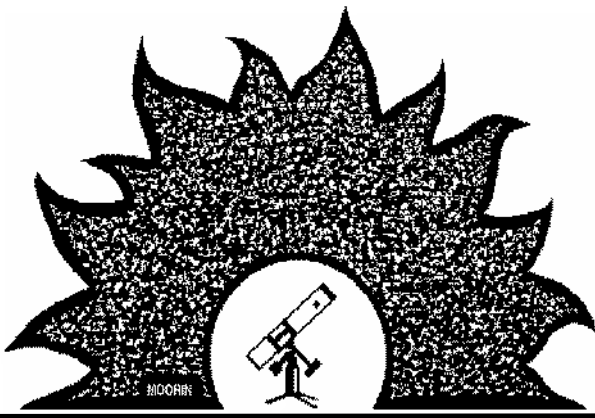




PAStimes

Phoenix Astronomical Society

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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Eric Steinberg and Alex Vrenios to speak at Apr 3 Meeting

By Terri with submissions by Eric and Alex

At the April 3 PAS Meeting, we will be having 2 wonderful PAS members doing presentations that you will not want to miss. Also, remember to bring your magazines and books to swap and a snack to share. Water will be provided by President Bruce. We look forward to a fantastic evening with your attendance. Bring a Friend!

Eric Steinberg: What is "Nautical Twilight"? How do I find out when Capella rises next week? What exactly is "Seeing" and how does it work? Join us at the April 3rd meeting for an interesting talk called "Sky, Time and Weather: Resources to Fine-Tune your Sky Watching." Eric Stein-

berg will discuss these and related phenomena, along with weather and other resources to help plan your observing session. See you there.

Alex Vrenios: "Introduction to Astronomy" is a 1-hour slide presentation for kids. It begins with the shepherds who named the recurring patterns of stars they saw at night, and the few wandering stars among them. It tells how astrologers related a wandering star's position among the stars to events in our lives, while astronomers devised methods by which their future positions may be predicted. It presents our Sun as not just the center of our solar system, but a star among

hundreds of billions of stars in our Milky Way galaxy. It tells of Sir Edwin Hubble who became the Father of the Modern Cosmos when he discovered that the Andromeda "nebula," thought to be a cloud-like patch of gas and dust, was really made up of stars - billions of them - concluding that it was another, distant galaxy not unlike our own. The presentation ends with the concept of a universe with billions of galaxies, each galaxy containing billions of stars, each star potentially having planets around it, perhaps with a planet that is just like our own. ***

PAS Meeting Mar 6

By Terri, Event Coordinator

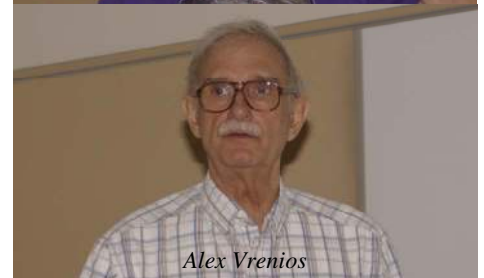
At the Mar 6 PAS Meeting, we had an awesome guest speaker, Steve Coe from SAC. Steve has been observing for a very long time and came to tell us all about Charles Messier and the Messier Marathon. It was a very entertaining, fun, informative meeting with lots of great photos and stories. Steve did a fantastic presentation. Many thanks to Steve!

We had 4 new attendees to the meeting. Two of which were my Aunt MaryLou and Uncle Dennis visiting from Florida.

We opened the meeting with a few brief announcements and then let Steve take the floor. When Steve finished his presentation we turned the floor over to Alex who then did a presentation on how to read the

Clear Sky Charts. This was very informative and useful. The whole night was very useful topic to hear about. Many thanks to Alex for a presentation well done.

We had the Raffle and Rodney Fong won. And Steve had brought a Book to do a Book sale and signing, and he also raffled off one of his books. Howard Moneta won the book. Many thanks to everyone who brought snacks to share. Thanks also to Bruce for providing the bottled water at the event. It was nice seeing you all there and we are looking forward to a great meeting on Apr 3. See you there!



<u>President / Librarian</u>	Bruce Wurst	602-971-3555	President@pasaz.org
<u>Vice President / Events Coordinator</u>	Terri Finch	602-561-5398	VicePresident@pasaz.org
<u>Treasurer</u>	Mike Marron	480-488-3031	Treasurer@pasaz.org
<u>Newsletter Editor</u>	Don Boyd	480-963-7189	Editor@pasaz.org
<u>PAS Host</u>	Mikey Webb	602-432-4318	mike.webb50@gmail.com
<u>Member-At-Large</u>	Dave Hellman		david.hellmann@paradisevalley.edu
<u>Member-At-Large</u>	Jenny Weitz	602-787-6818	jennifer.weitz@paradisevalley.edu
<u>Webmaster</u>	Chris Johnson		Webmaster@pasaz.org
<u>Rocketry Liaison</u>	Jerry Belcher	623-328-9290	http://ahpra.org/launches.html

April 2014 Upcoming PAS Events

By Terri, Event Coordinator

To RSVP: Events@pasaz.org

Apr 3: PAS Meeting 7pm to 10pm PVCC Main Campus LS-109. Bring a snack to share. Water provided by President Bruce. Great Guest Speaker lined up. Bring a friend! Everyone welcome!

Apr 9: CTCA (private). RSVP is with Joe. PAS Star Tour Members Only.

Apr 10: Free Telescope Workshop and public Star Party at PVCC main Campus - 32nd Street & Union Hills- 7pm to 10pm. RSVP is required with Terri Events@pasaz.org. When you RSVP - leave number in your party and make & model of the scope you are seeking help with. This is also a good class to attend to get ideas on what type of scope you should

purchase. RSVP for the Workshop, the Star Party or both.

Apr 12: (Private) Movie night at Eric's house in Scottsdale. Movie begins at 7pm. RSVP is required as seating is limited to 12. \$1 donation to snacks for attendance. Movie: Apollo 13. PAS Members only.

Apr 13: Bookmans FREE Telescope Workshop. 3:30-5:30pm. Please RSVP Events@pasaz.org by noon the day of the event. Bring something to take notes with, your telescope, accessories, questions. RSVP is required. When you RSVP, leave your name, and the make and model of the telescope you need assistance with.

Apr 15: Total Lunar Eclipse

Apr 23: Back up Date for CTCA of Apr 9.

Apr 24: PAS Awards Ceremony (Private). PAS Members Only. Location: TBA to Members in Private Calendar. Time of event is 7pm to 10pm. Bring Snacks to share. This is a Party! You MUST RSVP your Pizza by the Tuesday before the event (how many slices of what kind of pizza).

