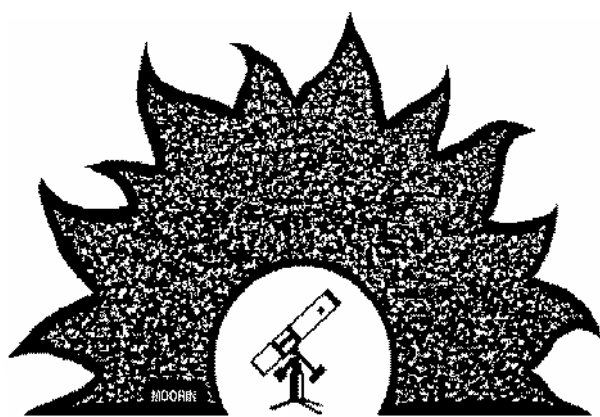




# PAStimes

Phoenix Astronomical Society  
[www.pasaz.org](http://www.pasaz.org)

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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

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## David Williams to speak at PAS September 2nd

### "400 Years of Exploration: Galileo, Jupiter's Moons and the Europa-Jupiter System Mission"

2010 marks the 400th anniversary of Galileo Galilei's use of the telescope to discover various objects in the Solar System, including Jupiter's moons. In February 2009 NASA selected the "Europa-Jupiter System Mission" to be the next Outer Planets Flagship-class mission. It is a joint project with the European Space Agency, and it will include a NASA-built Europa orbiter and an ESA-built Ganymede orbiter which will synergistically explore these moons of Jupiter, along with the moons Io and Callisto, and Jupiter's atmosphere and rings. Join Dr. David Williams of ASU's School of Earth and Space Exploration, and a member of NASA's Outer Planets Advisory Group, who will review the exploration of the Jupiter system from Galileo (the scientist) to Galileo (the spacecraft), followed by a discussion of

this new mission, its science goals, objectives, mission design and potential to advance our understanding of potentially habitable worlds around gas giant planets.

Dr. David A. Williams is currently serving as a Faculty Research Associate in the School of Earth and Space Exploration at Arizona State University. He served as a Visiting Assistant Professor at ASU in 2001-2002, in which he co-taught Physical Geology and a graduate seminar in Planetary Volcanology. David is currently performing research in volcanology and planetary geology, with a focus on planetary mapping, geochemical, and remote sensing studies.

David received his Bachelor of Science in Astronomy & Astrophysics (with minors in Mathematics and Geology) from Indiana University in 1989, and his Master of Science in Geology from Arizona State University in 1992. He received his Ph.D.

in Geology from the University of Alabama in August 1998.

David is also currently president of the United Federation of Phoenix, the second longest continuously-running *Star Trek* and general science fiction fan club in the United States. A life-long *Star Trek* and *Star Wars* fan, he has participated in national *Star Trek* conventions and various charity events.



Photo Courtesy David A Williams

## May PAS Meeting Review

By Terri, Event Coordinator

The May PAS Meeting had a spectacular turn out this year! We had a pizza party and had a large number of attending PAS members. At the meeting, to conserve time, we did the PAS Elections in brief. The officers who had the positions previously, all agreed to take the same positions again this year. Congratulations to everyone who ran for office again. Along with the elections we also congratulated Bob Christ for achieving the Herschel 400. This is an awesome achievement, and Bob got an award from the Astronomical League. Rod presented Bob with the award. Kevin Harcey

brought four astrophotos to share, since our guest speaker, Chris Johnson, was to be presenting the topic of Astrophotography. Thank you, Kevin, for sharing those beautiful photos with us. Photos of this event can be seen in the PAS Photo Gallery.

Then we turned the meeting over to Chris, who did a fantastic job sharing his topic and his enthusiasm for Astrophotography. The topic was not just what you can photograph through your scope, but rather on how you can do it with very little expense. I thought Chris did an awesome job!

Chris ended his presentation earlier than the meeting ended, and so Jerry talked

next about the upcoming morning comet in the sky in the first week of June. We then enjoyed more pizza, cleaned up and departed from the Library. We moved over to G-147 for some short chatting and departed around 10pm.

It was an awesome meeting. Many thanks to everyone who brought a snack to share. Thanks to Steve for providing the ice. Steve also took a lot of photos, which I hope to acquire and post on the website for everyone to enjoy. It was an enjoyable season-end meeting. We hope to see you at the September meeting! Have a great summer.  
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|                                            |               |              |                                                                             |
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## Upcoming September 2010 PAS Events

By Terri, Event Coordinator

**Sept. 2:** PAS Meeting in PVCC Library, 7pm to 9:30pm, Guest Speaker: David Williams

**Sept. 4:** Virtual Star Party at Chris's in Goodyear, begins at 8pm, PAS Members Only, RSVP with Chris

**Sept. 5:** FREE Bookman's Telescope Workshop, 3:30pm to 5:30pm Bookmans Backroom, RSVP with Terri

**Sept. 7:** Cancer Treatment Center Star Party, 8pm to 10pm, PAS Members Only, RSVP with Joe

**Sept. 10:** Wigwam Creek School Star Party, 7pm to 9pm, PAS Members Only, RSVP with Terri

**Sept. 11:** Cuttin Edge Observatory Star Party in Mayer, PAS Members Only, RSVP with Chris

**Sept. 16:** PVCC Public Star Party, 6pm to 10pm, by PVCC Telescope Dome, RSVP with Terri

**Sept. 17:** Wigwam Creek School Star Party Back Up Date, 7pm to 9pm, PAS Members Only, RSVP with Terri

**Sept. 18:** International Observe the Moon Night and Public Star Party at PV Park,

6pm to 10pm, RSVP with Terri

**Sept. 21:** Cancer Treatment Center Star Party Back Up Date, 8pm to 10pm, PAS Members Only, RSVP with Joe

**Sept. 24:** Temple Beth Star Party, set up 5pm, Event 6pm to 9pm. RSVP with Terri, Paid Star Party, PAS Members only, no limit on scopes attending.

