

# PAStimes

Phoenix Astronomical Society  
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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

## Richard Greenberg to speak At PAS December Second

### Bio:

Richard Greenberg is Professor of Planetary Sciences at the University of Arizona. As a celestial mechanician, his research interests span all aspects of planetary motions, especially those that involve non-gravitational effects like collisions and tides, including formation of planets, extra-solar planetary systems, evolution of asteroids and meteorites, and the orbits of satellites. As a member of the imaging team for the Galileo mission to Jupiter, he became especially engaged in interpretation of the

processes that have shaped the satellite Europa. His is the author of the widely acclaimed book "Unmasking Europa: The Search for Life on Jupiter's Ocean Moon".

### Presentation title:

"Unmasking Europa: The Search for Life on Jupiter's Ocean Moon"

### Description of talk:

Europa's global ocean contains twice the liquid water of all Earth's oceans combined. Tides warm this satellite of Jupiter and stress its icy crust. The distinctive

tectonic cracks and ice floes demonstrate active linkages between the surface and the ocean just below, providing a variety of evolving environmental niches. These processes were recent, and likely continue today. A habitable biosphere might extend from the ocean up to within a few centimeters of the surface. Longer term changes in environmental conditions may have driven biological adaptation, as well as provided opportunity for evolution. Life on Europa might be relatively accessible to spacecraft exploration, but at the same time vulnerable to contamination.

## November PAS Meeting Review

By Terri, Event Coordinator

It was a lovely meeting. Mike did his presentation on "Upcoming Astronomical Disasters", and even made it brief enough that there was about a half hour of time to socialize afterward. The topic went over very well, and it appeared that many of the 20 attendees wanted to know more. Maybe we can have Mike do a longer version of this same talk, or add to it, at a future meeting, or possibly during the summer as one of his lectures in the "Summer Lecture Series."

We opened the meeting with a few brief announcements. Sam Insana talked about how wonderful and dark the skies were at the Picket Post star party a few days prior to the meeting. Jerry Belcher took a little more than five minutes to review a few upcoming things and ask again if anyone had telescope parts they didn't need, so he could make the next few awards for various upcoming competitions PAS is hosting. He wants to make some awesome plaques for the Moon Marathon (March 19) and the

Messier Marathon (March 13). Read about the Messier Marathon challenge within this issue. He also mentioned the upcoming PAS Social which is on January 22.

Tim Jones took a moment to tell everyone how the Messier Marathon works, which is a great thing to know, because when Tim asked if anyone had been to a previous Messier Marathon, no one raised their hands. I will include an article about the Messier Marathon closer to March for those who might want to attend. There are two Marathon locations for which I will do an article. One of them is hosted by SAC and EVAC and is south of Phoenix. The other one is held north of Phoenix, sometimes at the Two Trees site, and is hosted by Dennis Young's club, Sirius Lookers of Sedona. You may attend either of them to try to win the Marathon. And as a PAS member, you can win the award that Jerry is making for this event, for PAS members only.

It was a very good meeting. Wish more of you could have attended. Frank recorded

the presentation. And Don won the 50/50 raffle - \$22 was split. Many thanks to the Wursts for providing the donuts and cookies. Sam, thank you so much for the ever-so-popular popcorn. The water this time was donated by the Wursts. PAS Snack fund did not purchase it this month. The 15 photos for this meeting are in the PAS Photo Gallery. Take a look! And see you at the next meeting!!! \*\*\*



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## Upcoming December PAS Events

By Terri, Event Coordinator

December is a busy holiday month and so PAS doesn't always have a lot of events. Plan to have more fun in 2011!!! Here's the December line up of events....

**Dec 2:** PAS Meeting in the PVCC Library, from 7pm to 9:30pm. Everyone is welcome. Bring the whole family!

**Dec 4:** Cuttin' Edge Observatory (CEO) Star Party. PAS Members only. RSVP is with Chris [webmaster@pasaz.org](mailto:webmaster@pasaz.org). This event is held in Mayer, AZ. All PAS Members welcome. Serious observers only.

**Dec 7:** Cancer Treatment Center (CTCA) Star Party. RSVP is with Joe [collins79@cox.net](mailto:collins79@cox.net). This is a paid star party and only PAS Members are to attend. Dinner may be provided. Contact Joe for details. Official time of event is 8pm to 10pm.

**Dec 9:** PAS FREE Star Party and Telescope Workshop at PVCC. Learn to use your telescope if you have one, and

enjoy other astronomy activities even if you don't have a scope yet. Meet in Room G-147, where many handouts related to astronomy and telescopes will be available to pick up. Possible Moon demo and Meteorite Man should be there. If you have a telescope, bring telescope and accessories, meet in G-147 for indoor instruction, then go outside with your scope and teacher for evening instruction. Star Party for all may also be held outdoors, weather permitting.

**Dec 11:** Geminids Meteor Shower / Star Party at PV Park - 40th Street and N of Bell Rd. Time: 6pm to 10pm. Public welcome, bring a friend and the whole family. Bring your own chairs, snacks, drinks and jackets. RSVP is with Terri [Events@pasaz.org](mailto:Events@pasaz.org) or 602-561-5398. The event will be cancelled if there are no public RSVP's.

**Dec 12:** PAS FREE Telescope Workshop at Bookmans - 19th Ave & Northern - 3:30pm to 5:30pm. RSVP is with Terri [Events@pasaz.org](mailto:Events@pasaz.org) for this event.

Bring your scope and accessories, and learn how to use your telescope. Everyone welcome!

**Dec 16:** PAS Meeting of the Minds (MOMs) in Room G-147 at PVCC. We start to gather around 7 pm, and meeting opens at 7:30. This is the PAS Business meeting where we party and discuss topics. The MOMs Agenda can be found at this link: <http://www.pasaz.org/forums/downloads.php?do=file&id=60> If there aren't enough topics to hold a minimum of a one-hour meeting, the meeting is canceled, and the topics move to the next month's meeting. Everyone is welcome at this meeting (adults only please). Check with Terri [Events@pasaz.org](mailto:Events@pasaz.org) as to whether the meeting is on or off. No RSVP is required.