Apr 25: School (Private) Events from 7:30 to 9:30pm. RSVP your attendance. 4 Scopes needed.

Apr 26: Private Star Party in N. Scottsdale. RSVP is closed. More details in Private Calendar. ***

RSVP Your Pizza for Apr 24

By Terri, Event Coordinator

I'm taking orders of what you want on your pizza and how many slices. If you are attending the Apr 24 Awards Ceremony, PAS Members only, you will want to join us for food. Pizza is being provided by Darren Johnson and Hungry Howies Pizza, and you have to tell me what 1 topping or 2 topping pizza you are interested in having and how many slices. You can mix and

match, if you wish. We will be taking donations for the pizza in the PAS Snack Fund box for which all funds collected at that meeting will go to reimburse Darren for the pizza. Drop me an email by Noon the day of the meeting, or you can text my phone, or call to give me your pizza slice order. Do it now! I need your pizza order by Tuesday before the meeting, that's Apr 22. Thank

you for helping to make this Awards Ceremony an awesome event for all PAS Members! This is a PAS Members only event. Wear your name badge to get in. Current PAS Members only. If you do not wish to participate in the pizza, please BYO food. Bottle water will be provided by President Bruce, and if you want more than water, BYO drinks. ***

Telescopes for Tanzania

By Linda Staats

Hello, I live here in Phoenix and am the mother of a past President of the Phoenix Astronomical Society - a way, long-time ago in the late 80's early 90's. (Kai Staats.) I simply wanted to let you know about this very cool project happening called, "Tele-

scopes for Tanzania." It is through the Astronomers without Borders organization.

<http://astronomerswithoutborders.org/projects/telescopes-to-tanzania.html>

Do your members ever become involved in other people's projects, such as this? If so, might you promote this. Kai had

the opportunity to travel to Tanzania last year and has met some of the folks involved. There is such passion and desire among the local teachers to make a difference for the children. Just thought I would inform you of this project and opportunity. Thanks! Linda Staats ***

Black Mountain Campus Star Party Feb 27

By Terri & other attendees

The Black Mountain Campus star party was a great success! It started out with a discussion about the clouds and winds for the event, the Wednesday before. It looked like we would be canceling the event, but instead, around 3pm, we called the event On. We had 14 public RSVP's that had come in before the event. At one point, about 8pm, Pam counted 45 in attendance. Thank you, Pam for doing the count.

Attending from PAS we had: William & Terri Finch doing handouts, scope watching, and assistance. We didn't bring our scopes due to William still having the ear infection that was still making him too dizzy to feel comfortable to pick up heavy items & keep balance. Mike Marron brought his Meteorites and Ofelia Waters was in attendance with him. Earl DeLong brought his scope, as did Eric Steinberg. Sam Insana attended with Frank Insana with Sam's scope. Howard Moneta attended with his scope (Howard is a new PAS Member as of a month) and Kevin Witts had his scope (also a new member as of a month). Alex Vrenios brought his scope. Bob Senzer came to assist. Bob Ewing, arriving a little later, due to his class ending at the PVCC Main Campus, used the Light Bridge the school has, and some of his students assisted him. And Rodney Fong brought his scope, too. Jenny Weitz was in attendance with several of her honor students and they brought out telescopes, too. It was a great turnout of scopes.

When we got there, about 6:10pm, the winds were atrocious. Eric avoided putting the shroud (I call it clothing) around his scope because the wind would grab it and push the scope around. About 7:45pm the winds died down. 7pm came and there were no clouds the whole night. We had clear viewing. It was really awesome.

I wish to thank Jerome Taubel for attending the event. He came to us from Minnesota. And a wonderful couple from Saskatchewan, Canada, also joined us at this event, Greg & Laurie Kelly. We also

had a wonderful lady from the AZ Sci Tech Festival, Pam Ferguson, who was handing out the Sci Tech Festival booklets. She gave me a pile to hand out at the next few events we do where kids and the public are involved. It was very nice chatting with her.

We took in a new member this night, Alfred Fantegrossi, who brought his scope. Welcome to PAS, Alfred. And we had one other scope attend, who isn't a member yet, Jodi Sullens. Many thanks to these two wonderful attendees with their scopes. We had a great time. From time to time, I would watch their scopes while they walked over to view through Eric's scope. It was a fun time for all. Our next events like this are on Mar 20 and May 29. We hope for clear skies and to see you all at these fun events! Thanks to all the PAS Members who attended.

Jenny writes: Fantastic event last night :-)

Jerome writes: Terri and William: Thank you so much for the hospitality you and the Phoenix Astronomical Society extended to me last week at the public Star Party at the community college. Please give my regards to Howard, Eric, William and all of the others. It made a wonderful mid-winter trip to Arizona all the more enjoyable. If you or any PAS club members are ever near Rochester, Minnesota, please look up the Rochester Astronomy Club, send me a note at my e-mail address, or give me a call. We would love to host a visit either to a club meeting or to a star party. I will be back in Arizona in the fall, or maybe sooner. Perhaps we can get together again. I'll be sharing my story at the the next RAC meeting, so y.2ou may get other RAC club members looking you up in the future. Enclosed are some of the pictures I took. Enjoy and thanks again! (Terri adds: The photos Jerome sent over of the BMC event will be in the PAS Photo Gallery, soon.

Alex writes: I arrived when there was still enough daylight to see where to park

and where to set up. It was my first star party at this site so that was a benefit to me. The setup area was pretty much filled with telescopes in very short order. I found the Orion nebula and stayed on that all night. About two or three dozen people got a look through my scope, mostly students who were either coming from or on their way to a class.

After the first few people, I realized that about a third of them didn't know what Orion was, let alone what a nebula was! So I modified my pitch to start with a question, "Do you know what Orion is and how to find it?" If they answered "No." I began with a laser pointer tour of that constellation (watching for aircraft, of course) and pointed out the bright spot in his sword where they would be viewing a stellar nursery of relatively newly created, hot, blue-white stars. Finally, I mentioned that some of the other scopes were viewing a supernova, and that when such an event completes it leaves stellar dust and gas, just like the nebula surrounding the group of stars they just saw: the circle-of-life of a star. Just before we began packing up to leave I started to realize how much I actually learned that night. My casual conversations with other PAS members taught me about some of the mythology behind Orion, his dogs, Taurus and a rabbit named Lepus that I hadn't noticed before. Even some details about Perseus, Cassiopeia and Andromeda. I also got to see M81 and M82 together, in the same eyepiece. I could even make out that they were galaxies, not just that same fuzzy patch I've seen so many times before from my backyard. The Black Mountain site is not exactly a dark site, but it's so much better than what I'm used to that I look forward to returning in March.