**Sept. 26:** FREE Bookman's Telescope Workshop, 3:30pm to 5:30pm Bookmans Backroom, RSVP with Terri

**Sept. 30:** PAS Meeting of the Minds, Business meeting, 7pm to 10pm, G-147 PVCC

## Mike's July 4th Star Party

By Don Boyd

When I got there just after 6:00, Kevin, John and Bob S. were already there. Chris and Judy arrived just before the fireworks. There were five pies, I think two were pecan and three apple. I brought potato salad.

Chris and Judy left about 10; Kevin and John left just after that... so it was just Mike, Bob and me. I set up my scope, mainly to make sure it was operating correctly before the CTCA Star Party next week. It worked fine except I did not have any guid-

ed tours set up. Since I don't know the summer sky, I looked at Saturn and that was about it. We stayed out till midnight when the moon came up. I left at 2:00 AM; Bob stayed the night.

## Meeting Of The Minds Review 5/27

By Terri, Event Coordinator

The Meeting of the Minds for May 2010 was awesome. Many topics were reviewed and discussed. What was awesome was that Joe showed us a presentation on what to expect at the CTCA (Cancer Treatment Centers of America) star parties. Dave announced that the June 17th Telescope Workshop would also be a major Star Party.

Then we discussed various places to hold public star parties. It is hoped that those making the suggestions, would also help set up the star parties at those locations.

Chris announced PATS (Pacific Astronomy and Telescope Show) coming up in September. He is planning a caravan trip. If you wish to follow him out to the event, plan it through him... plan to leave the night before. The event is on September 18-19, with plans to leave Friday night.

Someone suggested a joint star party with other clubs, possibly with Dan Heim. Steve suggested a star party at Buckeye Shooting Range.

Then the topic moved to field trips. PAS has had a few field trips in the past. If you have an idea for a field trip, drop Terri a call or email and let's get something planned.

Mike prepared an expense report which answered the question we wanted to know... could PAS cover the cost of a Season End pizza party for the May PAS meetings? The answer was yes. So, future May PAS Meetings will rely on an expense report given at the April PAS meeting, which would then let the members know if PAS will cover the cost of the pizza or not, for the party in G-147 for the May PAS Meeting.

Jerry, an adjunct of PVCC, is selling his 10" dob with eyepieces for \$550. Dave Hellman is the contact for that sale.

Then we turned it over to Joe, who did an awesome presentation about the CTCA star parties, with what to expect, photos to get to know the layout of the area, etc. I wish to thank everyone who attended and gave their input. We hope to see you at the next MOM's.

OH, one more thing was decided. For the summer MOM's, we will make them a party. That means bring your own drinks but bring a snack to share when we hold the MOM's in the summer months. See you at the next one. \*\*

# SUMMER ASTRO FUN IN REVIEW

By Terri, Event Coordinator

Every summer, PAS holds events. Some survive the monsoons, and others are just washed away or clouded out by them. This summer is no different. But in addition, several PAS members have told me of other events they attended. I'd love to hear about your summertime astronomy fun. Take a moment to write an article for PAS and tell

everyone what fun you had visiting some place that was astronomy related. Did you go to Lowell Observatory, or Mt Lemon, or out of Arizona? We would love to hear about it. Write an article and submit it to Don or myself, and let's get your article in the newsletter.

It would be wonderful to have new, exciting astronomy reviews in this season's newsletter.

I await your submissions to either [events@pasaz.org](mailto:events@pasaz.org) or [editor@pasaz.org](mailto:editor@pasaz.org). Thank you so much for taking a moment to make our newsletter more enjoyable for those reading it. \*\*\*

## How To RSVP For An Event

By Terri, Event Coordinator

Technology is a great thing when people know how to use it, or are willing to learn to use it.

PAS members who do not have internet access can RSVP by calling the correct PAS RSVP person. That is why we set up one PAS person to be the RSVP contact. But if you have internet access and can RSVP by email or in the online PAS Calendar, here are the suggested and preferred ways to RSVP for any PAS event.

1) It is preferred that you go to the calendar date of the event you wish to volunteer for. Most of the time, I provide the link right in the email. If it is a public event, the public calendar has the data and the ability to RSVP right there in the calendar listing.

If it is a private event, you click on the words "Private Calendar" listed on the page that came up when you opened the public calendar date for that event, and it takes you to the private calendar. There, you can RSVP.

2) If for some reason you can not get the calendar to take your RSVP, you should then email the proper PAS RSVP person and let them know you wish to attend. The email option works well. The PAS RSVP person should then confirm they got your

RSVP, so that there isn't any question as to whether you are listed to help out or not.