**Dec 21:** Back up date for Dec 7 CTCA star party.

**Jan 6, 2011:** PAS Meeting in room G-147 at PVCC, from 7pm to 9:30pm. Everyone is welcome. Bring the whole family! HAPPY 2011!!! \*\*\*

## Meteorites For Sale

By Terri, Event Coordinator

I have 25 small meteorites that were given to PAS a while ago. At the December PAS Swap Meet, I'd like to sell them off, and all income from that sale will go to

PAS. We are selling them at \$5 each. You pick which one(s) you want, and pay William. Any that are left will be raffled off at school star parties where Mike and Terri are both present. One meteorite per event can

be raffled off for free until they are all gone. So, if you want one before they are all gone, see William at the December PAS meeting and get one for yourself for \$5. See you at the Swap Meet! \*\*\*

## All Arizona Star Party Nov 5-6, 2010

By Tim Jones

With the issues of border security and the location of the old All Arizona Star Party site south of Arizona City being on a known coyote trail, the AASP was relocated this year to a new site west of Phoenix, at Hovatter Road Airstrip in Salome, Arizona. This is located at Exit 53 on I-10. The event runs for three days and two nights and is sponsored by the East Valley Astronomy Club.

While the AASP is scheduled for Friday through Sunday, some folks with open

schedules started arriving at the site as early as Wednesday. Bob Christ and I were attending the First Friday event at the Phoenix Art Museum and didn't head west until Saturday afternoon. We arrived around 3:30 under near total cloud cover and joined the already strong crowd of around 60 vehicles. The temperature was mild and we had a chance to visit with old friends and make new ones. At 4:30, EVAC held a raffle and gave away prizes donated by Starizona, Photon, and Chart-markers. The two grand prizes were a

hand-built observing chair and a 12" Dob with all the trimmings. After the raffle, we all dug into Claude Raines' "gAstronomical Chili" and fixings for dinner, and visited while wishing away the relatively thick cloud cover. By sunset, the vehicle count had grown to around 80 and everyone was busy getting their scopes warmed up. One concern shared by all was the proximity to I-10 and the vehicle lights. It turned out that while the traffic was visible, it was far enough away that the lights were simply a low glow on the

# Indoor Astro Event Review Oct 14

By Terri, Event Coordinator

This event started with a bit of surprise. I had gone to Dan's DFAC meeting in Anthem the night before, and up til then, we had no telescopes scheduled to show up at our event. I met up with Dennis Young, who told me he was coming the next night to help out. That was a nice surprise. Then

during the day, Thursday, while setting up for the event, I discovered a last minute email from Tim and Bob saying they would also attend. I wish to give many, many thanks to Tim, Bob and Dennis for providing such awesome views of the night sky to the 12 attendees of this event. Indoors I was doing the Moon demo and the handouts,

and Mike did his meteorites. It was a great success. We only had a few RSVP's, and the rest of the crowd just showed up for it. Thanks to all who attended!!! We hope to see you at the next Indoor Astro Event in the Spring. Photos of this event can be seen in the PAS Photo Gallery within the PAS Website. \*\*\*

## Thanks From Newest PAS Members

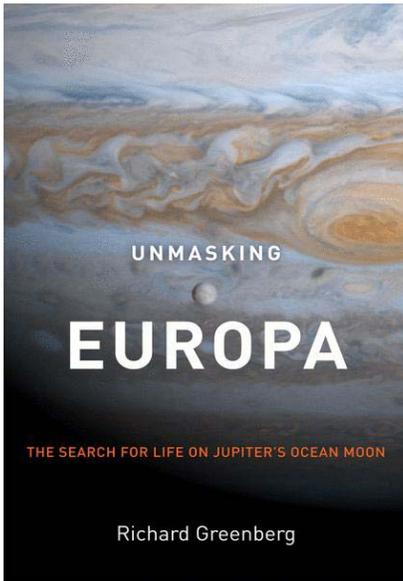
By Dan Evander

Terri, Rose and I enjoyed Thursday's meeting and we were really excited about everyone and

everything we were able to see.  
Thank you for putting that together.  
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Dan is referring to the PAS Indoor Astro Event of Oct 14. It was a great success. \*\*\*

## Unmasking Europa



Richard Greenberg

Richard will be selling & signing his new book at the Dec. Meeting. University of Arizona, Lunar and Planetary Laboratory, Tucson  
Unmasking Europa: The Search for Life on Jupiter's Ocean Moon  
A Close Look at Europa . . . And How Big Science Gets Done . . .

The second-outward of Jupiter's four major moons, Europa is covered with ice, as confirmed in views from modern telescopes and the thousands of images returned by NASA's Voyager and Galileo missions. But these higher-resolution views also showed that the ice is anything but smooth. In fact, Europa's surface is covered with vast criss-crossing systems of mountain-sized ridges, jumbled regions of seemingly chaotic terrain, and patches that suggest upwellings of new surface materials from below. How scientists think about the underlying forces that shaped this incredibly complex, bizarre, and beautiful surface is the subject of this book.

In *Unmasking Europa*, Richard Greenberg tells the story of how he and his team of researchers came to believe that the surface of Europa is in fact a crust so thin that it can barely hide an ocean of liquid water below. He shows how the ocean is warmed by the friction of tidal movements in this small moon as it orbits around immense Jupiter. The implications of this interpretation—which includes the idea that there are active intermittent openings from the liquid ocean to the frozen surface—are immense. The warmth, the chemistry, and the connections from ocean to surface provide the conditions necessary for the existence of life, even at this relatively remote locale in our solar system, far beyond what's normally thought of as its 'habitable zone.'

## Tropper Star Party Review 10/30

By Terri, Event Coordinator

The original plan for this paid event was to begin the star party at 7:30 pm on October 15th. However, the clouds in the sky changed that schedule, so we moved it to October 30th. Sometime during that Saturday, Scott and I talked and he decided to start this event at 6pm. This was short notice but I managed to call the needed attending scopes to tell them of the change.

It was Amanda, Don, Mike, Bruce and me. Bruce's van, with three scopes and three people, arrived first. While we were setting up, Don arrived. Mike arrived after a few of the party-going guests got there. I think

there were about 25 party people and the five of us, as well as Scott, his wife Lee, and their son. It was a good event.

The event was supposed to end at 10:30, but Scott was so interested in what we were showing him, he kept us longer. I believe we actually started packing up 11:45. We were able to keep the four scopes on different objects throughout the night. Scott, of course, really loved talking to Mike and looking through Bruce's 20" telescope. He saw things in the other scopes but kept going back to Bruce.

Dinner was pizza, shrimp, salmon, salad, strawberries, brownies, and bottled wa-

ter. It was delicious and well appreciated.

Many thanks to Scott and his family. They host very nice parties. We hope to be able to do more events for him. And thanks to Mike, Bruce, Amanda and Don for assisting with this event. \*\*\*

### THANKS FROM TROPPERS

By Scott Tropper

Terri, Just wanted to drop you a line and let you know how much we all enjoyed the star gazing event. Thank you to all including Bruce, Don, Mike, William, you of course and Storm (Amanda)! Hope you had fun too and enjoyed the food. See you guys soon. \*\*\*

# Members' Astronomy Night

by Terri, Event Coordinator

Attention all you wonderful PAS Members who would like to take 10-15 minutes to do a presentation to your club members.... now is your chance. PAS will be having a Members' Presentation Night on Sept 1, 2011. Start thinking about what you'd like to present, rehearse it, find out how long you need to do your presentation, and then drop me an email so I can get an idea of how many PAS members would like to fit into September's PAS Meeting. If we can keep the presentations to under 15 min-

utes, then we should have plenty of time for everyone who wishes to do a mini presentation. All PAS members are welcome to attend and present. Keep it short, in case others have something to add to enhance our evening.