Jodi writes: I had a great time and wish I could do it again sometime. It was nice being able to see through so many different sized telescopes at one time. Thanks and hope to see you again some night. ***

Sell Your Astronomical Equipment

By Terri, Event Coordinator

The PAStimes Newsletter is your means to selling your old, unwanted, but loved and used astronomical equipment. Write an ad with description & photos, get it in the next issue of the PAStimes Newsletter. PAS Members may post items for sale, in the newsletter, for free. Send them to Events@PASaz.org. ***

Canyon Springs Star Party Feb 19

By Earl DeLong, PAS Member

Don, Kevin, Mike and myself attended the Canyon Springs star party on February 19, 2014. The school is near Anthem mall and promised semi dark skies. The weather was warm and the pesky clouds broke for the evening. The event was a semi success. There was some confusion about where we were to set up. We had to wait for the Sheriff's department helicopters to land be-

fore setting up. We were given conflicting direction from both the school staff and Sheriff's personnel. This was finally resolved and we set up on the basketball courts with the Sheriff's department in the adjoining field. Observing was hampered by the lights and sirens of the Sheriff department vehicles. At 7:00 pm, we had to stop observing and cover our equipment as

the helicopters left. The Sheriff's department vehicles left also. From 7:15 pm until 8:00 pm we enjoyed relatively dark skies. I would recommend any future events not be scheduled with the Sheriff's department. The public were behaved and interested and I would return if asked. ***

ASU West Star Party Feb 20

By Various Attendees

In attendance at this event, from PAS was an awesome Telescope Team of Alex Vrenios, Leah Sapier, Howard Moneta & Angie Lee, Don Boyd, Eric Steinberg, Kevin Witts, William and Terri Finch. Paul Schmidke was the RSVP in charge, and the instructor at ASU West who invited us to do the event. An additional scope was provided by Jeff Hopkins.

Kevin writes: The ASU West telescope event was a success!

Initially, the sky was very cloudy and it looked quite questionable. Early set up required aligning Telerads with a Hot Air Balloon launched from the Cave Creek Area. Pretty amazing how that balloon stayed aloft while upside down...

Terri and William were the first to arrive for set up, followed by Kevin, Don, Eric, Alex, Leah and Howard. There were also two scopes affiliated with ASU in attendance.

First viewing opportunity (post Hot Air Balloon) was Jupiter and 3 visible moons. The public began to filter in as nighttime set. The skies became much clearer and the Orion nebula was soon in focus thru many scopes. I had a few oohs and aaahs from people viewing the Nebula and used a TeleVue 24mmm eyepiece for an even better view. I later moved on to the Double Cluster in Perseus, which yielded a very nice view. I late was able to pull in a very faint Andromeda by request from one attendee, who described it as a "Blue ball of Fuzz".

We wrapped up the evening by showing the double star that is Mintaka in Orion's belt.

We had a mix of students and families, with Terri and William providing star tours and assistance via two amazing green lasers.

I'd estimate that I had maybe 50 people view something through the scope and

many enjoyed a description of the Mythology related to Orion, Taurus and the Pleiades, as well as the relationship between Cepheus, Cassiopeia and their daughter Andromeda, and why they are all together in the sky.

We wrapped up at around 8:50.

Funny moments / memorable comments: A lady who mistook the existing jet contrails and clouds for the Milky Way, even though they passed in front of the stars. A little boy who commented that all he saw were a bunch of bright dots, Lots of comments and questions about the cost of the hobby, 3-4 people vowing to pull their old telescope out of storage, and Someone who asked where the moon was.

Leah writes: When I arrived at ASU West on Thursday night February 20, the sky was relatively clear. I set up my scope (6" newtonian dob). I noticed that Alex was already showing Jupiter to the audience, so I chose the Orion nebula. As each person viewed M42 through my scope, I explained how young stars were being formed inside the nebula. I pointed out the Trapezium as an example of newly-formed stars, but also mentioned that additional stars were being formed deeper in the nebula, and could not be seen, but have been detected in the infrared. I then explained that, after a hundred or so stars have been formed inside a nebula like the Orion nebula, the remaining gas dissipates and we have a star cluster - like the Pleiades, which I pointed out to them in the sky.

I think the audience enjoyed my explanations. But one person replied, when I told him about the Pleiades, that he had thought that was the Little Dipper. Since the crowd had thinned out a little by that time, I pointed out the Big Dipper to him, and then showed him how the "front pointers" at the front of the Big Dipper's bowl point to

Polaris, and the "back pointers" at the back of the bowl point to Beta and Gamma Ursa Minoris. I explained that in an urban/suburban area, we can't see all the stars of the Little Dipper, but we can see those three stars and be able to identify where that constellation is.

It was a pleasant evening, with clear skies and comfortable temperatures, and it was a wonderful outreach event. There was a good crowd and they enjoyed seeing sky objects through our scopes.

Terri writes: The ASU West star party was different for William and I this time. We did dinner at Arby's before hand, no one joined us. Then we drove over to the campus. Arriving a few minutes later was Kevin. So, I directed Kevin where to park and we started setting up. Paul came out with his scope. Don arrived next, and then Alex. Then Jeff Hopkins zoomed up to the observing area a bit quick, raising dust. The group was not pleased with the amount of dust in the air, but the event was about to get under way. The clouds were taking over the sky. We were skeptical as to if we were having an event or not, but as 7pm came, the clouds left and the rest of the night was clear. There was a slight breeze, now and then, but overall, the temperature was nearly perfect. It dropped around 8:30 but wasn't anything a light jacket couldn't take care of. Around 7pm, Howard arrived with Angie and I asked him to set up by Paul, and then Leah arrived, and we put her down the other end of the line of scopes.

During the event, William and I did handouts and answered questions because William had an ear infection and he didn't feel comfortable (dizzy) handling expensive equipment (our scopes). So, we didn't bring any scopes this time, but did the handouts table and talked to people and I did a sky tour. Our green lasers were very popular.

(Continued on page 5)

ASU West Star Party Feb 20

(Continued from page 4)

Melissa, a journalist for the school was there and asked a bunch of questions, for which I sent her to Eric, who is very knowledgeable about the night sky. She vanished shortly after she went over to Eric.