3) A third option is to go to the Forums. The quick way to find the info about an upcoming event is to go to the calendar, and click on the word "Forum," within the email message, as that is the link to the forum details for that event. You may then post in the forums that you are available to help out at that event.

When I am the PAS RSVP person for an event, I check the PAS Calendar, the Forums and MY email, before an event, to see who is RSVP'd to help out. I make a list, and send email out to only those who RSVP for that event. Therefore, if you do not RSVP for an event, you won't get the updates for that event. I also keep a hard copy list of who is RSVP'd to make sure we have enough scopes attending the event.

Now, if it is a PAID star party, and there is a limit on how many PAS members can attend, such as the CTCA events, then the time stamp on your email or calendar RSVP marks who gets the job. So, it is important that once you get an email notice about a Paid PAS star party, you should take a moment, right then, and RSVP your attendance by one of the three means above. You do not need to do all three. I'd suggest you do them in the order presented above. If one

option doesn't work out, do one of the other options until you are successfully RSVP'd to help out.

All calendar events have a time limit as to when you can RSVP to attend. If it is a public star party, the deadline is by 3 or 4 hours prior to the start of the event. The PAID star parties are usually by noon that same day. I figure if you don't know by noon if you can attend an event or not, you won't know it any later than that.

So, based on your situation - having internet access or not - you make the call, do the email, or RSVP in the Calendar or the Forums. Just get that RSVP to the proper person by the deadline and you are in the TEAM for that night's star party activities.

Technology is great. If you can't RSVP by one means, please try others. Your RSVP is important to those planning the events. An RSVP of "NO" is just as important as an RSVP of "Yes." We need to know you have seen the event on the calendar and not be left hanging as to whether you are going to be there or not. Thank you for your time.\*\*\*

### Astrotrivia

The dust trail left by Halley's comet is the source of two faint meteor showers every year: the Eta Aquarids on May 5-6 and the Orionids on October 21-22.

## GET 5, GET YOURS FREE

By Terri, Event Coordinator

A while ago, in fact it might have been several years ago, PAS created a new PAS Dues sheet in which, at the bottom of the sheet is a space to put a name of a referral. What is this for, you ask? What PAS wants to do is have you, as our PAS Ambassador for Word of Mouth Advertising, go out and sign up 5 new PAS members within a year's

time.

The year runs, just like the PAS year, from Jan to Dec. So, in January, start collecting NEW PAS members. They MUST put your name at the bottom of their Dues Sheet. When you have successfully gotten 5 new PAS members to sign up and join the club, you will be rewarded by having your dues for that next year FREE. Find 5 new

people, get your dues covered by PAS.

This is our way of thanking you for taking the time to find new PAS members. Just be sure to have them put your name at the bottom of the Dues Sheet, or you put it there when you offer them a copy of the Dues Sheet to sign up with. Put your name in the referral space. Let's all work together to make PAS the BEST club in Arizona!

# ALCON 2010

By Bob Christ

ALCON 2010, the annual Astronomical League convention, was held in Tucson this year, on the 25th and 26th of June at the Tucson Hilton East facility. This year the IDA (International Dark-Sky Association) convention piggy-backed the event and created great synergism. TAAA (Tucson Amateur Astronomy Association) co-hosted the event and did a grand job.

Tim Jones and I attended the full conference and the 2+ days we spent there with like-minded folks was a great experience and we thoroughly enjoyed it. The agenda was loaded with heavyweights in the astronomy field and their topics were both highly interesting and engaging. Door prize winners were selected periodically and I was fortunate to win a prize from Lightbuckets, a company that "rents" time on astroimaging equipment – similar to Chris Johnson's set-up, but commercial in "scope."

Multiple vendors were exhibiting and selling their wares and it was like being a kid in a candy store. Tim purchased a two-volume reference set signed by the authors that serves as a modern day update to Burnham's classic volumes. He also purchased four wide field oculars for an aston-

ishingly low cost. For many years I had hoped to own a meteorite, and I was not to be denied.

Geoff Notkin, of the Science Channel's Meteorite Man fame, attended the conference and displayed his wares. I was able to acquire a meteorite from Meteor Crater in Arizona at 1/3rd the cost and three times the size of the meteorites being sold at the Meteor Crater store. Life is good. Tim schmoozed with Geoff for quite a while and a photo of the two is shown.

Tim and I also took a Mt. Lemmon tour, hosted by Adam Block, who is an astroimager of growing renown. During daylight, we were able to view a star: Alderamin in Cepheus at magnitude 2.43. If one has an observatory and a permanently aligned scope – this is nothing special. But for those of us with impermanent setups, it



Tim with Geoff Notkin of "Meteorite Men" fame

was a treat. We were also able to visually see the sun's "Green Flash" phenomenon as it set. It's over in a flash, literally, and was very cool. As night fell, we observed usual June suspects through a 24" RCOS scope, and I must say the views were just a tad better than through my 9.25" tube.

It could be years before ALCON is held again in Arizona so I feel fortunate to have been able to attend this year's event. It was time well spent.