We will also make this a party, so bring a snack to share. We are in the Library, so let's keep the volume of our chatter low. Sign up as soon as you can with me. If we do a 15 minute limit per presentation, we can do five presentations in a night: 7:45 to

8, 8 - 8:15, 8:15 to 8:30, 8:30 - 8:45, 8:45 to 9pm. Then, we close the meeting and clean up. So the first five members to sign up will get the chance. If this turns out to be a successful meeting, with many topics and fun things to learn, and if more members are willing to present than we have time for, we can either shorten the presentations or I can schedule another Members Night in 2012. For upcoming Guest Speakers, be sure to see the list I keep updated at this link: <http://www.pasaz.org/forums/downloads.php?do=file&id=8>. Sign up today! \*\*\*

## How Do We Prepare The Newsletter?

By Terri, Event Coordinator

I wish to thank everyone in 2010 who contributed to the newsletter. It is really awesome to have some extra submissions so that the readers do not have to ONLY read what I have written. Different point of views are very important and help the newsletter be more interesting to all.

And in case you were wondering how our monthly newsletter, PASTimes, "magically" appears at a link on our website, or in your mailbox...

Recently, Don and I have been working with volunteer proofreaders. Here's what we have been doing to save time in putting together the monthly newsletter. The articles first come to me, usually. So, Sam, Joe, Rod and a few other people have submitted awesome articles, and they usually send them to me. I prepare a chart to track which articles go into each issue, so that when the deadline comes (now the 15th of each month) I send the already-assembled chart of articles to Don. It's a list to help him not forget which articles are needed to be in this issue. He and I keep the articles in a folder within our email for each month.

So, the article comes to me, I fix the title and byline, as sometimes the writer forgets to include that information. Then I skim for mistakes, fix spelling errors, and then send it on to both Leah and Don. Don throws it in his folder and Leah edits it. If you get an email from Leah with your arti-

cle attached and questions, please give her your input and decision on how you want the article changed or edited. She is the one fixing the articles to go straight into the newsletter.

Then Don assembles the newsletter with the edited articles. He formats it, and makes it look nice, and fits everything into the newsletter for that month, space permitting.

He then sends the almost finished pdf out for proofreading to Terri (me) and Matt. What I proof for is formatting, missing links, bolded items that aren't bolded, such as dates... and I make sure my list of articles that are supposed to be in there, are actually in that issue.

What Matt looks for is all of the above and then some. Between the four of us, we have been able to get a completed newsletter, totally edited and ready to post on line in about three days. I say three days because sometimes this falls around a weekend, and Leah isn't available on Saturdays to edit, so what might be a two-day process, turns into three days. Matt and I send our edits to Don for fixing, and then he posts the completed masterpiece on line.

If you wish to help with editing, drop me an email at [Events@pasaz.org](mailto:Events@pasaz.org) and we will add you to the list of proofreaders. You will get the semi-finished version, as Matt and I do, and you send your edits directly to

Don with page number, article name, or description where to find the error, and the correction needed. It is a vital part of PAS to be part of this Editing TEAM and I know Don appreciates all the help he can get. Some months are more troublesome than others when it comes to mistakes and errors, but now that we have a system where we send every written article to Leah first, the amount of "in article" mistakes has been reduced tremendously and has saved us a bunch of time. We really appreciate what Leah has done for us by taking over the editing of every written article as they are written... So, as I write articles throughout the month, as the need arises, they go to Don and Leah, and Leah does the editing, sends to Don, who then puts it in the newsletter, and then he sends to Matt and me, and we finish the last minute editing. Seems like a lot but it really pays off and gets the newsletter done quicker and without

as many errors as it could have had. So, send those submissions to me or Don.... and let's get the newsletter to be the best it has ever been!!! I feel a newsletter that is more interesting to read makes it a better newsletter. We hope for more submissions in 2011! Keep them coming!!! And remember, if you attend an event and want to write a review about it, please do. More than one review about the event is very welcome. Thank you all for your 2010 submissions. Let's make 2011 even better!!! \*\*\*

## Astronomy Posters For Sale

By Terri, Event Coordinator

At the December PAS Meeting we will be having the PAS Swap Meet. One of the items up for sale will be some astronomy posters. These posters came to PAS via

Don. They will be available at a cost of \$2/ poster with \$1 of each sale going to PAS. Here is a list of the poster images: Large Magellanic Cloud, Helix Planetary Nebula, Pleiades Open Cluster, Hubble Tuning Fork, Cassiopeia Super Remnant, Androm-

eda Galaxy M31. When purchasing these posters, pay Don and he will donate the \$1 for each sale to PAS. There is only one of each poster, so arrive early to get your choice. \*\*\*

## CTCA Review 11/2

By Joe Collins

Don and I were the primary PAS folks last night. Renee was a "helper". Marisa Benincasa provided two-sided color copies of our handouts/flyers. Since we didn't have a solar scope setup tonight, Don, Renee and I were able to enjoy a leisurely early free dinner in the Cafe via "Meal Tickets" from Marisa - with a great menu selection tonight of pork loin, vegetable quiche, tilapia in fruit salsa, mashed potatoes, etc. In addition, cookies and cold water were served at 8pm during the event. Since we showed up early, around 4:30pm, we had plenty of time for setup. The weather was on the cool side, but very comfortable. We will definitely need sweaters for next month's event. The atmosphere was cloudless and clear, and it was a moonless, exceptional night for observing. We were able to see planets (Jupiter and the Galilean moons, Uranus, and Neptune), open

clusters (the Wild Duck Cluster M11, the Beehive M44, the Pleiades M45), globular clusters (M2, M13, M92), the Andromeda Galaxy M31, the Ring Nebula M57, and several binary stars including Albireo. Light pollution prevented us from seeing some of the fainter deep sky objects. Even the globs looked underwhelming tonight, but Jupiter viewing was stunning! On the downside, we only found one box to block the flood lights until about 8pm, and the veranda obstructed the view of the Orion Nebula M42/M43 at the end of the event. We can do better next time by just bringing a couple of empty paper ream boxes so we don't have to rely on security to do this for us... they were busy last night with their rounds. The customer attendance was on the low side for our expectations: we only had 11 customers, which included only three patients and mostly CTCA workers. One ambulatory patient enjoyed the

telescopic viewing so much that he came back three times during the event.