I walked around and got a mini list of what everyone was showing this night. Paul was on Orion Nebula, Jupiter and Pleiades. Alex did Jupiter. Leah did the Trapezium and Orion Nebula. Howard did Jupiter, and Orion Nebula, Don did the Pleiades, Jupiter, ET Cluster, & Orion Nebula. Eric showed M42, Jupiter and M41. Kevin was showing the Orion Nebula, Jupiter, Andromeda and a balloon in the sky as well as S. Mountain. It was a very nice night to view these awesome objects. Many thanks to Howard & Kevin for allowing me to view a few things through their scope, when the lines thinned out. :)

Many thanks to the awesome Telescope Team we had here this night. Everyone was so well organized, showed many objects, and I really appreciate the attendance. We had a great turnout. I'd say probably 200-250 in attendance from the public. It was a very good event. William did have fun, even with being dizzy that night. We look forward to the next ASU West star party on Oct 30, 2014. See you there!

Earl writes: A dismal day of clouds and wind turned into a beautiful night on February 27, 2014 at the Black Mountain campus. I arrived at 6:00 pm and we had a large turnout from the club. Welcome new member Al. As we all set up, the clouds quickly dispersed and the wind slowly died down. I spent most of the evening observing open star clusters in the constellation of Gemini. I ended the evening observing a

few double stars in Gemini, M82 and supernova in Ursa Major, and M42 the Orion nebula. Eric introduced us all to M41 a nice open cluster in Canis Major. Everyone enjoyed the view of this cluster in their instruments. While turnout from the public was sparse, probably due to the cloudy day, those attending saw interesting objects under reasonably dark and clear skies.

Angie writes: The weather was perfect the night of the ASU event. There were at least 7 different telescopes present. The hosts were knowledgeable and friendly. The sky was pretty clear for Phoenix. I was lucky to see the gorgeous Orion nebula. I remember the gas cloud having a highly visible structure through Howard's scope. The event was busy, and everyone was very friendly. ***

Orangewood School Star Party Mar 7

By Terri & Various attendees

In attendance for this event was William & Terri Finch with scopes, Don Boyd with scope, Mike Marron with Meteorites, Eric Steinberg and Rick Cunningham with their scopes. Mark Thornton was our contact at the school.

The evening started out with William & I arriving first. Rick came in next followed by Mike. The pizza had already arrived about the same time that Rick, William and I got there. So, I directed everyone to park as I was eating, and we had a nice dinner together at one of the table. We set up for the event.

The night was a nice temperature. We had some heavy clouds coming in from the West trying to take over the event, but we

maintained some great objects to share with everyone. My telescope wasn't cooperating so I did Q & A and talked about the telescopes that were present at this event. The attendees were understanding and went to the next scope. We saw Jupiter, a bit of Orion Nebula, and the Moon. Attendance was less than the previous year's event, but everyone seemed to have fun. Mark had his telescope set up, an 8" dob. He let some of the students work the scope. It was a great event. We look forward to do it again next year. Many thanks to Mark for inviting us to the event and many, many thanks to my Telescope Team.

Mark writes: Thanks again for putting on such a great star party for our school. I

received several rave reviews from teachers and admin. The meteorites were a particular favorite. Andree Charlson and Kathy Freitag both commented on how interesting and knowledgeable the presenter was. The students also had several comments on it was well. They want me to set up my telescope again. I am going to get Andree and Kathy to write some formal letters for you so that you can have them on school stationery. I also wanted to let you know what a great time I had. I honestly had not used my telescope in almost a year prior to the star party. I had forgotten how much I enjoy observing. I will definitely be in touch. Thanks again, Mark ***

For Sale: CLASSIC CELESTRON® C8 SCT

This 8" catadioptric telescope is 'lightly used' and in very good to like-new condition. It comes with its own hard case, equatorial wedge and locked triangle steel tripod. I am the original owner, having purchased it directly from Celestron, and it has many extras; e.g. dew cap, light pollution filter (so it is useable within city limits), several eyepieces, a 2x barlow, all original paperwork and manuals and too much more to list.

I am selling the scope because I no longer use it like I used to. Everything is in fine working order, just as new. This 8 inch scope is available for pickup-only in Peoria, AZ: call Michael: phone number is 623.399.9989, email address: zapps1946@yahoo.com.

I can accept cash, Money Orders and Certified Checks only. The asking price is \$499, and I will consider all offers. Please, contact me if you are interested and we can arrange a time for you to inspect the scope ***

Arizona Sky

By Leah Sapir



This month we have a special event! A total lunar eclipse will grace our sky on the night of April 14-15. In Phoenix, the partial phase will begin at 11 pm and end at 2:30 am, and totality will last from midnight to 1:30 am.

What color will this one be? As the Moon passes through Earth's shadow, it is lit only by light that is refracted by Earth's atmosphere, and which therefore goes around the Earth. This is the light of sunrises and sunsets around the globe. So like sunsets, the exact color of the moon during an eclipse is affected by the dust in Earth's atmosphere at that moment. It could be reddish, or golden, or anything in between - watch and see!

And in the meantime, we can also watch another bright reddish object nearby: Mars, which is now officially at opposition. But while the reddish color of the eclipsed Moon comes from refracted light, Mars is red because of iron oxides in the soil. In a way we can say that Mars is rusty! And the color extends to the sky as well. Fine dust particles suspended in the atmosphere give the Martian sky a pinkish hue.

Mars is a terrestrial (rocky) planet about half the size of Earth in diameter; but since 3/4 of Earth is covered by oceans, while Mars has none, the surface area of Mars is about the same as the land area of Earth. Mars is less dense than Earth, with only 1/10 as much mass, making the surface gravity of Mars about 38% that of Earth. One day on Mars, called a "sol", is slightly longer than an Earth day, by 40 minutes.

The interior of Mars has never been examined, but it apparently holds a dense core containing iron and iron sulfide, among other minerals. The core's radius is about 1100 miles, going halfway from the center of the planet to the surface; it is surrounded by a mantle of molten rock and a solid crust like Earth's. The crust is only 50 miles thick in the southern hemisphere and 20 miles thick in the north.

Mars does not have a magnetic field, but might have had one 4 billion years ago. It had active volcanoes up to around a billion years ago, but today all its

volcanoes are extinct. It also lacks tectonic activity, but might have had some in the past.

