

PAStimes

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Steve Coe to Speak at Mar 6 Meeting

Info received from Steve, & Edited for the Newsletter by Terri

“Charles Messier, the man and a Marathon to honor him” is the title of Steve’s presentation at the March 6 PAS Meeting. Steve writes: “I have been an avid observer of the sky from Arizona for 35 years. I dearly love to get out under clear skies and view everything from the Moon and planets to a wide variety of deep sky objects. Recently, I have returned to doing some astroimaging. I usually do wide field images with a digital camera and lenses.

I was the Vice President of PAS in 1978. So long ago that I had dark hair and a 32 inch waist.

My presentation will discuss Charles Messier. Many of the brightest objects in the sky were cataloged by him as he searched for comets from Paris in the eighteenth century. I will discuss some of the galaxies, nebulae and star clusters he found. That will lead to a discussion of the All Arizona Messier Marathon and how you

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PAS Meeting of Feb 6

By Terri, Event Coordinator

The meeting opened up with a nice collection of attendees. We missed Sam Insana, who wasn’t there with his popcorn, but we had a nice collection of snacks to share. Many thanks to Ed Wurst for the cakes & cookies, and to Bob Senzer for bringing the Graham Crackers. President Bruce provided the bottled water, and many thanks to Ed Wurst for bringing the plates and napkins, because, once again, I forgot to grab them on my way out the door. Darlene provided the puffs & grapes and thanks to all who donated to the PAS Snack Fund.

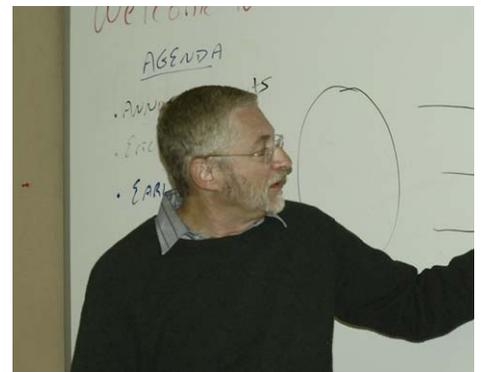
Announcements included Jerry Belcher with the upcoming events he shared from the new 2014 Astronomy Calendar - the one he was selling. Events like on Apr 15 will be a full eclipse of the Moon, and Oct 19 there is a Comet visible, around the orbit of Mars, and on page 79 Oct 8 has a total eclipse of the Moon, and then there is a partial eclipse of the Sun on page 79 as well. If you have the calendar, you can look up these fine events and share them through the PAS List Serv or the PAS Forums.

Matt also announced the 4 magazines he was auctioning off for which I don’t believe anyone won the bid.

Then we turned the night over to our first Guest Speaker, Eric Steinberg who has been a most awesome PAS member with so much to offer the club in information and a fun time anytime he attends any event. His topic was “How do we measure distances & the history measuring distances.” It was a very good talk. Very informative and entertaining. His talk was from 7:40 to 8:15 with a few Questions at the end. Thank you so much, Eric! I learned a lot from your presentation.

Then we took a 5 minute break to grab snacks, hit the bathroom, etc... which really went 10 minutes due to everyone needing to run to the bathroom. When everyone had returned, I gave the floor to Darlene Ahlefeld who then shared with us the three disasters whose anniversaries happened within the last 2 weeks from the meeting date. The Challenger blew up, Apollo 1 blew up and Columbia crashed. This data

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Eric Steinberg



Earl DeLong

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March 2014 Upcoming PAS Events

By Terri, Event Coordinator

To RSVP: Events@pasaz.org

Mar 3: Astronomy Session at Estrella Observatory. PAS Members only. BYO Food & Drink. RSVP is with Yves. Set up is at 6:30pm.

Mar 6: 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!

Mar 6: Astronomy Session at Estrella Observatory. PAS Members only. BYO Food & Drink. RSVP is with Yves. Set up is at 6:30pm.

Mar 7: (Private) Star Party for School. PAStimes Star Tour Members Only. Event is from 7:30 to 9:30pm.

Mar 7: Astronomy Session at Estrella Observatory. PAS Members only. BYO Food & Drink. RSVP is with Yves. Set up is at 6:30pm.

Mar 8: Public Sidewalk Astro Event at Bookmans at 19th Ave and Northern in Phoenix from 6:30 to 9:30pm. Volunteers are needed with or without scopes. RSVP to attend is with Terri.

Mar 8: Astronomy Session at Estrella Observatory. PAS Members only. BYO Food & Drink. RSVP is with Yves. Set up is at 6:30pm.

Mar 8: Scout Star Party (Private).

PAStimes Star Tour Members Only. One more scope needed. RSVP today. Event is from 7:30 - 9:30pm.

Mar 12: (Private) Star Party for School. PAStimes Star Tour Members Only. One more scope needed. RSVP today.

Mar 13: (Private) Star Party in Litchfield. RSVP is closed.

Mar 14: (Private) Star Party for School. School requests Mike only. RSVP is closed.

Mar 16: Bookmans FREE Telescope Workshop. Everyone Welcome. Meet in the front window of Bookmans at 19h Ave & Northern Ave in Phoenix from 3:30 to 5:30. Bring your telescope, accessories, something to write on and questions. RSVP is required with Terri at Events@pasaz.org. When you RSVP, include the make & model of your telescope.

Mar 17: CTCA (private). RSVP is with Joe. PAS Star Tour Members Only.

Mar 20: Public Star Party at Black Mountain Campus of PVCC from 7pm to 10pm. RSVP is with Terri at Events@pasaz.org.

Mar 21: Astronomy Session at Estrella Observatory. PAS Members only. BYO Food & Drink. RSVP is with Yves. Set up is at 6:30pm.

Mar 22: (Private) Dark Sky & Night Sky Training Session in Carefree. RSVP is required with Terri. PAS Members Only. Potluck is at 5:30pm. NSTS begins at 7:30pm.

Mar 24: Back up Date for CTCA of Mar 17.

Mar 28: Astronomy Session at Estrella Observatory. PAS Members only. BYO Food & Drink. RSVP is with Yves. Set up is at 6:30pm.