The low attendance could be attributed to two things: it was election night, and many workers who might have wanted to stop by after work fled for the polls. Also, our event did not show up on the patient/general calendar - I will have to talk with Marisa about that when I see her about events for 2011. They used to leave an easel with a sign by the elevator that has access to the 5th floor rooftop garden, but they have gone "high tech" with a scrolling plasma TV showing upcoming events. However, the PAS events weren't displayed on that either.

In summary, it was a good to great night for viewing for the few people that indulged, and we need to work with Marisa to increase publicity for better future turnouts. \*\*\*

## Many Many Thanks To Tim & Bob

By Terri, Event Coordinator

PAS has a list of Weather Watchers. When a star party is planned, we contact them with the zip code of the planned location, to watch the weather and update me with any weather related reasons that could cause us to cancel the star party. Well, for a Paid star party that was to happen on Oct 15, the clouds were taking over the sky. The night before, the clouds went away part way through the evening, and then came back. But on this particular night, the weather forecasters on the radio were saying there would be thunderstorms and possibly high winds. I was getting confused by all these forecasts so I asked the EXPERTS. I knew that for a limited time, Tim and Bob would be available by their computers to assist me

with a weather forecast. So, I quickly sent an emergency email asking for an update for a certain zip code. I wish to thank Tim and Bob for their quick response and advice. Bob said that if it is a Paid star party, cancel it as the sky won't produce enough clear holes to see anything. The weather site he uses is extremely accurate. I wasn't seeing that much in the way of clouds at that time, but then Tim gave me a forecast that got my attention. Then my hubby, William, came home and told me about the KTAR forecast; and from about 3:45 on, Don also confirmed the weather was going to be bad. So, I contacted those who had RSVP'd for this event, and the dude who was hiring us, and he successfully canceled the star party

before the storms came. I wish to thank Bob and Tim for their insight and advice. Without them, we might have gone there and seen nothing. Plus, the KTAR forecast wasn't totally correct, but it was enough to say to myself, "Think about this before we do it." So, the advice of the Weather Watchers, Tim and Bob, was extremely necessary and appreciated for this event. Thank you! And thanks to all the weather watchers who helped with the weather for the 14th as well. I really appreciate our TEAM. Keep those updates coming in when there is an event that night!!! If you aren't on the list of Weather Watchers, and would like to be, drop me an email and I'll add you to the list. Thanks. \*\*\*

## Thanks To Joe

By Terri, Event Coordinator

I want to take a moment to thank Joe Collins for the awesome articles he provided for the October issue of this newsletter. He is a wonderful writer and we hope to see more of his articles, & reviews in our PAS-times Newsletter. Many, many thanks to Joe for all his reviews last month, with hopes of seeing more of them in the newsletter issues to come. Thank you Joe!!!

As a note: If I, Terri, do not attend an

event, it is up to one of the PAS attendees to write a review for the newsletter. Prior to leaving the event, there should be a brief discussion about who will help out by doing the review. For Mike's events, another PAS member should write the review. For the CTCA events, Joe can write the reviews, and for events that a PAS member might be there when I am not, such as the Seven Springs star party, someone else should write the review. The reason we want re-

views in the newsletter is that our newsletter is a source of historical account. What did PAS do, where, when, why, and how did it turn out? We have no other way to track what we've done, so why not do it in the newsletter. Please send your reviews to Don at [Editor@pasaz.org](mailto:Editor@pasaz.org), anytime Terri is not at the event. Thank you in advance for your assistance. And it is always good to get more than one review of an event, if anyone wants to add their input, as well. \*\*\*

# Arizona Sky



By Leah Sapir

One of the highlights in the northern sky this month is Cepheus, a somewhat faint constellation that harbors some very beautiful and interesting deep sky objects. The constellation is supposed to resemble a king from one of the Greek myths, but its actual shape is more like a pentagon or house-shape (complete with pointed roof). If we are facing north, then starting from the zenith and going down towards the horizon we will see Andromeda, Cassiopeia, and Cepheus – a dysfunctional family in Greek mythology, but a bunch of great constellations in the sky! The “point” of the pentagon (or the “tip of the roof”) points approximately to Polaris.

The flat side of the pentagon (the base of the “house”) borders the constellation Cygnus, and is composed of the stars Zeta and Alpha Cephei. Zeta Cephei is a type-K orange supergiant about 725 light years away. It is a huge star, with a diameter almost as large as the orbit of Venus. Zeta is a little cooler than the Sun (if you can call a temperature of 4000 degrees to be “cool”) but because it is so large, it radiates 3600 times as much light as the Sun does. Zeta was probably a type-B blue star when it was born about 50 million years ago. But after a “fast and furious” youthful stage of fusing hydrogen into helium, it is starting to run out of hydrogen and has a core composed mostly of helium. Stars in this stage will begin to fuse their helium into carbon and oxygen; and when they run out of helium, they continue fusing the elements they have into other elements till the core is composed of iron. At that point, fusion can’t continue because it takes more energy to fuse iron than the reaction will produce.

Zeta’s mass is estimated to be about 6 to 8 times the mass of the Sun, but it is also losing about 1 millionth of a solar mass per year. Its future is uncertain (to us at least) because it is a sort of borderline case. If it is actually at least 8 solar masses, and doesn’t lose too much of its mass due to solar winds, then when it reaches the “iron core” stage it will be overcome by gravity and then explode as a supernova. (That will be something to watch in a few million years!) On the other hand, if its mass is actually closer to 6 solar masses, and/or if its solar wind causes it to lose sufficient mass, it won’t be massive enough to become a supernova, and instead it will fade out as a beautiful planetary nebula, similar to M57 (the Ring Nebula) and other planetary nebulae that we have discussed.

Zeta is located in one corner of a small triangle which also includes Epsilon and Delta Cephei. (While the three stars are “neighbors” in the sky, they aren’t really close to each other in space; Epsilon is only 80 light years away, and Delta is about 1000 light years from us.) Of course we’ve talked about Delta Cephei in the past, it is the prototype of the “Cepheid variable” stars that serve as a “standard candle” for measuring distances in space. Zeta

is a little brighter than Epsilon, and Delta is intermediate between them: varying from a magnitude as bright as Zeta, to one as faint as Epsilon. Delta’s cycle of variability takes just five days, so it’s fun to go out and watch!

Each day you can compare it to its neighbors and see it change. Or, if

you’re in a hurry, you can watch a time-lapsed animation made by snapping photos every day for a week: <http://tinyurl.com/38qet67>.

