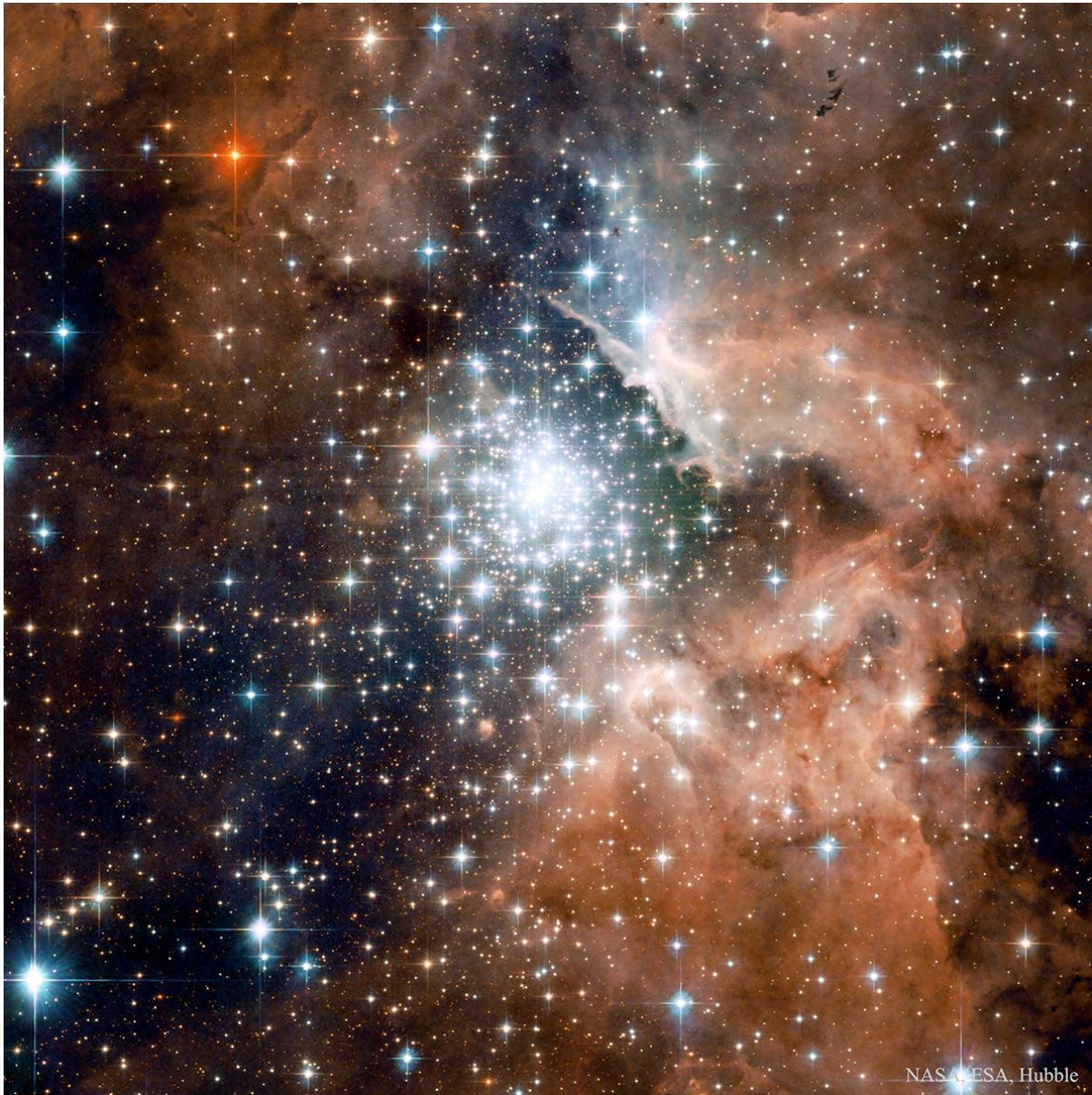
Starry Nights Coordinator: Open

Webmaster: Russell Chappell



## APOD DEC 6, 2016 - STARBURST CLUSTER IN NGC 3603

**Image Credit:** NASA, ESA, Hubble Heritage (STScI/AURA)-ESA/ Hubble Collaboration; J. Maiz Apellaniz (Inst. Astrofísica Andalucía) et al., & Davide de Martin (skyfactory.org)



**Explanation:** A mere 20,000 light-years from the Sun lies NGC 3603, a resident of the nearby Carina spiral arm of our Milky Way Galaxy. NGC 3603 is well known to astronomers as one of the Milky Way's largest star-forming regions. The central open star cluster contains thousands of stars more massive than our Sun, stars that likely formed only one or two million years ago in a single burst of star formation. In fact, nearby NGC 3603 is thought to contain a convenient example of the massive star clusters that populate much more distant starburst galaxies. Surrounding the cluster are natal clouds of glowing interstellar gas and obscuring dust, sculpted by energetic stellar radiation and winds. Recorded by the Hubble Space Telescope, the image spans about 17 light-years.