

# PAStimes

Phoenix Astronomical Society  
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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

## Jerry Snow to Speak In Library For February Meeting

By Terri, Approved by Dave  
PAS has been offered another chance in the PVCC Library for the main PAS Meetings. To do this, though, we must remember we are in a library and we need to keep our voices low the whole time we are there. Should we get another complaint about being too loud for the students, we will not be able to return to the library. Some of you voiced your opinion on how you like the library better than G-147 for the main PAS meeting. Well, it will be up to you to keep the voices minimized so that we do not disturb the other students in the library who might be studying. I appreciate Dave's hard work at getting this approved. And I appreciate all who attend and keep the noise level to a minimum. We want to stay in the library!  
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The following was provided by this month's speaker Jerry Snow.

### Pecked Stone And Sun Daggers-Stone Windows and Moon Beans

In this presentation I will look at two ways prehistoric people kept a calendar at two sites in the Flagstaff area. One site, Wukoki at Wupatki National Monument, used constructed architecture to mark cul-

turally significant times in the calendar. The other, Chavez Pass on the Coconino National Forest, used light-shadow projections on a petroglyph panel to mark culturally significant times. Both sites have a clear view of the sun and moon rising positions over seasonal cycles. Jerry grew up in Portland, OR., graduating from Portland Union Academy, Walla Walla College, and Oregon State University. He taught college for 10 years at Loma Linda University and Andrews University, in the areas of Biology and Ecology. He taught 15 years part-time for Chapman College in the above subjects and Environment Health. While teaching part-time he worked for the Monterey County Water Resources Agency in California.

He moved to Flagstaff with his wife, Juana, over a decade ago and has worked part-time for the US Forest Service, Rocky Mountain Research Laboratory in the area of Entomology. His hobbies include, model railroading, southwest history and archeoastronomy. He was a presenter at the 7th Oxford International Archeoastronomy Conference in 2004, for the American Rock Art Research Association Annual Conference in 2006, for the Joint Arizona/New

Mexico History Convention in 2007, for the Pecos Conference in 2008 and for the Conference on Archaeoastronomy of the American Southwest in 2009

Jerry Snow has been a Docent with the Museum of Northern Arizona (MNA) since 1994, specializing in Navajo Indian history and culture, Hopi Indian history and culture, and in archeology. He has curated and assisted with several exhibits at the Museum, including "Dwellers of the Four Worlds" (Hopi and Zuni kachina dolls), "Tolchaco" (Navajo, Hopi and Anglo life in the Arizona Territory), and "Stories on Stone" (Rock Art of the Colorado Plateau). He has been a tour guide to the Hopi Reservation for MNA. He has also been a tour guide to abandoned trading posts on the Navajo Reservation for MNA, for the Pecos Conference, Navajo Studies Conference and Arizona Site Steward Conference. He lectures in the Southwest on the Navajo Code Talkers of WW II. He is also an instructor/guide to the Grand Canyon, Chaco Canyon, Zuni Indian Pueblo, Mesa Verde and Canyon de Chelly for the Northern Arizona University Elderhostel Program.

## January PAS Meeting 2010

By Terri, Event Coordinator

Notes taken during meeting

See photos from this meeting in the PAS Photo Gallery

We opened the meeting with 4 new people in the audience. Many thanks goes out to Bob Senzer, who did a fantastic job

signing everyone in. Thank you Bob. Thanks to Sam for bringing the popcorn. The Wursts' brought the water & some cookies. Don brought some extra copies of the newsletter for those who can not download it from the internet. Many, many thanks to Chris for getting Dennis connect-



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## 2010 PAS Social In Review

By Terri, Event Coordinator

We arrived at the PAS Social!!! It was awesome. Many thanks goes to Sam, Ed & Rod for bringing tables & chairs. The photos for this event can be found in the PAS Photo Gallery on our website under the date of Jan 9, 2010. Feel free to enjoy all 180 photos. As soon as I figure out how to do it, there will also be videos of the event for your enjoyment, too. 2.2 gig of photos & videos were taken at this year's event.