Alpha Cephei, also known as Alderamin, appears at first glance to be a garden-variety type-A white star, about twice as large as the Sun in both mass and diameter, and 18 times as bright. But a closer look shows that it is rotating at a tremendous speed – about 150 miles per second! As a result, it rotates on its axis about three times a day, over 100 times as fast as the Sun (which takes about a month for one rotation). Alderamin emits large amounts of X-ray radiation, indicating possible magnetic activity. It is apparently nearing the end of its hydrogen-fusing stage.

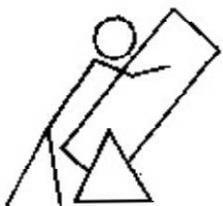
Alderamin is 49 light years away, and not far from the North Celestial Pole. In fact, in just 5000 years (set your stopwatch...) it will be the North Star, due to precession – a sort of wobbling of the Earth as it spins on its axis. The “wobbling” is very slow, and a full cycle takes about 26,000 years. Over that time, the Earth’s north pole changes direction slightly, and several stars take turns as our “North Star”. Besides Alderamin, which last held that position



*Iris Nebula NGC 7023*



*IC 1396 (image by Paolo Schiavone, featured on [www.astronomy.fm](http://www.astronomy.fm))*



# Arizona Sky

about 18,000 years ago, during the past thousands of years the stars Vega (in Lyra) and Thuban (in Draco) have in turn shared the honor currently held by Polaris, today's North Star.

About 6 degrees north of Alderamin is NGC 7023, the Iris Nebula, one of my favorite reflections nebulae. The bright spot in the center is the star cluster that is lighting up the nebula, but it isn't hot enough to ionize the surrounding gas; instead the starlight is reflected by the gas cloud. It appears blue because those wavelengths are more easily reflected from the particles of dust and gas. This beautiful nebula is about 1500 light years away, and about 8 light years across.

A more complex object is IC 1396, located about 3 degrees south of a line joining Alderamin and Zeta. The full nebula is a huge cloud of hydrogen gas, hundreds of light years across, and about 3000 light years away. The hydrogen is ionized by young stars within the nebula, and photos show its red glow. Within the larger nebula is an area known as the "Elephant's Trunk", about 20 light years long – plenty big, although dwarfed by the parent nebula. The Elephant's Trunk contains young stars that are ionizing the nearby gas, a curving

red shock wave where stellar winds from the young stars are crashing into other parts of the nebula, and dense dark clouds of dust and gas where more young stars are forming.

Meanwhile, back in the solar system, Mars is still hanging around in our twilight sky (mostly because of the early sunset) but is starting to fade away. Mercury is an evening star during the first half of the month, disappears at midmonth, then switches to the morning sky. Jupiter, Uranus and Neptune will be in the southwest at sunset, and are beginning to set earlier: Neptune sets at 11 pm at the beginning of December, and at 9 pm towards the end of the month.

Jupiter and Uranus follow about two hours later.

Saturn and Venus are morning stars. Saturn rises at 3 am at the beginning of December, and 1 am towards the end of the month. Venus rises around 4 am throughout the month.

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



*Elephant's Trunk Nebula*

## All Arizona Star Party Nov 5-6, 2010

From Page 2

northern horizon that had no effect on the darkness of the site.

Sunset was at 17:25 and we were seeing a major clearing in the clouds to the west of the field by 17:30. By 18:00, the sky overhead had cleared and we could see Jupiter's glowing orb to the east. By 18:30, twilight had set in and only targets to the very east were covered by the combination of the receding clouds and the Phoenix light glow reflection. For most of the evening after

astronomical twilight, I would give transparency and darkness an 8 or 9 and seeing held steady at 7 until around 22:00. At that time, seeing softened for a bit, making focusing a bit of a challenge, and then stabilized again at 23:00. Temperatures remained moderate until 23:30 when a chilly breeze started kicking up from the NW. As for viewing, targets from M13 to M42 were gorgeous. Andromeda and the Double Cluster were visible to the naked eye

while the Milky Way stretched from horizon to horizon. Sculptor's NGC253 and NGC288 were well placed in the southern sky and we were able to draw out the Eagle and the Swan in the western sky before they sank away for another trip around the globe.

It was a pity that only Bob Christ, Jerry Belcher, and myself were there representing PAS. All told, a very enjoyable event with good company and great observing.

## Thanks To PAS Members For Help With November Newsletter

By Terri, Event Coordinator

I wish to thank those PAS members who are helping with writing reviews for the events that I do not get to attend. Usually, everyone reads my reviews of our events, but lately Sam Insana, Joe Collins, and Mike Marron have written reviews for our newsletter and it is very much appreciated by all. I wish to thank these three wonderful gentlemen for their promptness

to getting the reviews to Don and me way before the 15th of the month deadline.

Don and I have moved the newsletter deadline to the 15th of each month. This gives Don a chance to get the newsletter totally ready to go out, and then if some fluke thing, like his printer, doesn't work, he has time to fuss with it to get it working again in time to send out the printed / snail

mail copies of the newsletter. We all appreciate all the work Don does each month in putting together a really awesome newsletter. Keep those submissions coming in! If I am not at an event, someone should write the review. Having reviews done by someone other than me, really dresses up our newsletter. So thank you all for your submissions, and keep them coming in! I thank you on behalf of both Don and myself. \*\*\*

## Daylight Into Dark Star Parties

By Terri, Event Coordinator

Some of our members have expressed a concern when a star party doesn't have enough dark hours for good viewing. Sometimes an organization (such as a school) will request that we begin our set up for a star party while it is still daylight or twilight. However, several of our members use telescopes which must be aligned to the North Star, by sight, in order to be functional the rest of the evening. Therefore, these scopes cannot be set up before dark. For the purpose of this article, we will refer to this type of telescope as a "NORTH STAR SCOPE". So, the PAS members who own a "North Star scope" have asked that I try to get the schools to do 2 to 3 hours of dark time, rather than starting a star party prior to dark. However, some schools cannot go that late. Therefore I have come to a compromise on that issue. For the schools who can accommodate later hours, we will set them up as requested. But for those who can not have their school kids

up to 10pm and must end earlier due to curfews... we will adjust.