Mar 29: Messier Marathon in Carefree. Potluck at 5pm. Marathon begins at sundown which is 6:40pm. RSVP is with Terri for this event. RSVP is required. Everyone welcome who is doing the Marathon or Dark Sky observing. Reminder: The Messier Marathon is not a public observing night. It is a serious observing session to compete in the marathon. Public is welcome so long as the marathoner's are not disturbed during their competition. Other scopes may be set up to share the night sky.

Mar 30: Astronomy Party at Estrella Observatory. PAS Members only. Potluck is at 5:30pm. RSVP is with Yves. Set up is at 6:30pm.

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! ***

2014 PAS Membership Dues

By Terri, Event Coordinator

The PAS year is from January to December. If you haven't paid your PAS Dues for 2014, you will, by the end of February, be removed from the PASaz.org website as a PAS Member, which means you lose your "Private" access, as well as from the PAS-Members list serv and the PASAnnounce list serv, and the PAS Members Roster. This

is a lot of work for those of us who have to do the removal, and having you renew your dues on time (next year will be Dec 31, 2014), helps us not to have to remove you, then add you back into the membership, when you do renew. So, if you haven't already renewed for 2014, please note, some of your access to the above list of

items, has been removed. We hope you will continue to support PAS. ***

Glowing nebulae are named so because they give off a dim, red light, as the hydrogen gas in them is heated by radiation from the nearby stars.

Plastic Bags for School Event

By Terri, Event Coordinator

At the March and April PAS Meetings, I'd like to collect any plastic bags you'd like to depart with. For the big event at Rancho Gabriela School on May 6, the teacher in charge has asked if I can bring them a ton of plastic bags to use at their event. I told them

I still have last year's supply but would see if I can add to it. So, I will have a great way to pass along more plastic bags, if you wish to bring some to the meetings and leave them with me. Since I need them in my hands no later than May 6, any event be-

tween now and then is fine to bring me bags. I only mentioned the two meetings as that is where most of you brought your bags to last year. Thanks so much for helping out with this event by donating your unwanted plastic shopping bags. ***

Steve Coe to Speak at Mar 6 Meeting

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can join many other observers while searching for Messier objects.

I will be selling and happy to sign my third book "Touching the Universe." This book is about my favorite 20 nights out with the telescope. Where we went, what we did, what we saw and how much fun it was

doing all that. A meteor shower, eclipse of the Sun, southern sky viewing and much more is included. The price is 20 dollars. Go to Amazon.com and search for my name, it will take you to all three books I have written. They are also available as electronic books."

The March Meeting will have a Magazine & Book Swap. Bring a snack to share (or donate to the snack fund) and President Bruce will provided the bottled water. If you prefer another drink, BYO. Doors open at 7pm. The meeting will begin at 7:30 and go to 10pm. Everyone is welcome. Bring a friend. ***

PAS Meeting of Feb 6

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was found in the 2014 Year in Space Desk Calendar. Thank you Darlene.

We then heard from Earl DeLong. Earl had done a presentation for us back in December but this time, his topic was "The Compton Gamma Ray Observatory" and in this presentation, we learned some chemistry, and some astronomy, and it was a very good presentation. Earl is also one of those

awesome PAS Members who has brought a lot to the PAS table by attending events, helping where he can, doing presentations... and he is very appreciated! Thank you Earl. His presentation was from 8:30 to 9:10pm.

I am so glad to have such awesome PAS Members in our club!

We then made a few more upcoming events announcements and closed the meeting. Many thanks to everyone who attended. IT was a very good meeting, with plenty of information, great friends, good snacks and we are all looking forward to the March 6 Meeting. See you there! ***

Next NSTS

The next scheduled NSTS (Night Sky Training Session) is scheduled

for Mar 22, 2014 at Mike's home in Carefree. Plan to attend this event

and learn to navigate the night sky. See you there! ***

Pizza Party for PAS Members Apr 24

By Terri, Event Coordinator

I wish to thank Darren Johnson, who owns the store "Imperial Outpost" at 47th Ave & Thunderbird, across the street from ASU West. Darren has offered to donate pizza to our party on April 24 for the Awards Ceremony and PAS Election of Officers. There will be a Snack Fund box at the back of the room, should anyone wish to donate back to Darren for his donation to our party.

This is a PAS Members Only party. PAS Members and their immediate (living in one household) family members may

attend this special Awards Ceremony Pizza Party. You will need to RSVP your type of pizza, so that we can accommodate everyone who wants to attend. Please request only up to 2 slices of pizza per person attending. There will be plenty of extras, but it might not be your first choice. Feel free to help yourself to more pizza after 8pm. This event will happen at 7pm to 10pm. Set up is 7-7:30pm. Please see the PAS website Private Calendar to know where the event will happen. This is NOT a Meeting of the Minds. It is a socializing, awards ceremony,

election night. After all the scheduled activities, we can socialize and enjoy the rest of the evening up to 10pm, or leave before then, if you need to. We want everyone in PAS to attend, whether you are running for office in PAS, or receiving an award, or not. Let's make this a special event. We will see you there. Remember to RSVP the type of pizza you wish to have at this event, with Terri Events@pasaz.org by Apr 22 so I can get the word to Darren about how many pizzas we need for that night. Thanks again to Darren. ***

Predicting Night Sky Conditions

By Alex Vrenios, PhD

There are wondrous objects in the sky and we amateur observational astronomers try to see what we can, whenever we can, within the limitations of our equipment and the local weather conditions. The truly dedicated observers among us will lug their biggest telescopes to the darkest sites to get the best from both, which leads me to the subject of this paper: How can we be sure that the dark site will have clear skies while we're there? We certainly don't want to cram all that delicate equipment into the family car and travel far from city lights just to drink coffee under the clouds!

So we plan. We watch all the TV weather reports, check predictions from the various online weather-oriented Internet sites and consult any one of a growing number of weather prediction apps on our smart phones. Trouble is, they seldom all agree, exactly, and there is always the possibility that they might all be wrong! It could turn cloudy just before we arrive at that dark site. Or worse, it could clear up just about the time we finish unpacking the car after aborting the trip.

So who's behind all these weather predictions anyway? Not too surprisingly, forecasting is mostly done by a seat-of-the-pants interpretation of output from several sophisticated computer models, by well meaning, well trained weather people – the forecasters.