## Thank You For Your Honesty

By Terri, Event Coordinator

I wish to thank everyone who attended the PAS meeting in May for which we had a pizza party. And for that party, I was honored to put out the initial cost of the pizza and be very thrilled that the PAS members were all honest and everyone put in their \$1/slice. At the MOM's at the end of May, it was decided that, for future pizza parties two things would happen. 1) The

PAS budget would be reviewed at the April PAS meeting, so that by the May PAS meeting, we would know if we have the funds for a pizza party whereby the cost of the pizza is taken care of by PAS. And 2) We would hold this type of "End of Season" party in G-147. So, at the April PAS meeting, for 2011, listen for the Treasurer's report, and then watch in the newsletter for an announcement as to whether we are having

a pizza party for the May meeting, and that we will then be in G-147 for that meeting. Thanks to all who participated in the party, enjoyed the pizza, and helped cover their cost. The pizza worked out to be just over \$1 per slice, but someone(s) were awesome enough to add additional funds to cover the extra cost. I thank you so very much! See you at the next PAS meeting!!! \*\*\*

## Thanks To Bruce For 160 Wigwam Photos

By Terri, Event Coordinator

At the Wigwam Creek School Star Party we had in April, Bruce brought his camera. The star party was mostly clouded out so he played with his new camera and then put 163 photos on a CD and gave them to me to post into the PAS Photo Gallery. The process has been taking some time, but shortly you will see 160 of Bruce's photos mingled in with the 95 photos I took that same day. That's a lot of photos for one

event. MANY, MANY thanks to Bruce for providing those photos. If you want your photos posted on the site in the PAS Photo Gallery of any PAS event you may have attended, please send them my way. I credit the photographer and include your photos in the album for the event. We'd love to have your photos in our Photo Gallery as a wonderful way to document the history of PAS. If you have a few photos, feel free to email them to me with date and description and

any other info you think the viewer of the photo album would want to know. If you have a lot of photos, put them on CD or DVD and get them to me and I'll be sure to include them in the PAS Photo Albums. Thanks so much to Bruce and anyone who sends or provides photos for this purpose. Keep taking those photos. PAS will have a great photographic history! \*\*\*

# CTCA #1 Review 6/8

By Terri, Event Coordinator

This was a fun event. CTCA stands for Cancer Treatment Centers of America. It is located in Goodyear. We held a star party on the 5th story roof for the patients and staff of CTCA. It was a great success. It started out with Joe arranging an awesome dinner for those who were participating as star party workers or volunteers. The dining area of this hospital is awesome! The food was wonderful!

After we were all fed, we went to floor 5 and set up our scopes to show the night sky. Sam and Frank were up there, then Joe and Renee. Chris came in place of Steve, who got sick and was stuck in bed, hopefully recovering. William and Amanda joined me on the roof with my scope. Mike came with his meteorites.

Mike set up over by the overhang part of the roof area. This is like a recreation area for the patients to come, be outside, and enjoy the outdoors instead of being stuck in their rooms 24/7. It was very nicely set up with chairs, lighting for safety (not for astronomy) and tables.

Mike was in the overhang area at a table, which also is where they put the sandwiches. Next time, we will put the sand-

wiches by the telescopes and Mike can stay at that same table which provided lighting from a nearby security light. Then, along the roof top, I had my scope. Next to me was Joe's scope, and then Sam was set up, and Chris was closest to the wall.

The temperature on the roof was hotter than I anticipated. The hospital staff provided cookies and ice cold bottled water. It was good to have the ice water available. The cookies were a dream! But, what was annoying about the set up was the security light by the stairwell door. So, the workers brought a box and tape. This set up would have worked to cover the light if it weren't for the bursts of wind. The wind, near the end of the time we were there, was just annoying. Whipping across the eyes that are trying to see objects in the night sky. And blowing the box off the wall, covering the security light. The gentleman who was assisting us with keeping the box on the light was so patient. We all joked about it, but it wasn't much fun to have that light in our eyes.

The later the evening got, the more wind picked up. But, overall, the star party was very fun. I was so amazed at how many people really enjoyed us being up there.

One couple stayed from before we were set up, clear till we were just about to take down the scopes. They really wanted to see a bunch of things that night. I found the Ring Nebula, which was near impossible due to that security light and the fact that the Ring was in the mush of the city lights. But I got it. Then I did the same thing for the Sombrero Galaxy. Found it, but just barely. It really is too bright up there for these fainter objects but I had to find them. Sam was doing an awesome job with objects. Chris, we all know, is so fast with his Go-to. Joe had brought his new GPS model and was playing with the settings. When he got them all figured out, it was a breeze to get from one object to another. I was very impressed with his scope. Lovely views. We must have him at a bunch of future star parties!

Many thanks to all who attended. Thanks to Joe for setting up this event. Two more have been scheduled for July 13 and Aug 17. We hope to see more PAS Members become involved in this event. It turned out awesome! Unfortunately, no one remembered to bring a camera, so there are no photos of this event. Sorry, maybe next time. \*\*\*

## Bookmans Review July 25

By Terri, Event Coordinator

It was a great meeting. We had no RSVP's up to 3pm, then Indy gave us a call to ask if he could join the fun. I invited him. He came and went in about 45 minutes. He brought his 4" Refractor ETX and Don assisted in person. Bob, William and I helped out with advice, and Indy left with more info, lots of handouts, and hopefully the desire to attend a future PAS event.

After Indy departed, we decided to hold a mini Meeting of the Minds and talk about upcoming events. We talked about

possible ideas on public star party locations. I have a bunch of cool events lined up for 2011, but no place to hold these events, and so our discussion came up with two locations to try to incorporate public star parties at for 2011.