Here's my suggestion for this situation. Many PAS members have scopes that do not need to see the North Star to operate. In fact, some people have solar filters for showing the Sun, and some can focus on objects (such as the Moon or planets) that are already visible in daylight or twilight. Those are the members I hope to see at the type of star parties, such as Sunset Ridge, where they request we come prior to sundown. We can show the Sun, Moon, and planets, do some daytime demos, and eat pizza with them. There are also some educational daytime activities that we can do while we are waiting for it to get dark - for example, we can show Mike's meteorites, or Leah's solar system model, or explain various diagrams in books such as "Nightwatch". Then, we have evening viewing until 9pm so that the school kids can get home before curfew. The PAS

members with the "North Star scopes" will not be expected to participate in these events, if there wouldn't be enough viewing time after dark. The issue is resolved.... And the rest of us, with scopes that do not absolutely need the North Star to align to, can do those daytime-into-evening events, including viewing of objects that are visible before dark. I do hope this helps the "North Star-challenged" scope owners to pick and choose the events they wish to attend. I set up events at they come in. And for some of them, I can't do anything about setting the hours. Therefore some events will not be able to have help from the North Star PAS members, because they don't have 2+ hours of dark. (However, those members are always welcome to come and participate in other educational activities until dark, if they like.) Thanks for taking a moment to hear the solution to our little North Star situation. Have a super day and a great observing session, whether you have a North Star scope or not! \*\*\*

## Adults Night Star Party at Desert Botanical Gardens

By Sam Insana

On November 5th, the Desert Botanical Gardens hosted a star party for adults from 7-9 pm. Mike, Don, and Sam led the party for PAS Star Tours.

Mike did a presentation on cosmic impacts, for about 20 minutes in the Marley Education Building. His powerpoint show and his meteorites impressed the crowd. There was wine and cheese and desserts for

everyone. From 7:30 to 9:00 pm, Don and Sam showed nine different celestial objects, including Uranus, Jupiter, the Andromeda Galaxy, M57 Ring Nebula, Perseus Double Cluster, and several other objects. We handed out star charts for the month of November, a description of PAS, and a double-sided page showing color photos of several of the objects with detailed written descriptions. (Joe had originally designed

this document and Sam made a few changes for the objects shown that evening.)

Although the afternoon was very cloudy, the evening was virtually cloudless. The setting in the cactus garden with the mild temperatures made the evening a delight for the 22 adults who attended. We all thank Frank for setting up this paid star party, and it looks like DBG will be asking us to do it again in the spring. \*\*\*

## No Year In Space Calendars Ordered

By Terri, Event Coordinator

No Year In Space Calendars were ordered at the November PAS meeting this year. Maybe next year we can order the 2012 version. Please have a super day. \*\*\*

## Past Issues Of PAStimes Newsletter

By Terri, Event Coordinator

At the PAS meeting, Don provides 5 color copies of the current Newsletter for the Guests to take home with them. We prefer that the PAS members do not take these copies, as the members can download them from the site, in color or B&W for printing. Leave the current copy of the Newsletter for the Guests to take, please.

If you have a bunch of copies of the newsletter, from previous years, and no

longer wish to hang on to them, remember, we recycle our newsletters. Bring them to the next meeting you attend, and leave them on the handout table. I use these at events for people to take home with them, and have a copy of our newsletter with the web address, and they can go to the site and print the current issue, if they desire. So, drop your unwanted, older newsletters onto the handouts table so that we may recycle them into other people's hands. If you wish, black out your address label, if you receive it by

snail mail.

I want extra copies for some upcoming larger events that are happening. This also saves us a little money, as I don't have to get 500 copies of the newsletter made for a large event. We just provide the older copies and we can make a label for the back that says "Download a FREE copy of the Current issue of this Newsletter on our website: [www.pasaz.org](http://www.pasaz.org)" Bring me your old copies, today. Thanks. \*\*\*

# Help With Logging Events For NSN

By Terri, Event Coordinator

I wish to thank those who have written reviews of the events we've done over the last two months. I use that info to log our events into the Night Sky Network calendar page, after they have successfully happened. As a result, we have earned the next toolkit, which arrived Nov 8th. Its title is similar to the title of Mike's Nov 4 PAS Meeting presentation "Cosmic Disasters." What's cool about this new kit is that it includes real

meteorites to use in the kit. I know, nothing is as good as the collection that Mike has, but to have some on hand if Mike can't make it to an event, that's just awesome.

Anyway, I'd like to encourage everyone who attends a PAS event to write reviews, especially where I do not get to attend. I plan to send out a description that will be useful to those who do write reviews, of the type of info I need to log events - for example, we

need an accurate count of attendees, etc. Thank you all. Joe, Sam, Mike, Rod, and many others have contributed to the newsletter with their awesome reviews, and have helped me log our NSN events, so that we were awarded another great item from the NSN. Last item we got was the Moon Rock, which I won for PAS. This time, it's a toolkit which we will use to talk about Cosmic Disasters. Thanks for you help! \*\*\*

## Phoenix Art Museum Star Party Review 11/5

By Terri, Event Coordinator

This was a great evening. The Phoenix Art Museum invited PAS to promote the club at their First Friday "Space Odyssey" event on November 5th. So, I got the word out, and Tim and Bob were the first to RSVP with telescopes. I had never been to the Phoenix Art Museum previously, so I didn't know what to expect. Take a look at the 62 photos in the PAS Online Photo Gallery. It was a challenge to see fainter objects, but Jupiter, the Pleiades, the Double Cluster of Perseus, and several other objects were viewed that night.

William and I arrived around 5pm. Tim Jones and Bob Christ showed up shortly after, and then Gilbert Gomez came along. Those were the three RSVP's I had. I was surprised and delighted to see an additional scope: James DeSantis showed up and helped out with his telescope, too. Thank

you so much James!!!

So, let me tell you about First Friday at the Phoenix Art Museum. There were so many people there. My contact, Alisha, had us up on the front lawn, which was elevated about 1.5 feet above ground level. We had the four telescopes and Tim's binocs there for the public to view through. William and I ran the PAS Table on ground level.

Along with PAS, there was a photo booth, where the attendees could make themselves aluminum foil hats, then take a photo of themselves with the hats. The hats were designed to keep the Aliens from stealing their brains. This was funny. Some of the hats were really awesome, and well thought out.

Another area had air brushed tattoos. I got one. A photo of it is in the PAS Photo Gallery. Two wonderful gentlemen set up a stand, and provided the air brushed tattoos

to just about everyone who attended. They were constantly busy that night. Another area had a vendor selling ice cream, cookies, drinks, etc.

In another area, they had Flamenco dancers, who arrived around 9pm. That was a nice treat to see. And in front of that stage was an area for kids to color space pictures and shoot off an Air Rocket, and a few other activities. This was really a "Space" themed evening.

After the event, William and I stuck around to help our Telescope Team pack up and to say good night to Alisha, who was so energetic and busy the whole night. Alisha mentioned that she'd love to incorporate us into future events at the Phoenix Art Museum. I sure hope she does. We had a great time. I wish to thank Tim, Bob, James and Gilbert for joining us, and thanks to Alisha for inviting us to do this fun event.

## Mike's Halloween Party Review Oct 23

By Terri, Event Coordinator

You simply must check out the 103 photos from this event! The photos tell it all!