Modeling, or more properly, computer software simulation modeling, is the use of a complex computer program that predicts the future state of a system based on its current conditions and an interpretation of how these conditions interact. A weather model reads in data about the wind speed, atmospheric pressure, temperature, humidity, etc., that define the current state. Then it uses mathematical formulas, models of atmospheric particle interactions to determine the conditions of the next state, after some user-supplied time interval has elapsed. Practical predictions weren't possible until the use of computer modeling began. Before then, weather conditions could be predicted, but not with any great degree of accuracy. And more often than not, the future arrived before the calculations were complete! Today's best models can accurately predict conditions 7 to 10 days into the future.

One commonly used simulation technique is called the Finite Element Method.

For example, metal bridge is assumed to be at a uniform nighttime temperature until dawn, when the sun comes up and parts of its topmost spires begin to warm up. Heat energy is transferred from those warmed up parts to the cooler ones. Given what's known about how the material conducts heat, the temperature of every tiny piece of that bridge can be calculated at the next state, and so on. Note that we didn't say anything about the current wind conditions, how heat gets transferred across bolted or welded components, or other factors that can influence the next-state calculations.

The perhaps overused phrase "the devil is in the details" certainly applies to computer modeling, where assumptions and errors in judgment can drastically influence the differences between the predictions of the computer model versus real life experience. Professionals validate a model before they rely on its predictive prowess.

The weather in our atmosphere is an extremely complex system. (It's no surprise to this author that Chaos Theory was first discovered while examining weather data!) There is a common example regarding the flap of a butterfly's wings in South America causing a typhoon off the shores of Australia. What is not so commonly discussed is that a rounding error can make it look like conditions are right for a typhoon even when that butterfly is just resting, minding its own business.

A discussion started in our club's online forum about how clear the night sky might be for an upcoming star party. The focus soon switched to why the sources we commonly use to predict these things were in such disagreement. One member suggested we might have a speaker come to one of our monthly meetings and present the nature of these models. I'm no weather expert but I happen to know someone who is, so I sent him an email in regards to the "accuracy vs. models" issue. Specifically, did he know anyone who might want to give us such a talk? As it happens, he did not, but he had two comments about weather predictions that might be of interest to the group:

1. "Our forecasts (sky cover and all the other parameters) come from the graphical database that we generate. Each forecast office has a piece of the country that gets mosaicked at [our website]. For us, sky cover is the percentage of sky that has

opaque cloud cover. That forecast is geared more for the general public than astronomy interests, which have quite a bit more sensitivity to any cloud cover. We use a variety of models to derive the sky cover based on humidity at various altitudes. There can be individual forecaster biases where they may be reluctant to go absolutely zero during clear sky conditions. Conversely, some forecasters might tend to be overly conservative with the sky cover for instance when there is thick cirrus. And of course, we have no way of accounting for contrails.

2. "A kind of forecast you should be aware of is the TAF (Terminal Aerodrome Forecast), which we produce for a limited number of airports. The forecast covers wind, surface visibility (in statute miles), weather type, obstructions to visibility, and cloud layers. The cloud layer forecast is a combination of coverage and height above the ground. So for instance, SCT250 equates to scattered coverage (up to half the sky) with bases at 25000 feet above ground level. The 25000 ft level is an old standby for cirrus. Quite often the cirrus is actually higher than that (30K+). BKN250 is more than half of the sky covered but not 100% coverage. These forecasts are of course geared for the aviation community and the higher the clouds, the less impact they have on operations. Winds and obstructions to visibility are a lot more important until you get some fairly low cloud layers (below 5000 ft. and especially below 3000 ft.). Brevity is also important in the TAF so you won't see a lot of detail on fluctuating cirrus. As for visibility, the automated weather stations only go up to 10 miles so even if the real visibility is 50 miles, it will only show 10. All of that being said, you can get a sense of the type of cloud cover anticipated by looking at the TAF."

I've thought about this for a while and I've concluded that (1) the general public might be interested in the cloud cover only to know how sunny it will be for an outing, and (2) a pilot seems more interested in knowing how clearly he can see the ground from a given altitude. Neither of these forecasts is exactly what we require.

A more appropriate source for astronomers might be one of the "Clear Sky Charts in Arizona" at http://cleardarksky.com/CSK/prov/Arizona_charts.html

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Predicting Night Sky Conditions

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In particular, the charts for Phoenix or Carefree seem (to me) to be what we should be looking at for upcoming events.

Then I thought, "Wouldn't this make a great app for an iPhone?" I opened up iTunes, did a search for "clear sky chart app" and found an app named myCSC. And it's free! The developer site made no mention of an Android version, but they do have an app that runs on Windows.

Once the app is loaded, tap the Circle-i (upper left-hand corner), then the "Check

for Updates" button. It will download several hundred Clear Sky Charts representing their supported locations.

Back on the main screen, tap one of the three default charts and it will allow you to reset the "CSC Location" to Phoenix, or Carefree, or even the Antenna Site! You can display a maximum of three sites on the main screen. Then tap the 270-degree, arrowed arc (upper right-hand corner) to update all three predictions.

Tap on one of the charts to reset it to

some other location, to see a complete Clear Sky Chart, to get details about that site, or to see a map, with satellite or hybrid views, so you can figure out how to get there. Did I mention this app was free?

As an afterthought, there are enough professional astronomers in the world to warrant a high quality software package that predicts how clear and steady the atmosphere will be on a given night. I don't know of any, but if there is such a product I'll guess it's priced well beyond my budget. So for now, I'll stick with myCSC. ***

PAS Name Badges

By Terri, Event Coordinator

Recently, I have received three PAS Members request to create Name Badges for them. So, the day after the Mar 6 PAS Meeting, I will be putting the order in to get those three Name Badges for Mike, Kevin and Howard. Why do you want to have a PAS Name Badge? It is required for those who belong to the PAStimes Star Tours group, but for anyone else who isn't a member of that SIG, it is just nice to have a name badge to say you belong to PAS. So, get

your monies into to Mike or me, to order your name badges. Why do we announce this? Because it will be another 6 months before I put the order in again. 3 badges is the minimum order for me to go get these made. Name Badges are \$15. You need to turn in a Membership form, old or new form doesn't matter, with your cash or check, to Mike or me, to put the order in. So, if you are needing a Membership Name Badge due to recently signing up to be part of the

Star Tours team, I suggest you get your order in and paid for by Mar 6. If you can't make it to an event between now and Mar 6, drop me an email to say the check is on its way, and I will hold the order until I receive your check for the name badges. Who needs a badge? It is nice if all PAS Members have one, and you can get them for the whole immediate family as members at \$15 each. Get your orders in today. ***

The May 2014 PAS Meeting

By Terri, Event Coordinator

For the May 2014 PAS Meeting, we will be changing the day of the week, and the Room we are in to accommodate the Guest Speaker. Dennis Young will be the presenter. He can't do a meeting on a Thursday night, so we moved the meeting to the next week on Wednesday May 7th.