It was a productive meeting for those who attended, and Indy seemed pleased with the handouts and info we shared with him. Photos of this event are in the PAS Photo Gallery on our site [www.pasaz.org](http://www.pasaz.org). Enjoy! \*



Photo by Terri Finch

## PHOTOS REQUESTED

By Terri, Event Coordinator

Have you been taking photos at the PAS Meetings and wishing you could share them with the club members? Well, now is the time. Put all your photos, collected over the years, onto a CD and give them to Terri, and as long as they are dated, or in folders showing which event they belong to, I will

post them on the site for you, within the event photo albums for which they were taken. We'd love to see your photos posted on line. A "by-line" will be included with your photo within the album already created by me. Burn them to CD now and let's get everyone enjoying your PAS event photos. Thanks for your assistance. I will post in the

Newsletter a thank you to everyone who submits a CD of photos. These photos can go as far back as you have them. I plan to get all my photos posted as well, over time. So, send them my way, today by CD if there are a lot of them, or by email if you only have a few. Thanks!!! \*\*\*



# Arizona Sky

By Leah Sapir

The summer constellation of Scorpius is still visible in the southwest this month, and it is full of beautiful deep sky objects.

A bit to the right of the scorpion's tail is NGC 6334, the "Cat's Paw" nebula, an emissions nebula which shows bright red colors in photographs. This huge mass of hydrogen, 5500 light years away, is being ionized by bright young stars that formed within the nebula with the past few million years. The unusual shape is formed by dark masses of dust and gas, swirling around the brighter areas and hiding parts of them from our view. These dark nebulae include Barnard 257 to the left of the Cat's Paw, and Barnard 258 directly above it. The faint red nebulosity at the bottom right of the picture is RCW 126 (catalogued by Rogers, Campbell, and Whiteoak in 1960), and the small cluster of stars at top right is Bochum 13, named after a university in Germany. The Cat's Paw Nebula was discovered by John Herschel in 1837.

Directly north of the Cat's Paw is another bright emissions nebula, NGC 6357, the "War and Peace Nebula". It apparently earned this name from infrared images, in which the western part looks like a dove, and the eastern part like a skull. At 8000 light years, the War and Peace Nebula is slightly farther from us than the Cat's Paw. Like the Cat's Paw, it was discovered by John Herschel in 1837.

The War and Peace nebula contains many proto-stars wrapped in dark cloaks of gas and dust; it also contains an open cluster, Pismis 24, which is home to some of the largest stars in our galaxy – over 100 times the Sun's mass. One of these, Pismis 24-1, was thought at first to have a mass of 300 solar masses, but it turned out to be a triple star. The most massive star in the cluster weighs in at 200 solar masses.

Scorpius also has some nice globular clusters. About 6 degrees west of the Cat's Paw are NGC 6453, located about 23,000 light years from us; and NGC 6441, which is about 33,500 light years away. Globular

clusters are dense groups of older stars, found mostly in a halo around the center of our galaxy. In our picture of NGC 6441, the large star at the

right is G Scorpii, an orange giant located 127 light years away. It is actually a triple star – its two companions are the small nearby stars at its left and lower right.

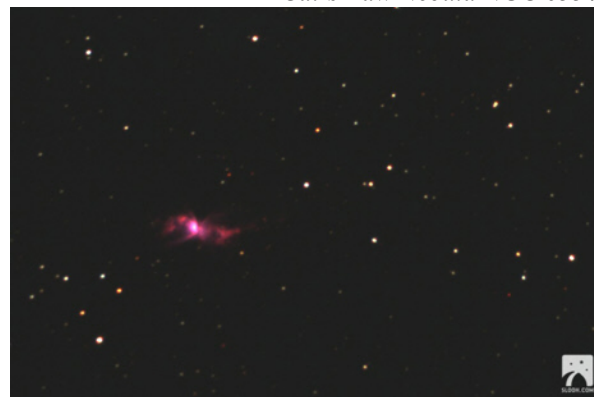
Slightly above/right of G Scorpii is a tiny purple star, known as Haro 1-36 (from a list of planetary nebulae published by Mexican astronomer Guillermo Haro in 1949). Haro 1-36 is actually a "symbiotic star" – this means that it is a double star system in a late stage of its lifetime; the larger star of the pair has already passed through the red giant stage and is now a white dwarf, while the smaller star has just now reached the red giant stage. Part of the red giant's stellar wind is captured by the white dwarf, releasing gravitational energy and causing a thermonuclear outburst – similar to a nova but slower and longer-lasting, sometimes continuing for over 100 years. There can also be shock zones of collision between the red giant's stellar wind and the remains of the white dwarf's stellar wind. It is a very rare type of star system; only around 200 of this type are known.

Southwest of the Cat's Paw is a smaller nebula, NGC 6302, also known as the Bug Nebula. This is a planetary nebula, the last stage in a star's lifetime, where the outer layers of the star are expanding, and the core of the star irradiates and ionizes them. An ordinary astrophoto shows a bright pink nebula with appendages resembling an insect's legs; but the view from the Hubble Space Telescope resembles a butterfly instead.