I'd like to thank everyone who attended and brought food to share. We had quite a collection of foods, fun, discussion, a movie for the adults, and then the kids also got in on a movie (something to do with fairies). Thanks also to all who brought Halloween decorations. The idea is, you bring a decoration to help make the party more HALLOWEEN-ISH. Then, when you go home, take your decoration with you. No need to buy a decoration, just bring something you have around the house, and provide it for the evening, and then take it home with you. Next year's event, we may repeat that, as it works well to help decorate the place for the party.

Attending this year was Mike - The

Obsolete Scientist; Sam as Chet, I mean Einstein; Bette was a something, but everyone thought she looked like Rod Stewart; we had a guest from the Hobbit community - Barbara was Bilbo Baggins; Bruce came as a hunter; William was a Vampire; and Terri was a Comet and Shooting Star Chef. A few people from Mensa joined the party. You'll have to see their photos in the Gallery. It was an awesome party, and we all ate, drank, and were very well stuffed when we finished eating. Many thanks to Ed for bringing the pie. Thanks to Sam for bringing the shrimp ring. The pizza that I brought disappeared within 15 minutes of its arrival. The rotisserie chicken, brought by Sam and Kevin, was eaten down to the bone. If you missed this year's event, be watching for the announcement of next year's event. Even though this wasn't a star party, the Moon

was awesome on this evening, and a beautiful sunset was seen, as well. Photos of both are provided in the Gallery. Hope to see you at the next one - October 29, 2011. Thanks to Mike for hosting this party! \*\*\*

## Dec 21, 2010 Total Lunar Eclipse

Starts 10:30pm on Dec 20, ends at 4am Dec 21  
Totality is from 12:40am to 1:50am on Dec 21



# Blue Rings around Red Galaxies

by Trudy E. Bell and Dr. Tony Phillips

Beautiful flat rings around the planet Saturn are one thing—but flat rings around entire galaxies?

That is the astonishing discovery that two astronomers, Samir Salim of Indiana University at Bloomington and R. Michael Rich of UCLA described in the May 10, 2010, issue of *The Astrophysical Journal Letters*.

“For most of the twentieth century, astronomers observing at visible wavelengths saw that galaxies looked either ‘red and dead’ or ‘blue and new,’” explained Salim. Reddish galaxies were featureless, shaped mostly like balls or lentils; bluish ones were magnificent spirals or irregular galaxies.

Elliptical galaxies looked red, astronomers reasoned, because they had mostly old red giant stars near the end of their life cycles, and little gas from which new stars could form. Spiral and irregular galaxies looked blue, however, because they were rich in gas and dust that were active nurseries birthing hot, massive, bluish stars.

At least, that’s how galaxies appear in visible light.

As early as the 1970s, though, the first space-borne telescopes sensitive to ultraviolet radiation (UV) revealed something mysterious: a few red elliptical galaxies emitted “a surprising ultraviolet excess,” said Rich. The observations suggested that some old red galaxies might not be as “dead” as previously supposed.

To investigate, Salim and Rich used NASA’s Galaxy Evolution Explorer satellite to identify 30 red elliptical galaxies that also emitted the strongest UV. Then they captured a long, detailed picture of each galaxy using the Hubble Space Telescope.

“Hubble revealed the answer,” says Salim. The UV radiation was emitted by enormous, flat bluish rings that completely surrounded each reddish galaxy, reminiscent of the rings of Saturn. In some cases, the bluish rings even showed a faint spiral structure!

Because the bluish UV rings looked like star-forming spiral arms and lay mostly beyond the red stars at the centers of the elliptical galaxies “we concluded that the bluish rings must be made of hot *young* stars,” Salim continued. “But if new stars are still being formed, that means the red-and-dead galaxies must have acquired some new gas to make them.”

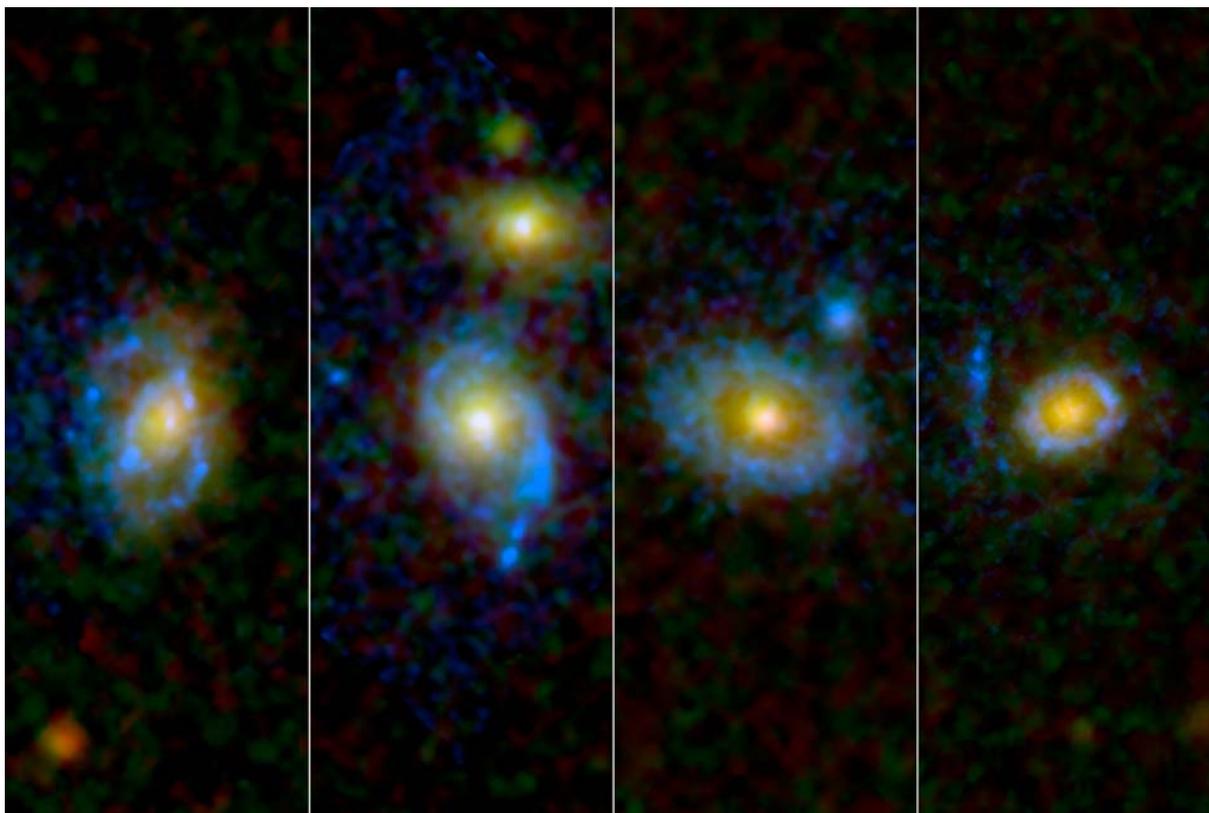
How does a galaxy “acquire some gas?” Salim speculates that it was an act of theft. Sometimes galaxies have close encounters. If a gas-rich irregular galaxy passed close to a gas-poor elliptical galaxy, the gravity of the elliptical galaxy could steal some gas.