The room we will be in will be larger to accommodate a larger crowd. Please make a note of this info so you don't show up at the normal schedule meeting day/time which would have been May 1. The room we are in is Patayan Room - East KSC-1000B - KSC Building. The meeting will

run from 7pm to 10pm, with the first half hour of setting up the guest speaker. We hope to see you there! This change of room will only be for this the May 2014 PAS Meeting. More details about the meeting will be in the May PAStimes Newsletter. ***

Star Parties at Estrella Observatory

By Yves Klein, written to Terri

The weather has been very unpredictable in the last couple of months, so I thought that I will do things a bit differently. I am thinking of having some astronomy sessions that I will post on FB and MeetUp which you can post also on PAS so if the weather is bad, and I have to cancel the main party of the month, people that like to do some astronomy can still come during the sessions.

Astronomy sessions will not have all the social gathering and food but will focus

on doing what we like most, explore the sky with our telescopes. People can come and bring their own drinks and food for the evening during those times.

So, the most convenient day to have a party is on the 28th of Feb. But I can have a Session on Feb 22 and 23 for this month.

In March I will plan on having sessions if the weather is good on 3, 6, 7, 8, 21, 28, and an Astronomy Party on the 30th.

There maybe other last minute sessions, if the weather is great.

Terri adds: These dates will be posted to the site, soon. RSVP to attend will be with Yves for all of these events. See the Calendar listing for address, RSVP info, and times of the event. These events are Private. PAS Members only. The Sessions will have a set up time of 1 hour prior to dark, and the Astronomy Party will have a potluck 2 hours before dark. ***

Arizona Sky

By Leah Sapir



Mars is about to be spectacular! Yes, really – although it won't be as large as the full moon ;) . Mars is heading towards an opposition on April 8, and will be about 15 arc seconds in diameter; during March it will be 12-14 arc seconds. (For comparison, in August 2003, one of the closer oppositions, it was 25 arc seconds. But when Mars is not at opposition, i.e. when it is at the far end of its orbit, its visual diameter can be as small as 4 arc seconds.)

The reason for the close and not-so-close oppositions is because the orbit of Mars is quite elliptical: although the average distance of Mars from the Sun is 140 million miles, or 1.52 AU, it can vary from 128 to 154 million miles. (By comparison, the difference between Earth's perihelion and aphelion is only 3 million miles.) Since both Earth and Mars are moving, we pass by Mars about once in 2.25 years. This is the opposition, when Mars is on one side of Earth and the Sun is on the other; and of course it is the closest we can get to Mars. If the opposition happens when Mars is at perihelion, i.e. when it is closest to the Sun, it will also be closer to us, and have a larger-than-usual visual diameter. This happens about once in 15-17 years, and the next one is scheduled for July 2018.

At the current opposition, the northern hemisphere of Mars will be tilted towards us, and it is now summer there, so if we have a chance to view Mars through a telescope, we should try to catch the polar cap before it melts. Summer solstice was on February 15.

Mars has four seasons, like Earth, and for the same reason. The axis of Mars is tilted at 25 degrees relative to its orbital plane, similar to Earth's tilt of 23.5 degrees. However, Martian seasons are longer than Earth's, because the year is twice as long (687 days, about 1.8 Earth years). On the other hand, Martian seasons are uneven because of its elliptical orbit. In the northern hemisphere, spring is about 6.5 months long, summer is 6 months, autumn and winter are about 5 months each.

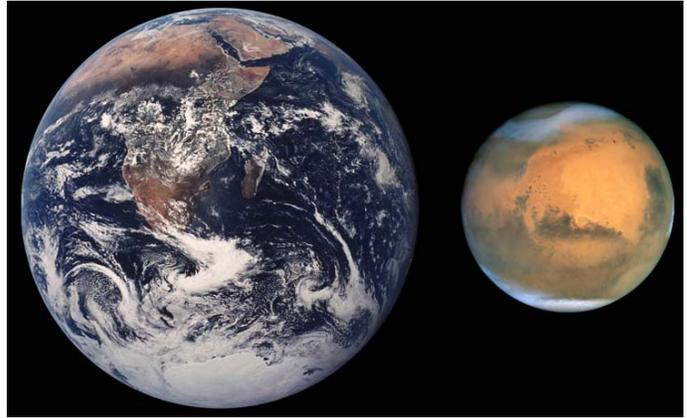
The polar caps vary with the seasons, much more than polar ice caps do on Earth. The northern cap is

about 2000 miles in diameter in winter and 600 miles in summer, while the southern cap is 2500 miles in winter, and 200 miles in summer. The southern winter and northern summer caps are larger than their opposite number, because northern summer/southern winter occurs when Mars is farther from the Sun. The winter ice caps are mostly frozen carbon dioxide ("dry ice") with a little water

ice. The residual part of the northern cap (the part remaining in summer) is made mostly of water ice, while the southern residual cap is mostly carbon dioxide. The ice caps are about half a mile thick in winter.

The average temperature on Mars is about -70 F, but can vary from -200 F at the winter pole to 80 F on a summer day at the equator. But that's only the surface temperature, not the air temperature, which remains below freezing. Mars has a very thin atmosphere, about 1% of Earth's atmosphere in pressure and density. And even though the Martian atmosphere is mostly carbon dioxide (95% carbon dioxide, 3% nitrogen, 1.5% argon and traces of oxygen and water vapor) it is so sparse that it isn't sufficient to produce a greenhouse effect. The carbon dioxide in the Martian atmosphere only raises the temperature by about 3 degrees F. In addition, the thin atmosphere of Mars allows ultraviolet radiation to reach the surface. Even though Mars receives only half the amount of sunlight as Earth does, because it is 1.5 times as far from the Sun, it has no ozone to block the ultraviolet radiation.