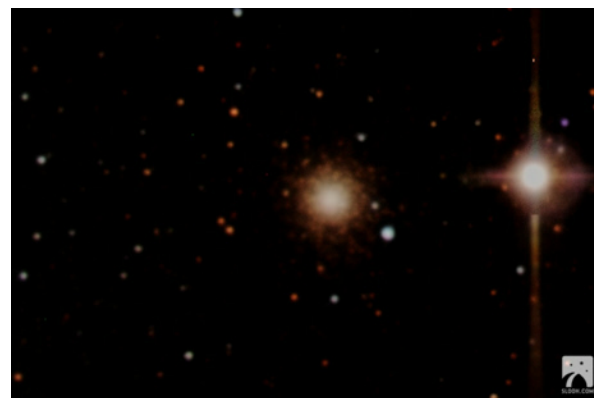
The central star of this nebula was originally about 5 times as massive as the Sun. Today, with its core exposed, it has a surface temperature of about 250,000 degrees C, but it is hidden from our view by a dense equatorial disk of dust and gas. Apparently, though, it produces more ultraviolet than visible light. The dust lane contains compounds that are rare in space – quartz and other silicates, carbonates and hydrocarbons, iron, sulfur, and even ice crystals in the form of hailstones. The "wings" of the



*Cat's Paw Nebula NGC 6334*



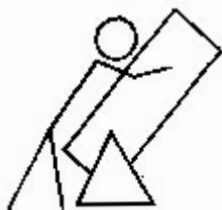
*Bug Nebula NGC 6302 (ordinary astrophoto)*



*Globular Cluster NGC 6441, Orange Giant G Scorpii, and Symbiotic Star Haro 1-36*

butterfly are composed mostly of hydrogen, oxygen, and nitrogen. They are about two light years across, and have a temperature of 20,000 degrees C.

The various parts of the nebula were ejected from the central star in several stages – first a slow-moving ring (about 20,000 mph) around the equator, forming the dust lane; then a faster-moving stage, ejected mostly from the poles (since its path was blocked at the equator by the dust lane) forming the bipolar "butterfly wings"; and then an even faster stellar wind of ionized



# Arizona Sky

particles, moving at a rate of 2 million miles per hour. Shock waves have formed where the fast-moving stellar wind has collided with slower-moving gas. There are also denser blobs of material that block the flow of the stellar wind. At the edge of the nebula, the gas is expanding at a rate of 400 miles per second (over 1.4 million mph).

NGC 6302 is about 4000 miles away. It was discovered by Edward E. Barnard in 1880.

More discoveries by E. E. Barnard can be seen a bit further north, in Ophiuchus. Barnard catalogued dark nebulae at the end of the 19<sup>th</sup> century, and was the first to realize that they are not areas empty of stars, but instead are thick masses of gas and dust, including dark carbon granules, that block the starlight behind them. We previously mentioned Barnard 257 and 258 near the Cat's Paw Nebula; another example is Barnard 72, also known as the Snake Nebula. Certainly a fitting nebula for Ophiuchus, the serpent-bearer! Our picture of the Snake Nebula also shows Barnard 74 at the left, and a semicircle of smaller dark nebulae, including Barnard 68, 69 and 70, at the bottom. Some of the additional dark nebulae in the picture were not included in Barnard's list, but were catalogued in the 1960's by Beverly Lynds, who analyzed photos produced by the Palomar Sky Survey. The bright star at the left of the picture is 44 Ophiuchi, a type-A white star at a distance of 80 light years. The Snake Nebula, by comparison, is about 650 light years away.

Meanwhile, back in the solar system, the planets are putting on quite a show.

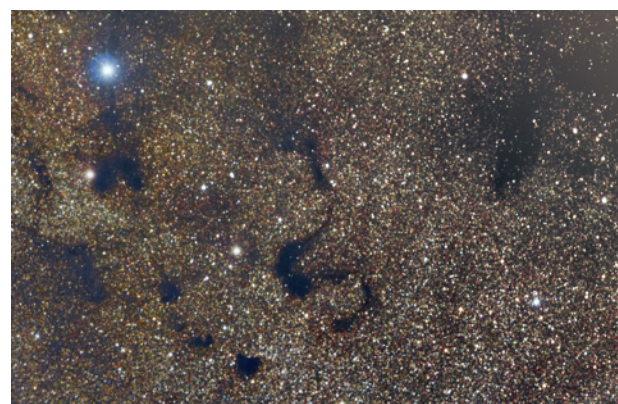
Venus, Mars, and Saturn are in the west after sunset, but getting lower – especially Saturn, which is already sinking into the sunset. Jupiter, Uranus and Neptune are rising earlier, and will be visible for most of the night. Mercury was an evening star in August, and has since slipped below the horizon; but it will reappear as a morning star after mid-September.

The third-quarter Moon will be between the Pleiades and Hyades after midnight on September 1, going across the sky from east to south; and on September 5 the Moon will be near the Beehive Cluster in the east before dawn. On September 9, the crescent Moon will join Saturn low in the west after sunset, and on September 10 and 11 it will be closer to Venus and Mars. On the nights of September 22-23 and 23-24, the full Moon will travel across the sky with Jupiter all night from east to west. On September 27-28, the waning gibbous Moon will follow the Pleiades across the sky from 10 pm till dawn, and on September 28-29 it will do the same for the Hyades.

Join us next time when we continue to explore the summer and fall constellations. And till then – wishing you clear skies, and happy observing!