Further studies by Galaxy Evolution Explorer, Hubble and other telescopes are expected to reveal more about the process. One thing is certain, says Rich: “The evolution of galaxies is even more surprising and beautiful than we imagined.”

The press release is available at <http://www.galex.caltech.edu/newsroom/glx2010-03f.html>. The full published article is “Star Formation Signatures in Optically Quiescent Early-Type Galaxies” by Samir Salim and R. Michael Rich, *The Astrophysical Journal Letters* 714: L290–L294, 2010 May 10.

Point the kids to the Photon Pile-up Game at <http://spaceplace.nasa.gov/en/kids/galex/pton>, where they can have fun learning about the particle nature of light.

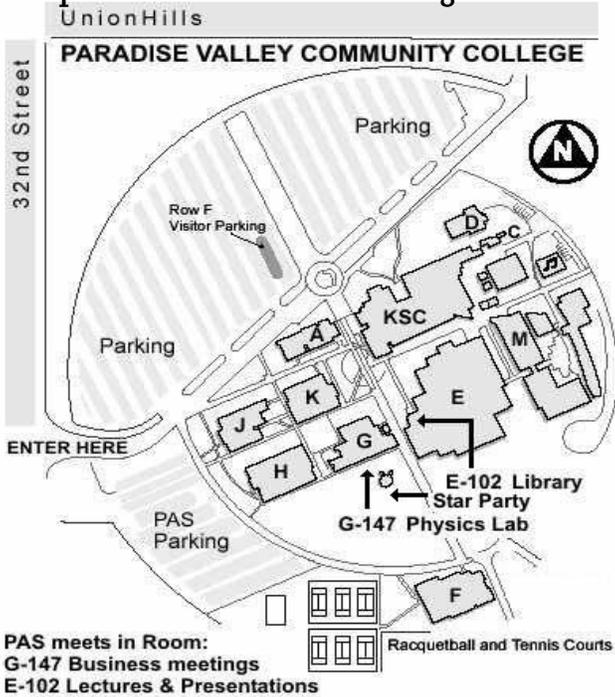
*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration*



*The Galaxy Evolution Explorer UV space telescope helped to identify red elliptical galaxies that also emitted the strongest UV. These are detailed, long-exposure Hubble Space Telescope images of four of these galaxies that capture the UV-emitting rings and arcs indicative of new star formation.*

# Map to PAS Meeting Location

## Family Night Star Party At Desert Botanical Gardens



By Sam Insana

On November 6th, the Desert Botanical Gardens hosted a star party for children and their parents. It was held in the pumpkin patch area of the Garden from 6 to 8 pm. About 12 children and 8 adults attended. The DBG staff had several astronomy games for the children, which helped a lot since it was fairly cloudy that evening. Don and Sam managed to show good views of Jupiter, Gamma Andromeda Double Star, and Pleiades Open Star Cluster. Andromeda Galaxy was a little hazy but we brought a very large photo of the

Galaxy on a poster board, so everyone could see how it could look in very dark skies when there are no clouds. We answered a lot of questions the children and their parents raised about the planets, stars, and galaxies. The weather was very mild and everyone appeared to have a good time. We handed out Star Charts for November and a little write up on PAS to everyone. Again we wish to thank Frank for helping with this project, and it looks like we may be invited back next Spring to do another paid Family Night Star Party for DBG.\*\*

# December

Please see page 2 for more information

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2 PAS Meeting	3	4 Cuttin' Edge Observatory (CEO) Star Party
5	6	7 Cancer Treatment Center (CTCA) Star Party	8	9 PAS FREE Star Party and Telescope Workshop at PVCC	10 AZ Cardinals School star party	11 Geminids Meteor Shower / Star Party at PV Park
12 Bookmans Telescope Workshop	13	14	15	16 PAS Meeting of the Minds (MOMs) It's a Party	17	18
19	20	21 Back up date for Dec 7 CTCA star party/ Total Lunar Eclipse	22	23	24	25 Christmas Day
26 Boxing Day	27	28	29	30	31	

## Ads in PAStimes

Ads in PAStimes run for a month and may be renewed on a month-by-month basis, if submitted by deadline, space permitting. Ads in PAStimes are FREE to members. All others are asked to make a small donation. Donations are to be sent to the Vice Prez who will forward them to the Treasurer.

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

To:

#### PAS MEETING OF THE MINDS

Dec 16, 2010 PVCC G-147 7-10pm

Be there to make the decisions that make PAS happen.

Bring snack to share, BYO Drinks, It's a PARTY!!! \*\*\*

## PAS Speaker Line-up for 2010/2011

By Terri, Event Coordinator

Join us for these exciting guest speakers:

Jan 6: Veronica Zabala: "Astronauts for Hire"

Feb 3: Dan Heim": CVEMS: The Newest Threat to Our Dark Skies"

Mar 3: Dennis Young - Topic: TBA

If you know of someone you'd like to hear as a guest speaker, send those ideas to Terri at [Events@pasaz.org](mailto:Events@pasaz.org). Let's get some fun speakers to our PAS Meetings with your suggestions and help! \*\*\*

PAS is incorporated in the state of Arizona as a non-profit, scientific and educational 501(c)(3) organization. Our newsletter PAStimes is published monthly from September to May and distributed by US PS and the Internet. All Issues are available for download on our website [www.pasaz.org](http://www.pasaz.org) Ads for astronomy equipment are provided as a courtesy to sellers and buyers, and do not constitute any endorsement by PAS. All Photos by Don Boyd unless otherwise credited. All articles and photos are copyright their authors or PAStimes.

## What's Up For December?

By Rod Sutter, PAS President

Name	Date	Rise	Set
Mercury	12-1-10	08:55	18:37
Venus	12-1-10	04:03	15:11
Mars	12-1-10	08:24	18:18
Jupiter	12-1-10	13:29	01:12
Saturn	12-1-10	02:44	14:29
Uranus	12-1-10	13:36	01:31
Neptune	12-1-10	12:06	23:00
Pluto	12-1-10	08:47	19:12

All Times Arizona Time

December 15 2010

**Sunrise: 07:19**

**Sunset: 17:20**

**Q3: November 28**



**New: December 5**



**Q1: December 13**



**Full: December 21**