Snacks were available, brought by many of the attendees. People were snacking before dinner. Dinner was scheduled for 5pm to allow those who couldn't get there earlier, to be able to enjoy some dinner, rather than have nothing to eat when they arrived. I heard from everyone, "Can we start eating now?" & I had to say "NO, not everyone is here yet, & the schedule says dinner begins at 5pm." So, we struggled, with snacks of popcorn, veggie tray, & a few other things until 5pm came, & it was a mad rush to get food. You'd think the whole room hadn't eaten in 5 years!!!

We ate dinner & watched the movie "UP" which is very cute. It was worth seeing it a second time. While people were eating, I was going around passing out the special raffle tickets for all the different projects we were doing that night. The Purple ticket was for the main PAS Door Prize, usually donated by Jerry. The Blue ticket was for the PAS White Dwarf Gift Exchange. If you brought a gift, you could swap it for a ticket, so you could then play the game. No gift, no playing the game with us. & the Orange ticket was a special ticket for within the White Dwarf Game & it was called "Are you a Player or a Watcher?" You had to attend the Social to find out what that ticket was for.

There were 26 in attendance. Chris's family & 3 others were guests. One PAS member RSVP'd & didn't make it through Chris's gate.

Here is the line up of food brought to this event & enjoyed by all: Chicken wings, Baked apples, Pizza, Salad, Veggie tray, Popcorn, Tuna Pasta Salad, Fruit Salad, Sloppy Joes, Desserts & a bunch more really delicious items. For drinks we had: Ginger Ale, diet soda, root beer, Pepsi, bottled water & Chris treated us through dinner with awesome smoothies in his new BLEND TEC. I have one of those blenders... it is the best!

The extra guests that attended: 3 of them were brought by Mike. He had Lynn & her two daughters attend, Elina & Sarah. They had attended the previous year & had a good time, so he brought them again. Last year, though, Elina wasn't feeling good & missed out on all the fun. This year, she & Sarah were very actively involved in the Dart Game. The other guests were Chris's family: His wife Tiffany, Daughter Katie & one Son, Jacob. The other son didn't show up until after the Dart game, Nathan. Our newest member Joe Collins attended with his wife Renee & their Daughter Kat. Very nice family.

PAS Members who attended were: Ed, Bette, Bruce Wurst, Terri Finch (William stayed home sick this year), Jerry Belcher, Don Boyd, Kevin Harvey, Frank Insana, Sam & Frank Insana, Mike Marron, Bob Senzer, Rod & Sue Sutter, & Greg Torda. Many thanks goes to all who participated in the games, enjoyed the evening & were good sports about the whole event.

After dinner, the Dart Game commenced. We had 3 Dart boards set up in Chris's backyard. The idea was you start at the dart board on the left, threw your three darts, then moved to the board in the middle, did the same 3 darts, then moved to the board on the right, & did the same three darts. As you moved up in numbers, you posted your success on the white board. Many photos of the white board, with the competition being logged as it progressed,

are seen in the photos I took that night. Bruce & Frank were neck & neck in the game. When it was all over, & the last round was called, Bruce took first place with a score of 20. Following close behind was Frank with 19 & Greg with 19. We awarded prizes for 1st & 2nd place this year... Many thanks goes to those who donated door prizes for this purpose. Jacob, Chris's son, with the help of Ed, took 4th place with a score of 15. Congratulations to everyone who participated. I had great hopes of being the winner this year, & really did better than any year previous, but didn't make it. The competition was stiff & FUN!!!

Then we moved on to the White Dwarf Gift Exchange game. This is the game we all get to laugh so hard it hurts!!! We made a circle, with some difficulty from some of the people who some how don't know what a circle looks like, but we got it rounded out. Then we began the FUN!!

Here are the rules of the game: Bring a wrapped, disguised gift per person playing, trade gift for ticket to play the game. Tickets are drawn, one by one, giving one person at a time a chance to take a gift from the table or steal a gift from another player. Rule 1: You can not steal from someone who has just stolen from you. Rule 2: Do not open your gift until everyone playing the game has a gift & the started ticket is drawn & it is your turn to open your gift & show its contents.