*Bug Nebula NGC 6302 (Hubble Space Telescope)*



*Snake nebula (B72 in Ophiuchus); image credit: Paolo Pinciaroli (Lebowsky) and www.astronomy.fm*

## Mike's Star Party / Mini Lecture / Pot luck of 5/29

By Terri, Event Coordinator

If you didn't get to attend this awesome party, you missed a great evening! Mike has some Mensa folk over and so he did a lecture, which many attended. The food was awesome! Thanks to everyone who brought yummy things to eat. John Pulis and Kevin Harcey were seen at this party. John's health is always getting in the way of him attending PAS events but we appreciate his company when he can make it. Amanda attended as well as Joe and Renee Collins. Renee brought their daughter, Kat, who was keeping many of us entertained through the night. Sam and Frank were in attendance as

well as Mike's friend Joe, and Bob Senzer.

There was food, socializing, and a mini star party that Sam ran outside while the rest of us listened to Mike's lecture and stuffed our faces with all the food. It was a great event. You'll have to be sure to attend the next one. Thank you to everyone who brought foods to eat. Oh, this was a momentous occasion - everyone who attended got to try the new Finch Garlic Dip. It went over so well that from six bricks of cream cheese to start with, less than half a brick came home with me that night. It must have been loved by all. See you at the next event!!!

Please visit the PAS Photo Gallery on the PAS Website for photos of this event. \*\*\*

Review by Sam Insana

For the Star Party, Sam used his 8-inch Meade reflector with a glass filter to show sunspots. He also showed several solar flares using his PST. At dusk, using the 8-inch reflector, people were shown Venus and Saturn. When it got dark around 8:30 pm, Sam showed two galaxies, M81 and M82. Later on he showed M13, the Hercules globular cluster; M57, the Ring Nebula; M31, the Andromeda Galaxy; Jupiter with its missing equatorial belt; and some craters on the Moon.



# The Turbulent Tale of a Tiny Galaxy

by Trudy Bell and Dr. Tony Phillips

Next time you hike in the woods, pause at a babbling stream. Watch carefully how the water flows around rocks. After piling up in curved waves on the upstream side, like the bow wave in front of a motorboat, the water speeds around the rock, spilling into a riotous, turbulent wake downstream. Lightweight leaves or grass blades can get trapped in the wake, swirling round and round in little eddy currents that collect debris.

Astronomers have found something similar happening in the turbulent wake of a tiny galaxy that is plunging into a cluster of 1,500 galaxies in the constellation Virgo. In this case, however, instead of collecting grass and leaves, eddy currents in the little galaxy's tail seem to be gathering gaseous material to make new stars.

"It's a fascinating case of turbulence [rather than gravity] trapping the gas, allowing it to become dense enough to form stars," says Janice A. Hester of the California Institute of Technology in Pasadena.

The tell-tale galaxy, designated IC 3418, is only a hundredth the size of the

Milky Way and hardly stands out in visible light images of the busy Virgo Cluster. Astronomers realized it was interesting, however, when they looked at it using NASA's Galaxy Evolution Explorer satellite. "Ultraviolet images from the Galaxy Evolution Explorer revealed a long tail filled with clusters of massive, young stars," explains Hester.

Galaxies with spectacular tails have been seen before. Usually they are behemoths—large spiral galaxies colliding with one another in the crowded environment of a busy cluster. Tidal forces during the collision pull gas and stars of all ages out of these massive galaxies to form long tails. But in IC 3418, the tail has just young stars. No old stars.

"The lack of older stars was one tip-off that IC 3418's tail isn't tidal," says Hester. "Something else must be responsible for these stars"

Hester and eight coauthors published their findings in the June 10, 2010, issue of *The Astrophysical Journal Letters*. The team described the following scenario: IC 3418 is speeding toward the center of the

Virgo cluster at 1,000 kilometers per second. The space between cluster galaxies is not empty; it is filled with a gaseous atmosphere of diffuse, hot hydrogen. Thus, like a bicyclist coasting downhill feels wind even on a calm day, IC 3418 experiences "a stiff wind" that sweeps interstellar gas right out of the little galaxy, said Hester—gas that trails far behind its galaxy in a choppy, twisting wake akin to the wake downstream of the rock in the babbling brook. Eddy currents swirling in the turbulent wake trap the gas, allowing it to become dense enough to form stars.

"Astronomers have long debated the importance of gravity vs. turbulence in star formation," Hester noted. "In IC 3418's tail, it's ALL turbulence."

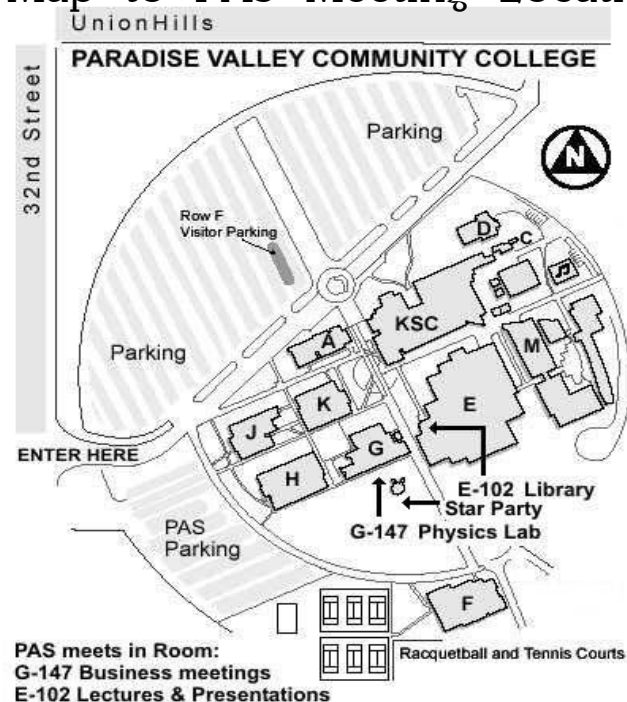
To many astronomers, that's a surprising tale indeed.