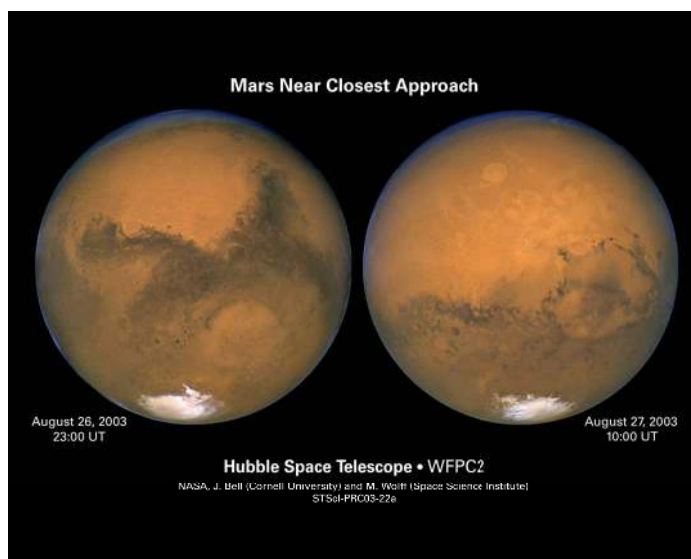
Although humans have not yet visited Mars, our knowledge of the neighboring planet has increased greatly over the past few decades, due to orbiting space probes and roving robots that have faithfully sent us large amounts of information and detailed pictures.

When we observe Mars through a telescope, we can see various dark and light patches, but these are just "albedo features" - areas of darker and lighter rock, sometimes covered with lighter-colored blowing dust. They don't always match up with topographic features, i.e. both mountainous areas and lowlands can be dark-colored in one part of the planet and light-colored in another. For example, the prominent dark patch Syrtis Major does not correspond to any specific topographical feature. It appears dark because of underlying basaltic rock, and sometimes shows seasonal "shape changes" when dust storms blow lighter dust over the basalt.

Close-up Mars pictures from space probes show cratered highlands in the southern hemisphere, while the northern hemisphere has mostly plains and lowlands, with few craters. The average altitude in the southern hemisphere is about 3 miles higher than in the north. The southern hemisphere also contains a huge crater, the Hellas impact basin (Hellas Planitia), which is 1200 miles in diameter and four miles deep. It is surrounded by a ring of mate-



Mars landscape, as seen by Mars rover Spirit (credit: NASA/JPL Caltech/Cornell Univ)



Mars photographed by HST in August 2003. Image on left shows Syrtis Major at top right, with Hellas Basin below. Image on right shows Olympus Mons at top left. (credit: NASA, J. Bell (Cornell U.) and M. Wolff (SSI))



Birds-eye view of Olympus Mons (credit: NASA and NSSDC Photo Gallery)



Arizona Sky

rial about a mile high, which extends another 1200 miles past the edge of the basin. The Hellas basin is one of the features that can be seen from Earth, as a light-colored elliptical area south of Syrtis Major.

Near the equator we find the Tharsis bulge, an elevated plateau about 6 miles high, and 2500 miles across - as large as North America. The bulge takes its name from a well-known light-colored albedo feature in that area. The Tharsis region contains several volcanoes, including a chain of three volcanoes in a row west of center, and Olympus Mons near the northwest edge.

In the 19th century, some observers mapping the albedo features of Mars had noted a small white dot northwest of Tharsis; since it could sometimes be seen even during a dust storm, it was assumed to be a very high mountain, and was named "Nix Olympica" ("Snows of Olympus"). Space probes later found a very high defunct volcano at this spot, and it was named "Olympus Mons".

Olympus Mons is the largest mountain in the solar system. Its base is about 350 miles in diameter, with steep cliffs around the edges. The base of Olympus Mons covers an area almost as large as Arizona. Its height reaches 15 miles from the surface, about three times as high as Mt Everest. The air density at the top of Olympus Mons is less than 10% of the air density at the surface of Mars (which is low to begin with - only 1% of Earth's atmospheric pressure).

Extending eastward from the Tharsis plateau is Valles Marineris, a system of canyons that is 2500 miles long and 2 to 4 miles deep. The widest parts are about 150 miles across. Valles Marineris is not a water channel like the Grand Canyon, but a crack in the Martian surface. It was produced by expansion of the crust of Mars due to heat from the nearby Tharsis bulge.

Despite its great size, Valles Marineris cannot be seen from Earth. However, if you'd like to take a trip through Valles

Marineris, here is a handy-dandy computer-generated animation prepared for you by NASA's Jet Propulsion

Laboratory: <http://tinyurl.com/npf2qu3>. (It's a large file, so give it time to load.)

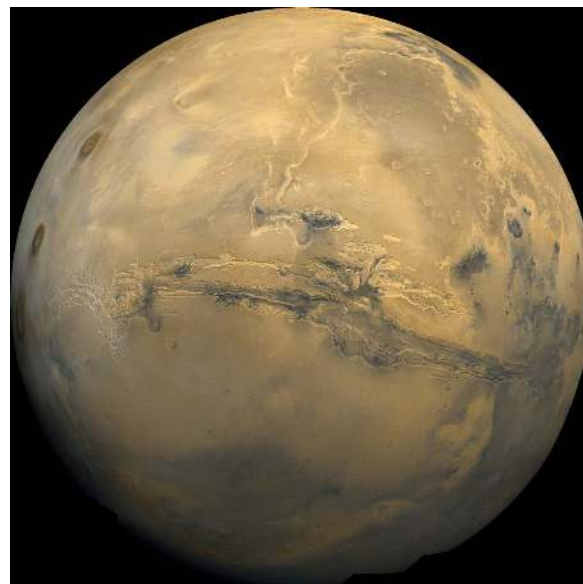
Mars does not currently have any liquid water. Due to the cold temperatures and low air pressure, water can exist only as a solid (ice) or gas (water vapor). The small amount of water that currently exists on Mars is located mostly in the polar ice caps and underground permafrost. In the summer, ice that evaporates from one polar cap, freezes out at the other polar cap where it is winter.

However, several space probes and rovers have found signs of erosion, and minerals such as sedimentary rock that can form only in the presence of water. Therefore, it is theorized that a few billion years ago, Mars might have had a thicker atmosphere, enabling the presence of liquid water. This would explain the erosion gullies and water-dependent minerals.

(Of course, don't miss this historic picture from April 1, 2005, showing the first discovery of water on Mars! <http://tinyurl.com/32uzo9>)

Elsewhere in the solar system this month: Jupiter is high in the west at sunset, and sets around 2 am at the beginning of April, and midnight towards the end of the month. Saturn rises at 10 pm at the beginning of April, and 8 pm at the end of the month. Venus is a morning star, rising around 4 am. Neptune rises at 5 am at the beginning of April, and 3 am at the end of the month. Uranus and Mercury are too close to the sun to be visible.