Moreover, a significant amount of the atmosphere freezes out to form the polar caps in winter, lowering the atmospheric pressure by about 20%. The dry ice starts to evaporate from the polar cap in the spring, but in the summer it freezes again at the opposite pole, where it is winter. Still, the Martian atmosphere is sufficient to produce massive dust storms that are often seen through a telescope, with winds of up to 200 mph. These are caused by seasonal temperature variations, and by the difference in temperature between the northern and southern hemispheres. Dust storms are



Size comparison of Earth and Mars (image credit: wikipedia and NASA)

more frequent when Mars is close to the Sun. The dark areas seen in telescopes, such as Syrtis Major, are mostly dust-covered highlands, and seasonal variations in their size and color are the result of blowing dust.

Since Mars is now approaching opposition, it will be rising in the early evening: around 10 pm at the beginning of this month, and 7 pm towards the end of the month. The full Moon will follow Mars across the sky on March 18-19 from around 9 pm to dawn.

Elsewhere in the solar system, Jupiter is still high in the sky at sunset, setting around 4 am at the beginning of March and 2 am at the end of the month. The first-quarter Moon will accompany Jupiter in the sky on March 9-10, from sunset to 2 am. The Moon will be between the Pleiades and Hyades on March 6, and near the Hyades on March 7, from sunset to midnight each time.

Uranus is still in our western sky after dusk at the beginning of March, but will fade into the sunset by the end of the month.

Saturn is approaching opposition, and rises at midnight at the beginning of March, and 10 pm at the end of the month. Saturn and the Moon will cross the sky together on March 20-21, from 11 pm to dawn.

Venus is a morning star, rising around 4 am all month. The crescent Moon will be near Venus on the morning of March 27, before dawn. Neptune disappeared from our evening sky last month, and will reappear as a morning star towards the end of March. Mercury is also a morning star, but barely visible in morning twilight, rising around 5:30 am.



Arizona Sky

We will have two New Moons this month: March 1 and 30, after having none in February. (This is not anything special about the Moon, but only because February was so short – so the New Moon that would

have appeared in February will arrive on March 1.) The first-quarter Moon is scheduled for March 8, Full Moon on March 16, and third quarter on March 24.

Join us next time when we continue to explore Mars and the Arizona sky. And till then, wishing you clear skies and happy observing!

Sonoran Trails School Feb 12

By Various Attendees

Attending this event from PAS was: Earl DeLong, Terry Dancer, Kevin Witts (New PAS Member), & Mike Marron. Our contact at this school was Kara Kadotani.

Earl writes: Kevin, Terry, Mike and myself attended the Sonoran Trails star party in North Phoenix. It was relatively clear but with a moon two days from full. As we set up and ate pizza, we were treated to another spectacular Arizona sunset.

We showed the heavens to 7th and 8th graders and their families. The students

were all given astronomy questions that they had to ask us for answers. Correct answers earned them extra credit.

I stayed on the bright moon all night. Terry mostly stayed on Jupiter and Kevin stayed on the Orion nebula. Mike was in the gymnasium with his meteorites.

The students were well behaved and interested, trying to earn extra credit. It was a nice location for a star party. There was easy access to the basketball court for set up. Kara and her staff did a good job

meeting our needs and preparing the students. I would definitely return for another star party at this school.

Mike writes: Sonoran Trails School: I was put in the gym with the robots and the Cave Creek Geologist. I made sure to show the Cave Creek meteorite but they liked the lunar and Martian meteorites better. The kids were amazed to see what they looked like as space dust while the space gold drew in a few adults. ***

Canyon Springs School Feb 19

By Various Attendees

In attendance at this event from PAS was: Don Boyd, Mike Marron, Earl DeLong, & Kevin Witts. The two contacts at the school were Ann Gallo & Cheryl Green.

Don writes: This was an interesting party. The Sheriff department send a squad car, a SWAT vehicle and 2 helicopters, so

there were very bright lights all around, which was a shame as the site would have been very dark except for them. The kids were well behaved and very interested in what we were showing.

Ann writes: It was a wonderful evening!!! Please tell the team it was great.

Thank you.

Cheryl writes: Yes the Telescope team did a great job and they were the very last people here talking with students and sharing their knowledge.. It was a very successful night. Thank you for coming and I am looking forward to next year as well. ***

Bookmans Telescope Workshop Feb 16

By Terri, Event Coordinator

Many thanks to the many PAS Members who have helped at this event: Rodney Fong, Kevin Witts who attended to learn more, Earl DeLong, William & Terri Finch, Don Boyd, and Terry Dancer. Ed & Bette Wurst were also in attendance. Attending the class were (in order of arrival): Pam Sullivan with a Venture Refractor RX-9, then Glen Myers showed up to talk telescopes (he's a previous member of PAS from before 1957, and the 2nd scope to arrive was Kristin and Michael with their cute Celestron Omni XLT 127 SCG. We had one walk in asking about what we were doing.

Don & Rodney helped Pam. Glen and Earl were chatting up a storm the whole event. Kristin & Michael showed up and Terry, Rodney and Don assisted them. It was a very successful event. Lots of conversing, lots of shared info. Looking forward to next month's Bookmans Telescope Workshop.

Additional members of PAS who showed up to assist, around 4:30pm was Leah Sapir, and Howard Moneta and Terry Dancer brought a friend, Chad. Thank you all for assisting today!

Kristin writes: Thanks for today! I

don't know what happened, but we can see through it now. Maybe it just needed someone with a magic touch. Funny how those things work.

Pam writes: Thanks so much for all your help. All of you were very patient with this "rookie" :) I went outside last night and tried to see the cloudy moon, but was not able to see through my lens....guess I need more lessons. I hope to attend your next star gazing and look forward to more help from the experts.

I will order Rigel scope and hope to get the books. ***

Antenna's Star Party Jan 25

By Eric Steinberg

Looking at the forecasts, we figured Saturday looked like the best bet for dark-sky observing, and so headed west. The near-overcast skies were not encouraging, but by the time we got out there it was starting to clear. Steve Coe and friend Don had just arrived and more folks trickled in as it got dark, including Tom and Jennifer Polakis. The first treat of the night was a dramatic sundog that Tom photographed:

<http://www.pbase.com/polakis/image/154254057/original>

As the sun went down, the sky thankfully cleared substantially, though sky conditions weren't great. Unexpectedly they got better and better as the night wore on and by 10:30 or so were spectacular with

almost no wind. The second treat of the night was visibility of Canopus low in the south over a saddle in the ridge to the south that's been named the "Canopus Gap." It's where Omega Centauri also appears in the spring.