Some prizes that were won this year: Planetarium projector, astronomy books (really nice ones), eyepiece filters, astronomy calendars, tickets to the Botanical Gardens & AZ Science Center, Flashlight with Red, Flying saucer, Star Trek Enterprise, 2 Telescopes, A lawn ornament, a big storage box (I was willing to purchase off of Lynn but she wasn't willing to sell), & many more exciting items. Special thanks goes to everyone who got the idea to be creative

# 2010 PAS Social In Review

with their gifts this year. Last year, Chris did a box inside a box gift. Awesome idea. This year, a small gift was one of the best prizes, as well as a few of the larger prizes were disguised really well, & then there were the mystery prizes. You picked a prize, it felt like nothing in it, & turned out to be something you had to go get from another room, hidden from view. Awesome ideas!!! I really appreciate thought put into this year's gift exchange. & the weird gift of the night was the one brought by Joe. He had disguised it to look like the secondary mirror of a telescope. It was packed in a round cloths hamper, with the idea that you'd think it was a telescope, & then it was labeled "glass" which helped with the disguise. Awesome. Thank you, Joe!!! Very creative. Other people to thank are Bruce, for a well done Telescope hidden in a box, & Chris, with the worlds smallest gift which was really a note saying to pick up your gift from Chris, & everyone else who made this event very, very exciting & fun this year!!! Thank you all!!!

After the group had their fun with the game, we then awarded prizes. We always award one Door Prize for attending the Social. If you attend, you get a ticket for attendance with the chance to be the first to pick from the door prizes available. Frank won the main Door Prizes. First place trophy for the Darts, awarded by Jerry, was given to Bruce!!!! Congratulations BRUCE!!! 2nd & 3rd place were awarded to Frank & Greg. The way we do the awards is we collect all the Donated Door Prizes on a table. Then award the most important item first, because the one who gets the award picks their wrapped gift/award. So, Bruce got the trophy, it wasn't wrapped. Greg & Frank randomly chose from the table of donated door prizes. Then we did some other door prizes, until we ran out of donated items.

The evening wound down with clean up & Chris put on the movie "400 years in Astronomy." As the movie played, many members packed up & left. Only a few stayed

to watch the whole movie. It was an awesome evening, with fun, laughter, competition, & YOU DON'T WANT TO MISS NEXT YEAR'S EVENT!!! Many, 100,000 thanks goes to Chris & Tiffany for hosting the party. It was a great success & one that will be remembered for a long, long time!!! I also want to thank everyone who helped

setup: Ed, Bob, Bruce, Don, & everyone who helped clean up. We missed a few PAS members this year, that attended in previous years, & hope to see them at future PAS events. \*\*\*





## Ads in PAStimes

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

# Lots Of Astro Equipment For Sale In Scottsdale

## 1. Orion XT10 Intelliscope-Autographed.

Excellent condition. Autographed by David Levy. Have shipping box for OTA but not

for rocker box. As a result I prefer pickup but will consider shipping. Also includes Telrad finder in place of 9x50, computer, computer holster, telescope manual, com-

puter manual, 20mm Orion Expanse eyepiece, Starry Night software. Located in Scottsdale, AZ 85255 \$495 obo. Cash, Paypal + 1.5%, plus shipping costs if shipped.



## MEADE LXD 55 OTA COLLECTION- 10" SN UHTC, 6" SN, 6" AR6 REFRACTOR

2. I bought the 10" new and never used it as I felt it was too heavy for the LXD 55 mount. Still have the original shipping con-

tainer. As new except for some dust. Stored inside house. The OTA includes UHTC, original finder, 2" eyepiece extender, 1 1/4" adapter, rings and dovetail. \$500 obo

3. The 6" SN is in excellent condition with 2" focuser with 1 1/4" adapter. Used little. Includes rings and original finder but no dovetail. \$275 obo