Join us next time when we continue to explore the Arizona sky. And till then,



*Global Mosaic of Mars Centered on Valles Marineris
(credit: NASA and NSSDC Photo Gallery)*



*Gullies with Characteristics of Water-Carved Channels
(credit: NASA/JPL/University of Arizona)*

wishing you clear skies and happy observing! ***

For Sale: Meade LX200 8" SCT

Telescope comes with original instruction book, diagonal prism & 7 super plossl eyepieces, super wide angle: 40mm, 32mm, 26mm, 12mm, 4mm, 6.4mm & 15mm with the best tripod available, super heavy and scope is in original boxes.. Asking \$1300 OBO Contact Roger at Schollra@aol.com or 480 99 with original instruction book, diagonal prism & 7 super plossl eyepieces, super wide angle: 40mm, 32mm, 26mm, 12mm, 4mm, 6.4mm & 15mm with the best tripod available, super heavy and scope is in original boxes.. Asking \$1300 OBO Contact Roger at Schollra@aol.com or 480 991 0133.

Heard Scout Pueblo Scout Star Party Mar 8

By Various Attendees

Attending this event from PAS were: Kevin Witts, Eric Steinberg and Mike Marron. Mike attended with Ofelia Waters. Roy Smolens & John Wintersteen were contacts for this event. Also attending was Roger Anzini.

Roy writes: . . . in a word or two - supercalifragilisticexpialidocious AWE-SOME! :-). Eric, Ken and Mike were truly inspirational, knowledgeable, friendly and welcomed our boys with such generosity. Roger Anzini (PAS friend - ?) was also brilliant to kick in his telescope and passion. Apologies, but I will get back to you later this week with more details, but I have an ill family member to deal with. Eternal thanks to PAS.

Eric writes: The Heard Pueblo scout camp is a pleasant sprawling complex nestled against the base of South Mountain. At that location on March 8th, PAS provided a star party for the Boy Scouts' STEM* camporee. Present were Kevin Witts with his 8" SCT, Eric Steinberg with the 22" and Mike (with Ofelia), as usual, meteorites in tow. We were also joined by a friend of Dennis Young who brought his home-built 16" dob. The scouts provided us with barbecue sandwiches after which we set up our scopes. Initially, winds were strong, but decreased almost completely over the next hour; sky conditions were about 7 to 8 for transparency and 6 to 7 for seeing. Though the area we were in was devoid of obnoxious lights, the sky glow from Phoenix was particularly bad, especially to the north, so we did most of our observing to the south and west. We showed the Moon, Jupiter, the Orion Nebula, M41, M37, NGC 457 (ET) and M82. The supernova in M82 was just barely visible in the 22" and will probably disappear in the next couple of weeks, so it was good to get a last look. Unfortunately, the winds which had died down began again around 8:30 and by 9:30 were getting pretty strong, so we packed it in at that point. Overall we had a good-sized, appreciative and well-behaved group for a successful event.

John writes: We had a great time -- great folks who related so well to our Scouts (and adult leaders); weather was just fine; location was OK for the equipment. In short, it was close to perfect for our boys. I don't know how many boys and adult leaders came to the telescope area -- some troops were packing to leave, etc -- so Eric

would know better than me how many boys came over.

We will be doing another STEM camporee next spring, and if everything works out, it will focus on awards and rank advancements. So we might work with you in advance to see which of the Astronomy Merit Badge requirements could be met, and which of the STEM award requirements that could be met related to astronomy. If we do that, your members might find something that they'd be interested in year-round, especially passing on their knowledge when telescope viewing isn't practical.

I got to look through both telescopes and saw things I'd never seen before, including a nova (though it was dying compared to two weeks ago), actual gas clouds (plus with a green filter that really showed them up), the 4-star cluster (like a trapezoid: "Trapezium"???). And I handled, actually picked up and looked at, Mike's meteorites as he explained what I was looking at. For me personally -- FANTASTIC. The 20 minutes I was able to take away from duties was just great for me -- made my Saturday evening especially memorable. Thank you so much for all your help setting this up!

Roger is one of our long-time Scout leaders, and was a great help. I was pretty busy with other program stuff going on at the same time, but here's what I saw Roger doing:

1. Friday night he set up several telescopes next to the staff cooking area, where the youth and adult Scout leaders gathered for the evening meeting ("crackerbarrel" in Scouting lingo). I saw boys and adults looking at and through his telescopes and high powered binoculars.

2. Saturday he was in charge of working with Eric, Ken and Mike (getting them to the possible location(s), guiding their vehicles, getting the boys there as they left the campfire 100 meters away, etc). Frankly, I was focused on Mike's meteorites and the Eric's and Ken's telescopes, so I didn't even look to see if Roger had set up a telescope or several -- the advantage to his telescopes is that he was allowing the boys to handle them (adjust the focus, hold the large binoculars to look at the target part of the sky first, etc.). In any case he was a welcome addition to our STEM program, and a great help to Roy and I because we had a lot of things going on at once.

Having Eric, Ken and Mike there was just superb. You know, I'm sure, that they (and the woman with Mike) have just the right personality to work with boys (and old geezers like me too). Their enthusiasm is infectious!

Roger writes: Good to hear from you again. My stepson is a member of scout troop 41. So, I have done some star shows for troop 41 at their evening award events at a ranch east of Cave Creek. One of the troop 41 scoutmasters asked me if I would help out at the camporee, I said yes, so they gave my number to Roy Smolens who contacted me.

I thought Roy was a super host out there on Saturday night, he made extra sure that I had everything I needed. The kids and parents were great, I probably had 70 or 80 folks come to the scope, several of them came back to look again and again. The only location that was really any good at all was Orion and surrounding area.....lots of WOWs for M42, Jupiter and of course the moon. Best Wishes, Clear Skies, Roger

Kevin writes: Heard Scout Pueblo Star Party: This event took place on Saturday, 3-8 at the Scout Camp located at the base of South Mountain. I arrived at the designated time to find Mike Marron and Eric Steinberg already on site. The scout camp is used most weekends by various troops and this weekend's focus was on technology. A large tent was set up with piles of "junk" electronics, appliances and random computer/tech components. The scouts were tasked throughout the day to sift through the components and create other functional items using a blend of the junk parts. The kids built computers, printers, toys and even a working phonograph that played a discarded Bob Marley record at an incredibly fast speed (Bob Marley meets the Chipmunks).

We were fed (pulled pork sandwiches and potato salad) and then moved our vehicles to set up on an isolated lot to the west of the camp.