See other surprising UV images from the Galaxy Evolution Explorer at <http://www.galex.caltech.edu>. Kids (and grownups) can play the challenging new Photon Pileup game at <http://spaceplace.nasa.gov/en/kids/galex/photon/>.



In the ultraviolet image on the left, from the Galaxy Evolution Explorer, galaxy IC 3418 leaves a turbulent star forming region in its wake. In the visible light image on the right (from the Sloan Digital Sky Survey), the wake with its new stars is not apparent.

## Map to PAS Meeting Location



# Paradise Valley Park Review 8/13

By Terri, Event Coordinator

Not many meteors were seen at this Meteor Shower / Star Party, but everyone who RSVP'd to attend the event, did. It was a great turnout. I counted 30 in attendance. Plus we had our newest member, Gilbert, join in the fun. You can see photos of Gilbert in the PAS Photo Gallery on line. The telescopes for the night were Don, Terri and Gilbert. We had Mike with us which was a great pleasure. While we were setting up, Mike stole the show, as he always does. He kept the crowd until I announced I had Venus in my scope. Then the crowd looked through the scopes and went back to Mike. It was like he was magnetic or something. :) We also saw Saturn, the Moon, Ring Nebula, M13, and a bunch of other cool items. The sky was totally clear. There was a lot of heat rising off the ground but above us was really steady. It was hot and extremely humid. William assisted in the set up of my scope, then laid back on his chair (actually it's my chair but he uses it more often than I do at star parties) and used our Sky Scout to find Mars. We never did see Mars, as I think it was too close to the SR51 bridge. By 9pm all the good stuff had set and the crowd was leaving. I saw one meteor. You know how it is when you are working our scope... no time to view meteors. I heard one other person mention they saw one. Thanks to everyone who attended from the public: Sarah, Daniel, Amy, Yao-ying and Keenan and their guests. We hope to see you at future PAS events. And thanks to Gilbert, Don and William for their help making this event a success. \*\*\*

Please see page 2 for more information

## September

| Sun                                     | Mon | Tue                                                              | Wed | Thu                                 | Fri                                                     | Sat                                                                                   |
|-----------------------------------------|-----|------------------------------------------------------------------|-----|-------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                         |     |                                                                  | 1   | 2<br>PAS Meeting in<br>PVCC Library | 3                                                       | 4<br>Virtual Star Party                                                               |
| 5<br>Bookman's Tele-<br>scope Workshop  | 6   | 7<br>Cancer Treatment<br>Center Star Party                       | 8   | 9                                   | 10<br>Wigwam Creek<br>School Star Party                 | 11<br>Cuttin Edge<br>Observatory Star<br>Party                                        |
| 12                                      | 13  | 14                                                               | 15  | 16<br>PVCC Public<br>Star Party     | 17<br>Wigwam Creek<br>School Star Party<br>Back Up Date | 18<br>International<br>Observe the<br>Moon Night &<br>Public Star Party<br>at PV Park |
| 19                                      | 20  | 21<br>Cancer Treat-<br>ment Center Star<br>Party Back Up<br>Date | 22  | 23                                  | 24<br>Temple Beth Star<br>Party                         | 25                                                                                    |
| 26<br>Bookman's Tele-<br>scope Workshop | 27  | 28                                                               | 29  | 30<br>MOM                           |                                                         |                                                                                       |

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Don Boyd  
PAStimes Editor  
701 W. Del Rio St.  
Chandler AZ 85225

To:

## PAS Speaker Line-up for 2010

By Terri, Event Coordinator

**Oct 7:** Jenny Neureuther, Topic: A Peek into Radio and X-ray Astronomy

**Nov 4:** Mike Marron, Topic: Astronomy Events That Can Kill Humanity in the Next 10,000 Years.

**Dec 2:** Richard Greenberg, Topic: Unmasking Europa: The Search for Life on Jupiter's Ocean Moon

Do you have an idea for a Guest Speaker? Send them to [Events@pasaz.org](mailto:Events@pasaz.org) \*\*\*

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## What's Up For September?

By Rod Sutter, PAS President

| Name    | Date    | Rise  | Set   |
|---------|---------|-------|-------|
| Mercury | 09-1-10 | 06:23 | 18:38 |
| Venus   | 09-1-10 | 09:37 | 20:36 |
| Mars    | 09-1-10 | 09:18 | 20:41 |
| Jupiter | 09-1-10 | 19:46 | 07:42 |
| Saturn  | 09-1-10 | 07:57 | 20:03 |
| Uranus  | 09-1-10 | 19:41 | 07:41 |
| Neptune | 09-1-10 | 18:08 | 05:02 |
| Pluto   | 09-1-10 | 14:38 | 01:04 |

All Times Arizona Time

September 15 2010

**Sunrise: 06:07**

**Sunset: 18:30**



**Q3: September 1**



**New: September 8**



**Q1: September 15**



**Full: September 23**