4. 6" AR6 Refractor. In very good to excellent condition. Purchased with some en-

hancements from WarpsCorp(David Sherfly). See Warpscorp at Yahoo Groups. However I don't remember what the enhancements were! Very nice scope. Includes cage, dovetail, Warps finder with quick release base, standard base on OTA, 2" focuser with 1 1/4" adapter, and standard finder base mounted on the cage. \$425 obo



5. I have a number of other astro items for sale that are unpriced at this point such as SBIG STV with efinder, Meade Deep Sky Imager, Meade Deep Sky Imager Pro, Meade CCD Color Filter Set, CG5-AT mount complete, LXDS55 mount complete which includes uninstalled Hypertune kit

and Warps Drive Conversion Belts-all like new & unused. Have an orange tube C8, 110 v, tripod, wedge with upgrades, storage trunk-all in fair condition; C5++, 9v, JMI Decoders, padded case-all in v.g. condition. I am the original owner of all the items in this group.

Reason for having to part with this equipment is age and I am selling the Scottsdale house(hopefully). Any reasonable offers considered.

Call John at 480-419-8054 or email with questions [jhflyn@gmail.com](mailto:jhflyn@gmail.com).

# Upcoming February PAS Events

By Terri, Event Coordinator

**Feb 4:** PAS Meeting 7pm to 9:30pm - Location: G-147 (In Library).

**Feb 6:** Virtual Star Party at Chris's in Goodyear 7:30pm - ? - PAS Members ONLY RSVP with Chris.

**Feb 11:** Telescope Training Workshop at PVCC 7pm to 10pm, RSVP Required

with Terri.

**Feb 13:** Cuttin' Edge Observatory Star Party - PAS Members Only. RSVP with Chris.

**Feb 17:** Chapparral HS Star Party 7p, - 9pm - PAS Members Only - Volunteers needed. RSVP with Rod.

**Feb 18:** Gavilan Peak Star Party 6:30pm - 8pm - PAS Members Only - Volunteers needed. RSVP with Terri.

**Feb 20:** Wigwam Whole School Star Party 4pm - 10pm - PAS Members Only - Volunteers needed. RSVP with Terri.

**Feb 25:** Meeting of the Minds 7pm - 10pm. \*\*\*

# January PAS Meeting 2010 Review

Continued from page 1

ed to the internet using his own cellular device.

We did a few brief announcements. Jerry showed off the 1st place trophy for the Dart Game happening at the PAS Social Jan 9th.

Then Dave showed up later on & helped hook Dennis up to the internet. Dennis Young was our guest speaker & did a fantastic job!!! He talked about the internet

& how much it is expanding in the field of information that can be found on line about astronomy. The energy levels Dennis shares with the audience is extremely exciting!

We watched the video Dennis brought. Navajo / NASA video. Dennis brought many fun toys to enjoy & look at. Cool historical video. Info Dennis shared with us after the video. US Naval Obs does one day a year, observe through 61" during the

Flagstaff Festival of Science. Then the talk turned towards putting people in space. For a mere \$98,000 you can go in space with the ticket Dennis had in his hand. 300 tickets have been sold. 2nd video... [www.virgingalactic.com](http://www.virgingalactic.com). Join a game show & win a ticket to space. Meteor over Utah & another over Africa. World Wide Telescope. Talked about Stellarium. Many more websites. Very informative. Many thanks goes to Dennis for a very good presentation. \*\*\*

# PAS Name Badge Orders

By Terri, Event Coordinator and Name Badge Gopher

Deadline to order is Feb 4th at PAS Meeting. New PAS Members, PAS offers its members the opportunity to get a PAS Name Badge. Belonging to a club is good, but to have a name badge really shows your support. The name badge is not mandatory, but most PAS members really appreciate having one. Once you do have one, it would be awesome to see you wear it at all PAS events. If you are part of the PAStimes Star Tours (those PAS members who get paid to

show the night sky to the public), then you are required to have a PAS name badge so that you match the rest of the TEAM when doing these type of star parties. But the average, non Star Tour PAS member, is not required to have a name badge. To get your name badge, should you need or wish to have one, jump to this link: <http://www.pasaz.org/forums/downloads.php?do=file&id=17> And order one using the dues sheet. Your order goes to Mike, and then he will let me know you have ordered one. I am putting an order in right after the