Eric set up his "cannon" as it was described by some, Mike set out his collection and I set up "fuzzy" (8" SCT). It was a sufficiently dark, clear evening but was quite windy. The scout masters also had a collection of lower-end scopes, binoculars and other astronomy tools for the boys to look at and handle. Throughout the night, we showed the usual objects along with

(Continued on page 9)

Heard Scout Pueblo Scout Star Party Mar 8

(Continued from page 8)

several Messier objects including some clusters and Eric's locating of the SuperNova.

Many of the kids didn't really understand how the dynamics of the sky work, so I was able to deliver some Astronomy 101 lessons. The StarWalk app on my I-pad was a hit again and kids like the binocular experience as well.

Probably the best experience of the evening was with a young scout named

Sam and his dad, who both spent a lot of time viewing at my scope. Sam is about 10 years old and has a tremendous knowledge already of constellations, and all things stellar. He was able to point out various parts of "Jason's Ship" to me in the sky, including the constellations of the four sections we recognize today, Carina the keel, Puppis the stern, Vela the sails and Pyxis the compass using the SkyWalk app.

After the observation session, I overheard Sam's Dad comment to him that he

was happy to see Sam so psyched about the experience, that he didn't realize that Sam was so into this stuff, and that they would spend more time in the future exploring the sky together. That's really what it's all about... a kid catching the fever that we all share!

I'd estimate that maybe 75-80 people looked through my scope on Saturday and the Scout leaders expressed their appreciation for our attendance. ***

GCC North Campus Star Party Mar 7

By Various Attendees

In attendance at this event from PAS was: Kevin Witts, Howard Moneta and Rodney Fong. Rodney didn't take a scope this time, but the other three PAS Telescope Team members, did.

Rodney writes: The GCC North Campus Star Party went well with just a little wispy clouds here & there. Howard & Kevin had their scopes periodically on Orion Nebula, Jupiter (a great crowd pleaser especially with children), the Moon, Star Clusters, etc. I opted to "Assist" which worked well because large clumps of people were lining up. Sally of GCC estimated over 150 people attended. The school's 8 scopes as well as several scopes from SAC & Sirius Lookers of Sedona stayed busy all night. The dark condition was similar to Black Mountain Campus. It was a fun night.

Sara writes: It went very well! Without your club's contribution of telescopes I think our lines would have been much longer. Last year, with just our 8 telescopes, visitors probably waited in line about 1/2 an hour to 40 minutes. This year, with your club's help, I think the longest line was no more than 15 minutes - and that was only at the beginning of the evening. I think all told, we had our 8, plus 6 other telescopes from several astronomical societies and clubs. And, having more telescopes means we could point at more objects.

We estimated that we had probably 300 visitors pass through over the course of the evening. Everyone I spoke to seemed to enjoy it.

Thank you so much for getting the

word out. I'd like to do this again next year. My vision is to eventually coordinate a huge star party and get advertising out so that we can host many more people from around the valley. I will certainly contact you next August/September when my ASTRO club has chosen the date for the next one. We always try to coordinate the star party with the AZ SciTech festival each spring.

Again, thank you so much for helping out with the event. I really enjoyed working with Howard and Kevin. Clear skies!

Kevin writes: The GCC Star party took place on Friday, March 7th as a part of Arizona's SciTech festival of events. The beautiful GCC North Campus lies well west of I-17 on Happy Valley road. This location provides a reasonable dark sky nestled at the foot of some impressive mountains.

The event was hosted by two professors of GCC's outstanding Astronomy program, Kevin and Sally Watt. Kevin Watt is affectionately known by staff and students as "Kilo" (get it? Kilo-Watt?) and is a former Air Force officer. The school was granted funds a few years ago to build a Planetarium on location. Once the feasibility of that project was dismissed, the staff proposed the construction of an observation pad. The pad's set-up is outstanding. There are 8 piers built in a semi-circle around an isolated, vibration-free cool-tech concrete deck. The piers are equipped with wedges, power and red lighting. The pad resists vibration, facilitated water run-off and is made to not retain heat. All of this aids in the observing experience.

The school has 8 SCT 8" scopes for student use and these were set up on the pad for the public's use at this event, manned by the students. The pad faces south and has a clear shot to the horizon, looking over natural desert.

In addition to the 8 GCC scopes, PAS was represented with two scopes (Howard Monetta and me) and there were approximately 10 more scopes set up in the parking lot from various clubs as far away as Sedona.

While the GCC scopes focused in on showing the Moon, M42 and the Owl Nebula, the other volunteers were encouraged to find other objects of interest to the public. I'd estimate approximately 250 people filtered past my scope throughout the night. I showed Jupiter, Perseus Double Cluster, M37, a few double stars, The Stargate and some other objects.

I also brought binoculars and my I-pad with the StarWalk app loaded on it. I received a bunch of Ooohs and ahhs on various objects and also found many people surprised by just how much is visible through regular magnification binoculars. Many people also enjoyed using the Starwalk app and learning about the origin of some of the constellation designations as well as the "highway through the sky" that the planets travel on.

We were encouraged by GCC to participate in future events and they expressed their appreciation for our attendance. I think the event went excellent and they certainly indicated that they'd like us back next year... ***



Old Tool, New Use: GPS and the Terrestrial Reference Frame

By Alex H. Kasprak

Flying over 1300 kilometers above Earth, the Jason 2 satellite knows its distance from the ocean down to a matter of centimeters, allowing for the creation of detailed maps of the ocean's surface. This information is invaluable to oceanographers and climate scientists. By understanding the ocean's complex topography—its barely perceptible hills and troughs—these scientists can monitor the pace of sea level rise, unravel the intricacies of ocean currents, and project the effects of future climate change.

But these measurements would be useless if there were not some frame of reference to put them in context. A terrestrial reference frame, ratified by an international group of scientists, serves that purpose. "It's a lot like air," says JPL scientist Jan Weiss. "It's all around us and is vitally important, but people don't really think about it." Creating such a frame of reference is more of a challenge than you might think, though. No point on the surface of Earth is truly fixed.

To create a terrestrial reference frame, you need to know the distance between as

many points as possible. Two methods help achieve that goal. Very-long baseline interferometry uses multiple radio antennas to monitor the signal from something very far away in space, like a quasar. The distance between the antennas can be calculated based on tiny changes in the time it takes the signal to reach them. Satellite laser ranging, the second method, bounces lasers off of satellites and measures the two-way travel time to calculate distance between ground stations.

Weiss and his colleagues would like to add a third method into the mix—GPS. At the moment, GPS measurements are used only to tie together the points created by very long baseline interferometry and satellite laser ranging together, not to directly calculate a terrestrial reference frame.