The third treat was viewing the new Type IA supernova in M82 – very prominent, especially if you're familiar with it. It's currently magnitude 11, but may continue to brighten for up to two weeks and should be visible on a good night even here in town. I find it amazing to imagine viewing a single star at 12 million light-years distance!

http://s176.photobucket.com/user/walc0m77/media/new_animation_supernova_m

82_22_gennaio_2014_zpsbd4116c7.gif.html

Overall, skies were spectacular and we did spend some time just looking. As far as observing, I picked up 18 new Herschel objects, (mostly in the south) along with a number of Messier and NGC objects including the Sculptor (NGC253) and a blazing M42. Also looking great were M35 and M37, NGC1501 (PN) and M79 (GC).

We finished around 1 AM. After a short but pretty sunrise hike up the ridge, we returned home Sunday morning. Here's another Polakis photo of that view:

<http://www.pbase.com/polakis/image/153953802>

What a great night! ***

Emunah Star Party Feb 1

By Eric Steinberg

On Saturday night February 1st, Eric Steinberg, Ora Kurland and Mike Marron did a star party for the Emunah Montessori School in central Phoenix. The weather did not look good leading up to the event, but skies cleared in time to show a number of objects to the very appreciative group of around thirty adults and children. Mike as usual captivated one and all with his meteorite presentation and Eric gave a talk tying in astronomy with the weekly bible portion for the Jewish school. One especially pleasant surprise was the level of knowl-

edge of the children, who asked intelligent questions throughout the evening and seemed to understand the answers as well. We showed the moon (early on), Jupiter, the star Sirius, the supernova in M82 and M42 – surprisingly successfully given one of the worst light-pollution environments I've seen! M82 itself was just barely visible, but the supernova star, 12 million light-years distant shone brilliantly. It was quite satisfying to share this rare sight and others with the group.

Mike writes: Eric, Aura and I went to a Montessori Hebrew school. One boy said I was awesome and made sure that every adult and kid came over to see my meteorites. Eric showed the supernova in M82 while I showed my 6 billion year old carbonaceous chondrite from a star that had gone supernova. The adults were very interested so I explained my Pacific impact theory and my leptonic proton and the other simplifications of quantum physics. A Rabbi who went through the illustrations said "Son, you've got to publish this." ***

BASIS Mesa School Star Party Feb 4

Assembled by Terri, Event Coordinator

In attendance at this event was Don Boyd, Mike Marron and Rick Cunningham. Our contact at this school was Jon Hutman.

Jon writes: "Hi Terri, Last night was a huge success. The guests loved being able to look at the stars, nebula, Jupiter, etc. and like always Mike did an outstanding job with his meteorite display. I had a guest tell me that Mike should be the guest speaker as they just wanted to listen to him all night! The sky's were mostly clear, with small interruptions from the clouds. Our head count was 268 guests who attended the whole night, and probably another 20-30 who showed up later and did not get "checked" in. All in all, a huge success! Mike did inquire about gas money and I told him that a check should have been

received by you. Did you get our check? Thanks again for all of your help! All the best, Jon." In a separate email, Jon writes: "Thank you all once again for making our first Family Space Night @ BASIS Mesa a huge success! I hope that we can continue to work together in the future. All the best, Jon"

Don writes: "It went well...we had mostly clear skies to start the event, but by 7:30 it was mostly clouded over and all we could see was Jupiter and Luna. We were joined by 6 scopes from EVAC as well. I started out on the moon, then tried to find ET, but he was in the clouds as was the double cluster. I then viewed the Pleiades, mostly thru clouds, the rest of the night. I was surprised at how good it looked thru the

clouds. Even after the clouds got really heavy we could still see the 6 or 7 naked eyes stars in the eyepiece, albeit very faintly. We set up in the parking lot as their basketball court is in the walled courtyard as is their playground."

Rick Cunningham writes: "The people from Basis Mesa, a new school not completely occupied, were very helpful. I ask to have the parking lot lights around us turned off. This was before they were scheduled to come on. That was accomplished. About dusk another gentleman came out and ask again if we needed anything. I saw another row of parking lot lights to the south had come on and ask to have them turned off also. They were. Aside from the light coming from the inte-

(Continued on page 9)

BASIS Mesa School Star Party Feb 4

(Continued from page 8)

rior of the school it was pleasantly dark compared to my home viewing conditions. Arriving at 4:30 for the 5:00 setup it was about 50% cloud cover. It cleared some by 6:00, but from 6:30 on the cloud cover gradually increased to complete overcast. PAS had two scopes for viewing, Mike for meteorites, and EVAC had six scopes. After my setup I viewed the sunset through my solar filter. The view was spectacular. The cloud bands passing before the sun made it look more like Jupiter than the sun. Sunspots were prominent and clustered almost like Jupiter's red storm. I took pic-

tures but had neglected to turn off the flash. The best views of the sunspots and cloud banding did not come out unfortunately. At about viewing time NGC 457 Owl Cluster, aka E.T., was not visible so I pulled out my variable moon filter and showed the moon all evening. Given the viewing conditions were not optimal I was pleasantly pleased to hear all the exclamations of surprise and wonder at the view from the eyepiece. Many viewers came by several times. Don was showing Pleiades most of the evening. There was over 100 in attendance."

Mike writes: Basis Mesa School what a long drive. It was past Gateway Airport and Google Maps only showed dirt. I was in the school area where they had a planetary researcher explain his interferometry techniques to find exoplanets. As usual I was trying to find kids who would be willing to go get 1% of an asteroid for me. One of the parents later went to the organizer, Jon Hutman and told him that it would have been more interesting if I had been the main speaker. ***

Morris K Udall Star Party Feb 7

By Various Attendees

In attendance at this event, from PAS was: Rick Cunningham, Earl DeLong, Don Boyd, & Mike Marron. Our contact at the school was Sara Pearson.

Don writes: We got there about 6 and setup on the basketball courts and it was mostly clear. We were set up and showing objects by 6:30. Earl took the moon, Rick tried Orion but the clouds were already starting to move in so he moved to Castor, and I took Jupiter. We each stayed on the objects all night, By 7:30 the clouds were very heavy but the 3 objects we viewed were still visible. They closed down at 8:30 and of course it cleared up then.