Feb PAS meeting. I have one order so far and would like to have a few more before making the trip to order and pick up the name badges. Get your order in by the Feb PAS meeting, and then once they are created, I will bring them to every meeting afterward until you pick them up. Thank you for your orders. Those of you who have ordered and not received, please note, every PAS meeting and MOM's, I bring them with me. If you can't attend those meetings, call or email me to set up pickup or delivery. \*\*\*

# Updated PAS Files

By Terri, Event Coordinator

The beginning of the year is always a busy time for the Event Coordinator... hey! That's me! Well, what I have done is update our public files so that they list within them the upcoming events by topic. If you didn't already get an email about these updated files, with the links attached, and I think I sent a total of 4 emails about it, and you are a current PAS member, you might want to drop me an email at [Events@pasaz.org](mailto:Events@pasaz.org) and let me know. I sent them out the week of Jan 11th, and continued into the beginning of the week of Jan 18th.

What these files have.... There are different events we do. I broke down the files by event. There is a file for all the 2010 Virtual Star Parties, & another file for PVCC events, a file for Telescope Training Workshops, and CEO star parties, and star parties at Schools and star parties for the Scouts, and some more files. These files are dynamic, meaning they change as the information changes. So, when the January events go by, and I'm looking at Jan 2011, I will update the files, if it is time to do so. So, you want to have access to them and

make a link to them, so you can get the info needed anytime.... and if you didn't get those initial emails, drop me an email today and let's get those links to you. I'm hoping that those of you who haven't heard anything from me in email, and are PAS members currently, will update your email address with me, if you didn't get these files. I have a couple PAS members whose email doesn't work. If you are one of them, email me today to get these files and keep in the loop as to when events are added or canceled. \*\*\*



## Building a Case Against Ozone

by Patrick Barry

When it comes to notorious greenhouse gases, carbon dioxide is like Al Capone—always in the headlines. Meanwhile, ozone is more like Carlo Gambino—not as famous or as powerful, but still a big player.

After tracking this lesser-known climate culprit for years, NASA's Tropospheric Emission Spectrometer (TES) has found that ozone is indeed a shifty character. Data from TES show that the amount of ozone—and thus its contribution to the greenhouse effect—varies greatly from place to place and over time.

"Ozone tends to be localized near cities where ozone precursors, such as car exhaust and power plant exhaust, are emitted," says Kevin Bowman, a senior member of the TES technical staff at the Jet Propulsion Laboratory. But the ozone doesn't necessarily stay in one place. Winds can stretch the ozone into long plumes. "Looking out over the ocean we can see ozone being transported long distances over open water."

like CO<sub>2</sub>, ozone is highly reactive. It survives in the atmosphere for only a few hours or a few days before it degrades and effectively disappears. So ozone doesn't have time to spread out evenly in the atmosphere the way that CO<sub>2</sub> does. The amount of ozone in one place depends on where ozone-creating chemicals, such as the nitrogen oxides in car exhaust, are being released and which way the wind blows.

his short lifespan also means that ozone could be easier than CO<sub>2</sub> to knock off.

"If you reduce emissions of things that generate ozone, then you can have a quicker climate effect than you would with CO<sub>2</sub>," Bowman says. "From a policy standpoint, there's been a lot of conversation lately about regulating short-lived species like ozone."