"There hasn't been a whole lot of serious effort to include GPS directly," says Weiss. His goal is to show that GPS can be used to create a terrestrial reference frame on its own. "The thing about GPS that's different from very-long baseline interferometry and satellite laser ranging is that you don't need complex and expensive in-

frastructure and can deploy many stations all around the world."

Feeding GPS data directly into the calculation of a terrestrial reference frame could lead to an even more accurate and cost effective way to reference points geospatially. This could be good news for missions like Jason 2. Slight errors in the terrestrial reference frame can create significant errors where precise measurements are required. GPS stations could prove to be a vital and untapped resource in the quest to create the most accurate terrestrial reference frame possible. "The thing about GPS," says Weiss, "is that you are just so data rich when compared to these other techniques."

You can learn more about NASA's efforts to create an accurate terrestrial reference frame here: <http://spacegeodesy.nasa.gov/>.

Kids can learn all about GPS by visiting <http://spaceplace.nasa.gov/gps> and watching a fun animation about finding pizza here: <http://spaceplace.nasa.gov/gps-pizza>.

For the Wednesday, May 7 PAS Meeting

By Terri, Event Coordinator

Please note, the normal date/time of the May 1, 2014 PAS meeting has been moved to May 7th, same time, different room on the PVCC Main Campus. More details will be in the May issue of the Newsletter, but for now, here's the plans:

The guest speaker will be Dennis Young. He is the President of Sirius Lookers of Sedona (the astronomy club of Sedona). He is also a good friend and an honorary member of PAS.

The plan is to have dinner with Dennis at Village Inn prior to the PAS meeting.

We will be in a different room than normal, provided with Jenny's assistance, so watch for that announcement. All the normal things will happen at the meeting such as the magazine swap, the book swap, Snacks and bottled water provided by President Bruce.

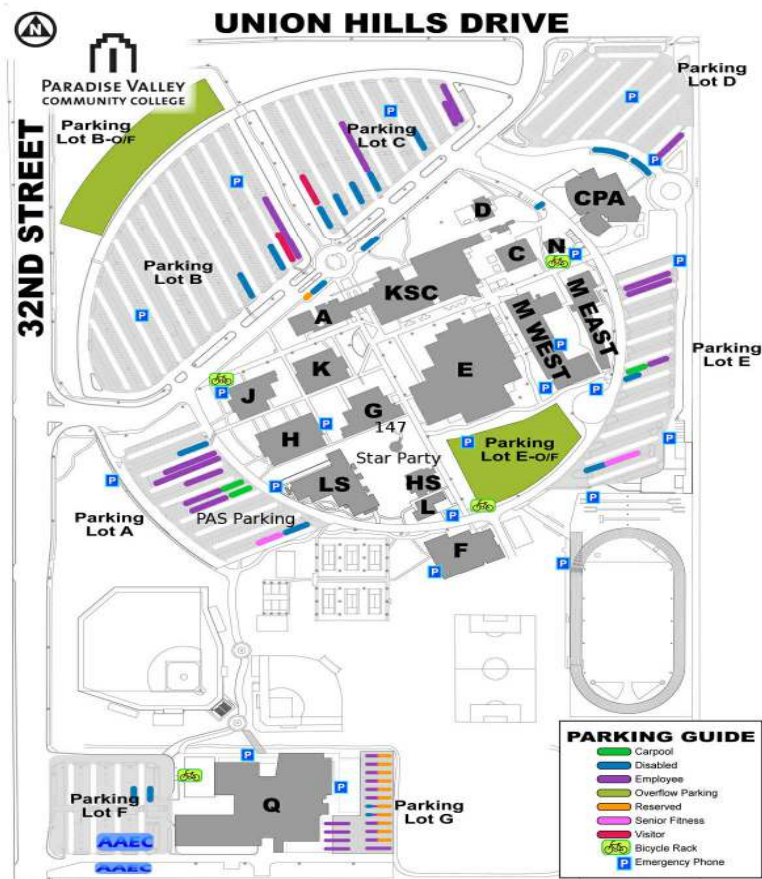
(Continued on page 12)



Artist's interpretation of the Jason 2 satellite. To do its job properly, satellites like Jason 2 require as accurate a terrestrial reference frame as possible. Image courtesy: NASA/JPL Caltech.

Map of PVCC Main Location

18401 N. 32nd Street | Phoenix, AZ 85032



Map of PVCC Black Mountain

34250 N. 60th Street | Scottsdale, AZ 85266



See page 2 for more details

April 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3 PAS Meeting	4	5
6	7	8	9 CTCA (private)	10 Telescope Workshop & Public Star Party	11	12 Movie at Eric's (Private)
13 Free Telescope Workshop	14	15 Total Lunar Eclipse	16	17	18	19
20 Easter Sunday	21	22	23 CTCA Back up	24 Awards Ceremony (Private)	25 School (Private) Star Party	26 Private Star Party
27	28	29	30			

Don Boyd
PAStimes Editor
3039 W. Peoria Ave 102-188
Phoenix AZ 85029

To:

May 7 PAS Meeting

(Continued from page 10)

Everyone is welcome and we hope to have a super turnout. I may be asking a few members to assist Dennis in getting his stuff into the room for his presentation, and then afterwards, getting the stuff back to his vehicle. That would be greatly appreciated.

Please note, the PAS Officer Elections will be held during the PAS Awards Ceremony on Apr 24 (a closed, PAS Members only event). This will free up more time for the Guest Speaker to do his presentation at the May meeting. We hope to see you there! ***

2014 PAS GUEST SPEAKER LINE-UP

By Terri, Event Coordinator Events@pasaz.org

Do you have an idea for a Guest Speaker? Email me the details. Here's the scheduled Guest Speakers at PAS:

<http://www.pasaz.org/index.php?pageid=meetings>

May 7: (Please note change of date & location - Patayan Room - East KSC-1000B - Ksc Building): Speaker: Dennis Young: Topic: TBA

Sept 4: Members Night - Anyone Sign up to do a mini presentation.

Oct 2: Mark Murison: Topic: TBA ***

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What's Up For April

By Rod Sutter, PAS Past President

Name	Date	Rise	Set
Mercury	04-15-14	05:37	18:02
Venus	04-15-14	04:01	15:23
Mars	04-15-14	18:04	05:48
Jupiter	04-15-14	10:41	00:59
Saturn	04-15-14	20:51	07:33
Uranus	04-15-14	05:28	17:56
Neptune	04-15-14	03:52	15:01
4Pluto	04-15-14	00:45	10:59

All Times Arizona Time

April 15 2014

Sunrise: 05:58

Sunset: 18:59



New: April 30



Q1: April 7



Full: April 15



Q3: April 22