I never even did an alignment since when the stars were visible we were super and when it eased off so I could do one, we were completely socked in.

I think we might have had 400 kids, as we were very busy from 6:30 to 8:00. They were very well behaved and it was a real pleasure to do the show for them. Most of them had parents and a lot of the teachers came out as well.

Earl writes: As I left to head south to Morris K Udall school, the sky looked dismal. There were patchy clouds and a lot of haze. The clouds did spout two sun dogs near the sun.

When I arrived at the school, Rick C.

was already there. Rick and I went indoors to eat before setting up. After eating, I set up my 10 inch telescope and Rick set up his 8 inch telescope. Then Don arrived and began setting up his scope. Mike M. was indoors with his meteorites.

The event was well attended by the public. Everyone was well behaved and patient as there were long lines behind the three telescopes present. I stayed on the 1st quarter moon all evening. Rick C. jumped between the moon, Jupiter, double star Castor, and the Orion nebula as clouds/haze allowed. I believe Don stayed on Jupiter.

We fought the clouds until 8:00 PM when as luck would have, it cleared. Unfortunately the families began to leave and we packed up around 8:30 PM.

The public really enjoyed looking through our equipment. Even with the language barrier, I could sense their excitement and awe when looking at the heavens. I look forward to another event at this school. Our thanks to Sara P. and her staff.

Rick writes: I arrived Friday night about 5:20 P.M. at Morris K. Udall school. It was warm and partially overcast, but no rain as was predicted earlier in the week. Earl, Don, and myself set up on the basketball court. Mike set up inside. Don showed Jupiter, Earl showed the moon, and I was

showing Castor, the binary star. I see them as a white - white pair. Many of the viewers saw them as a blue - red pair. During the viewing the cloud cover increased to 100% with only the moon and Jupiter visible to the naked eye. I was able to continue showing Castor until somebody bumped my telescope off target. NO! I didn't think I'd find Castor again since I could not see it, but was lucky. It only took me about 20 seconds and the long line waiting to view was again moving. As the viewing time was concluding the overcast sky cleared!

This was a well attended event.

Mike writes: Morris K. Udall School: They put Ofelia and me in a classroom. Each classroom had activities. Ofelia was a huge help translating ideas into Spanish and helping excite the kids about space. The kids were happy they got to hold and learn so much about my meteorites. One adult said, "Good luck collecting that 1%."

Sara writes: It was a great event! Mike kept a crowd at his area. Although there was some cloud cover we did get to see Jupiter, the moon, and a double star. We had a volunteer room where we had food and drinks for our volunteers. I look forward to another event next year. Thanks for your support. ***



A Two-Toned Wonder from the Saturnian Outskirts

By Dr. Ethan Siegel

Although Saturn has been known as long as humans have been watching the night sky, it's only since the invention of the telescope that we've learned about the rings and moons of this giant, gaseous world. You might know that the largest of Saturn's moons is Titan, the second largest moon in the entire Solar System, discovered by Christiaan Huygens in 1655. It was just 16 years later, in 1671, that Giovanni Cassini (for whom the famed division in Saturn's rings—and the NASA mission now in orbit there—is named) discovered the second of Saturn's moons: Iapetus. Unlike Titan, Iapetus could only be seen when it was on the west side of Saturn, leading Cassini to correctly conclude that not only was Iapetus tidally locked to Saturn, but that its trailing hemisphere was intrinsically brighter than its darker, leading hemisphere. This has very much been confirmed in modern times!

In fact, the darkness of the leading side is comparable to coal, while the rest of Iapetus is as white as thick sea ice. Iapetus is the most distant of all of Saturn's large moons, with an average orbital distance of

3.5 million km, but the culprit of the mysterious dark side is *four times* as distant: Saturn's remote, captured moon, the dark, heavily cratered Phoebe!

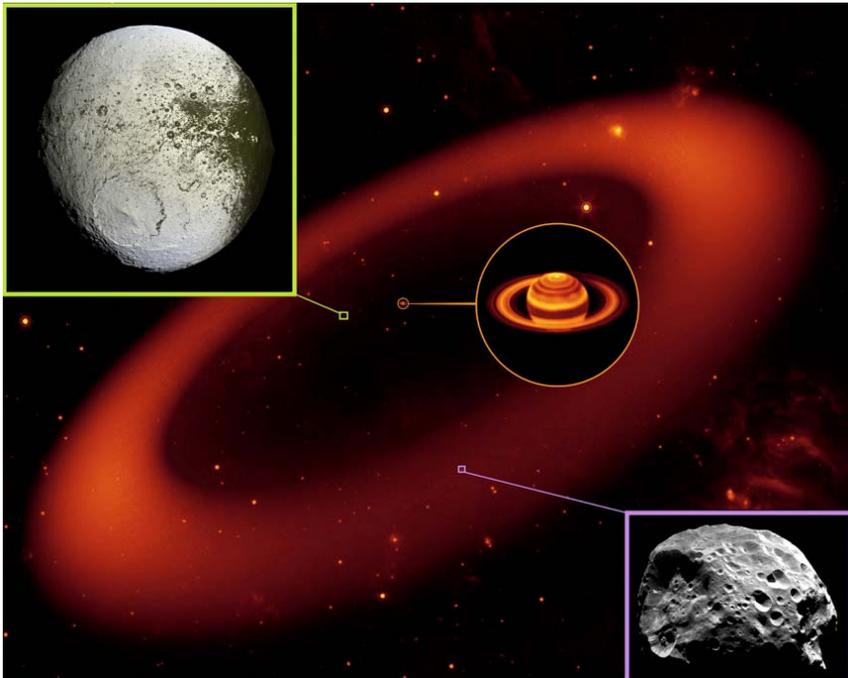
Orbiting Saturn in retrograde, or the opposite direction to Saturn's rotation and most of its other Moons, Phoebe most probably originated in the Kuiper Belt, migrating inwards and eventually succumbing to gravitational capture. Due to its orbit, Phoebe is constantly bombarded by micrometeoroid-sized (and larger) objects, responsible for not only its dented and cavity-riddled surface, but also for a huge, diffuse ring of dust grains spanning *quadrillions* of cubic kilometers! The presence of the "Phoebe Ring" was only discovered in 2009, by NASA's infrared-sensitive Spitzer Space Telescope. As the Phoebe Ring's dust grains absorb and re-emit solar radiation, they spiral inwards towards Saturn, where they smash into Iapetus—orbiting in the opposite direction—like bugs on a highway windshield. Was the dark, leading edge of Iapetus due to it being plastered with material from Phoebe? Did those impacts erode

the bright surface layer away, revealing a darker substrate?