To be clear, Bowman isn't talking about the famous "ozone layer." Ozone in this high-altitude layer shields us from harmful ultraviolet light, so protecting that layer is crucial. Bowman is talking about ozone closer to the ground, so-called tropo-

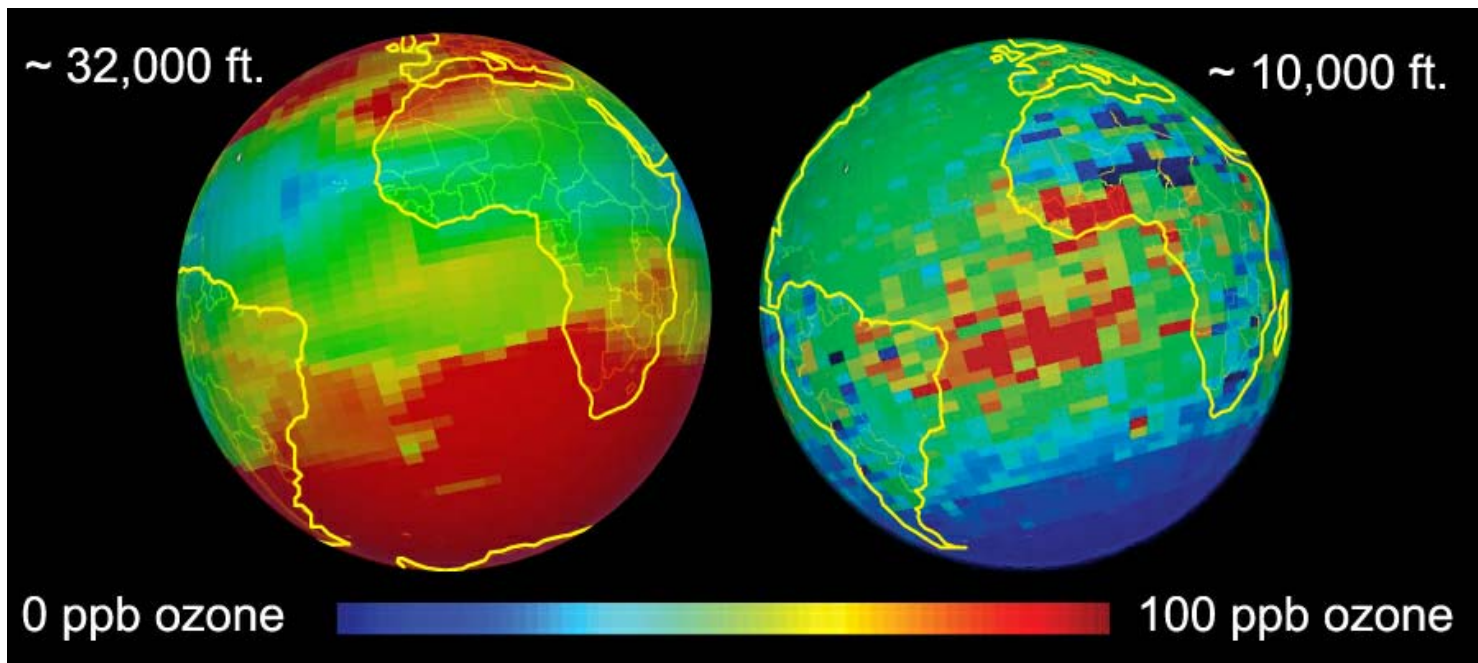
spheric ozone. This "other" ozone at lower altitudes poses health risks for people and acts as a potent greenhouse gas.

TES is helping scientists track the creation and movement of low-altitude ozone over the whole planet each day. "We can see it clearly in our data," Bowman says. Countries will need this kind of data if they decide to go after the heat-trapping gas.

Ozone has been caught red-handed, and TES is giving authorities the hard evidence they need to prosecute the case.

Learn more about TES and its atmospheric science mission at [tes.jpl.nasa.gov](http://tes.jpl.nasa.gov). The Space Place has a fun "Gummy Greenhouse Gases" activity for kids that will introduce them to the idea of atoms and molecules. Check it out at [spaceplace.nasa.gov/en/kids/tes/gumdrops](http://spaceplace.nasa.gov/en/kids/tes/gumdrops).

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



*These images are TES ozone plots viewed with Google Earth. Colors map to tropospheric ozone concentrations. The image on the left shows ozone concentrations at an altitude of approximately 32,000 feet, while the one on the right shows ozone at approximately 10,000 feet. The measurements are monthly averages over each grid segment for December 2004.*



# Arizona Sky

By Leah Sapir

This month, Taurus and Auriga take center stage. If we follow Orion's belt to the right, we come to the V-shaped head of Taurus, with bright Aldebaran representing the eye of the bull. The rest of the "V" is actually a nearby star-cluster, the Hyades, about 150 light years away. (Aldebaran is a foreground star at about half that distance.) Following the same line a little further – from Orion's belt through the Hyades and onward – we come to the Pleiades, another naked-eye star cluster. The Pleiades appear more compact than the Hyades because they're farther away, about 400 light years. In reality, each cluster is about 15 light years across.

If we follow the two sides of the V outwards, towards the left, for about 4 times the length of the V, we reach two bright stars about 8 degrees apart, and about 20 degrees from the point of the V; these are the bull's horns. The brighter one, Elnath, doubles as part of the constellation Auriga; the fainter one, Zeta Tauri, is a close neighbor of M1, the Crab Nebula – only one degree away in the sky. In 1054, the supernova that later created the Crab Nebula was visible to the naked eye, even in the daytime, for about 3 weeks. But today, all that remains of the supernova is a very-faint expanding nebula with a rapidly-spinning neutron star in the center.

Zeta Tauri and M1 are "neighbors" only from an optical point of view. Actually Zeta is about 400 light years from us – approximately the same distance as the Pleiades – while M1 is 6500 light years away. In a 3-dimensional sense, Zeta is closer to the Pleiades (about 180 light years away, as the space-crow flies) than it is to M1.

Going north from Orion through Zeta Tauri and Elnath, we come to the bright star Capella, "the mother goat", a yellow giant about 45 light years away. Near it in the sky are a triangle of fainter stars nicknamed "the baby goats": Epsilon, Eta, and Zeta Aurigae. Epsilon (also known as Almaaz or Al Anz), the one closest in the sky to

Capella, is a white supergiant about 2000 light years away. Although it seems faint to us, it is actually one of the most luminous stars in the

Milky Way – about 100,000 times as luminous as the sun.

Usually Epsilon shines at 3<sup>rd</sup> magnitude (from our point of view), but right now it is in the middle of one of its periodic eclipses, which occur once every 27 years, and cause it to dim by almost one magnitude. The current eclipse began in August 2009, and will last till spring of 2011.

The regular eclipses show that Epsilon is part of a binary system. But unlike most eclipsing binaries (e.g. Algol in Perseus) where the eclipse might last for a few hours or days, Epsilon's eclipses last for two years. Apparently Epsilon's unseen companion is surrounded by a large dark cloud of dust that takes two years to pass in front of Epsilon. The companion, a small hot B-type star, is estimated to be about 30 astronomic units from Epsilon (about the distance of Neptune from the sun) and the dust cloud around it is thought to be about 8 AU across (slightly smaller than the diameter of Jupiter's orbit). There appears to be a "doughnut hole" in the middle of the dust cloud, because Epsilon becomes a little less dim in the middle of its eclipse.

Recent infrared data from the Spitzer Space Telescope indicate that the dusty disk is made of larger particles, like sand or gravel, rather than fine dust. The material was ejected by Epsilon, which is nearing the end of its lifetime, and was gravitationally captured by the companion. Research and observations are still ongoing by AAVSO (American Association of Variable Star Observers) and other "Citizen Science" projects.

Auriga is also home to several other interesting objects. About 2/3 of the way

from Epsilon Aurigae to Elnath (about 10 degrees from Epsilon) is a nice asterism, visible in binoculars, composed of pairs of stars in a curved line. Alan MacRobert of "Sky and Telescope" calls it "the leaping minnow". The stars of the minnow are 5<sup>th</sup> and 6<sup>th</sup> magnitude, and include the stars 16-19 Aurigae. Although they seem similar to us in brightness, the stars actually vary greatly in size and distance, from 200 light years for 16 and 18 Aurigae, to 3000 light years for 19 Aurigae.