In reality, the dark particles picked up by Iapetus aren't enough to explain the incredible brightness differences alone, but they absorb and retain *just enough* extra heat from the Sun during Iapetus' day to sublimate the ice around it, which resolidifies preferentially on the trailing side, lightening it even further. So it's not just a thin, dark layer from an alien moon that turns Iapetus dark; it's the fact that surface ice sublimates and can no longer reform atop the leading side that darkens it so severely over time. And that story—only confirmed by observations in the last few years—is the reason for the one-of-a-kind appearance of Saturn's incredible two-toned moon, Iapetus!

Learn more about Iapetus here: <http://saturn.jpl.nasa.gov/science/moons/iapetus>.

Kids can learn more about Saturn's rings at NASA's Space Place: <http://spaceplace.nasa.gov/saturn-rings>.



Images credit: Saturn & the Phoebe Ring (middle) - NASA / JPL-Caltech / Keck; Iapetus (top left) - NASA / JPL / Space Science Institute / Cassini Imaging Team; Phoebe (bottom right) - NASA / ESA / JPL / Space Science Institute / Cassini Imaging Team.

Biltmore Prep Feb 21

By Various Attendees

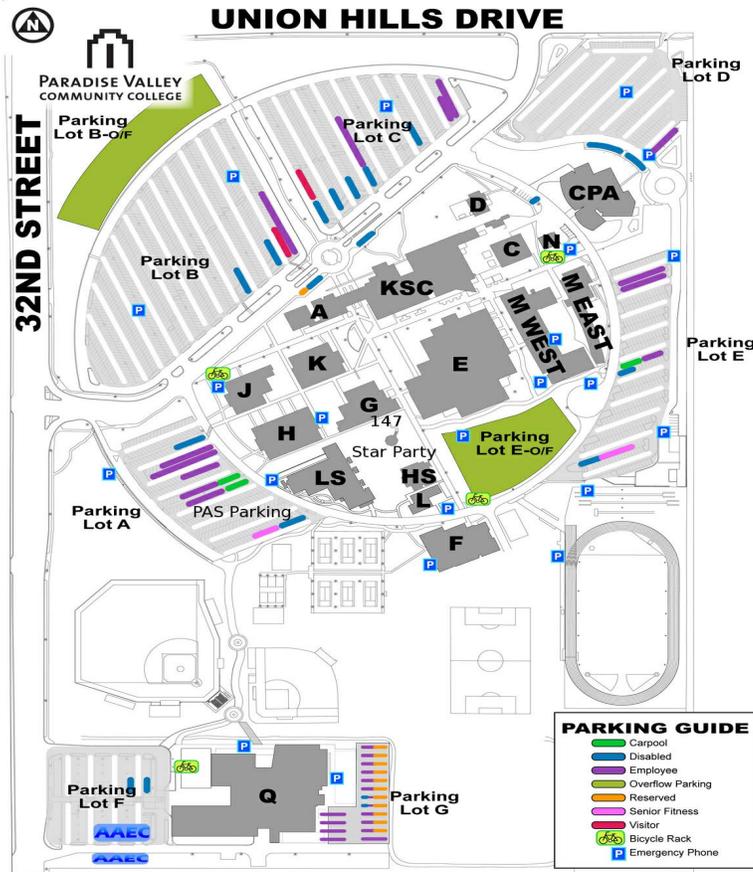
Attending this event from PAS was: Rick Cunningham, Earl DeLong, Eric Steinberg, Sam Insana, and Mike Marron. Our contact at this event was Thula Ngwenyama.

Thula writes: Dear Terri, Thank you so much for setting up an amazing Star Party for Biltmore Prep. We had an amazing time - had roughly 100 people attend - and everyone thoroughly enjoyed it. We want to make it an annual event! Mike was wonderful and a big hit, and Sam was a pleasure to work with. We look forward to booking something in the winter/spring of the 14-15 school year. All the very best, Thula

Earl writes: Sam, Eric, Rick, Mike and myself enjoyed an evening of urban observing at Biltmore Prep academy on February 21, 2014. The staff was very attentive to our needs as we set up on the basketball court. The crowd was interested and well behaved. We enjoyed views of Jupiter, the Orion nebula, double stars, open clusters and a supernova remnant. This was my first visit to this area of town and I would return if asked. ***

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

March 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3 Estrella Observatory (Private)	4	5	6 PAS Meeting/ Estrella Observatory (Private)	7 (Private) School Star Party/ Estrella Observatory (Private)	8 Sidewalk Astro Event/ Estrella Observatory (Private)/ (Private) Scout Star Party
9	10	11	12 (Private) School Star Party	13 (Private) Corporate Star Party	14 (Private) School Star Party	15
16 Telescope Workshop	17 St. Patrick's Day	18	19 (Private) CTCA	20 BMC Star Party	21 Estrella Observatory (Private)	22 (Private) Members Star Party
23	24	25	26 Back up to Mar 17	27	28 Estrella Observatory (Private)	29 Messier Marathon
30 Estrella Observatory (Private)	31					

Don Boyd
 PASTimes Editor
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To:

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.

Apr 3: Speaker: Eric Steinberg: Sky, Time and Weather: Resources to Fine-Tune your Sky Watching”

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

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

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What's Up For March

By Rod Sutter, PAS Past President

Name	Date	Rise	Set
Mercury	03-15-14	05:29	16:22
Venus	03-15-14	04:17	14:57
Mars	03-15-14	20:52	08:20
Jupiter	03-15-14	12:32	02:51
Saturn	03-15-14	23:00	09:39
Uranus	03-15-14	07:26	19:50
Neptune	03-15-14	05:51	17:01
Pluto	03-15-14	02:46	12:59

All Times Arizona Time

March 15 2014

Sunrise: 0:38

Sunset: 18:36



New: March 01



Q1: March 08



Full: March 16



Q3: March 23