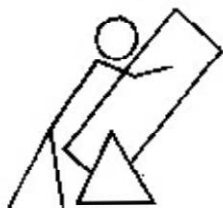
A little to the left of the "minnow" is open cluster NGC 1893, visible in binoculars or a small telescope, which happens to be at the center of a lovely emissions nebula, IC 410. The nebula is more visible in photographs than to the eye. Detailed photos such as this APOD picture <http://tinyurl.com/y8twdsz> show tadpole-like shapes at the edge of the nebula. The "tadpoles" are clouds of dust, lit up by the



The three "baby goats": Epsilon Aurigae at the top, Eta Aur and Zeta Aur at the bottom. "Mama goat" Capella is just outside the



Nebulae in Auriga: AE Aurigae and IC 405 ("Flaming Star" nebula) at center, with the "Leaping Minnow" and IC 410 at its left. Open cluster M38 is visible at the top left.



# Arizona Sky

stars of the cluster, and are potential sites of star formation. The tadpoles' long dust tails, about 10 light years long, stretch away from the center of the cluster. Apparently they are being blown in that direction by radiation from the cluster's bright young stars. NGC 1893 and IC 410 are about 4 million years old, and about 12,000 light years away.

To the right of the "minnow" is another interesting nebula, IC 405, also known as the "Flaming Star" nebula. The star lighting up the nebula is AE Aurigae, a "runaway star" that was expelled by the shock wave of a supernova in Orion's belt about 3 million years ago. It has been moving since then at 80 miles per second, i.e. about 280,000 mph. (For comparison – the speed of the space shuttle is 17,000 mph; and the earth's speed around the sun is about 67,000 mph.)

AE Aurigae just happens to be passing through a dusty area, lighting it up as an emissions nebula; after around 20,000 years it will pass on, and the nebula will be dark again.

Meanwhile, back in the solar system, Mars is still putting on a good show. Now at opposition, the closest point of its orbit, Mars is about 14 arc seconds in diameter and 60 million light years away. Catch it while you can, because it will be moving away from us by the end of the month. For our convenience, planets at opposition are up all night.

Saturn is moving towards opposition, and it will be up for most of the night (rising around 10 pm at the beginning of February, and 8 pm towards the end of the month). Mercury will be a morning star, visible before dawn in the first half of the month.

Venus is still close to the sun, but will be visible in the west during evening twilight, particularly towards the end of the month. Jupiter, on the other hand, will be visible after dusk at the beginning of the month, but will be fading into the sunset after midmonth, with Neptune and Uranus following soon after.

Mars will be passing about 3 degrees from the Beehive cluster on February 1-10. On February 2 and 3, Saturn will be near the third-quarter moon after midnight. The first-quarter moon will be near the Pleiades on February 21-22, till about 1 am. And on February 25-26, the full moon, Mars, and the Beehive cluster will form a triangle about 5 degrees on each side.

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

## Intro To Astrophotography

\*March 19 - 21, 2010\*

\*Intro To Astrophotography

<http://www.noao.edu/outreach/kpvc/astrophoto.php>\*

Kitt Peak National Observatory (56 miles southwest of Tucson)

Tucson, Arizona, United States Three-day workshop intended for those who are ready to take the next step into the world of astrophotography and image processing. We will cover everything from the history of photography itself to modern cameras, webcams,

and CCD image processing. Avoid years of false-starts and costly mistakes. Learn how to create stunning astrophotos like those seen in books and magazines. Instruction will cover imaging techniques for a wide range of budgets and equipment.

## Wanted: Guest Speakers

By Terri, Event Coordinator

PAS is currently seeking Guest Speakers to fill in for Mar, Apr and May 2010. Here is the current PAS Speaker Line-up:

<http://www.pasaz.org/forums/downloads.php?do=file&id=8>.

If you know someone who would like to do a presentation for PAS, please send

them my way. Have them drop an email at [Events@pasaz.org](mailto:Events@pasaz.org) or call Terri at 602-561-5398. Your help is appreciated!! \*\*\*

## DYNAMIC PAS DOCUMENTS

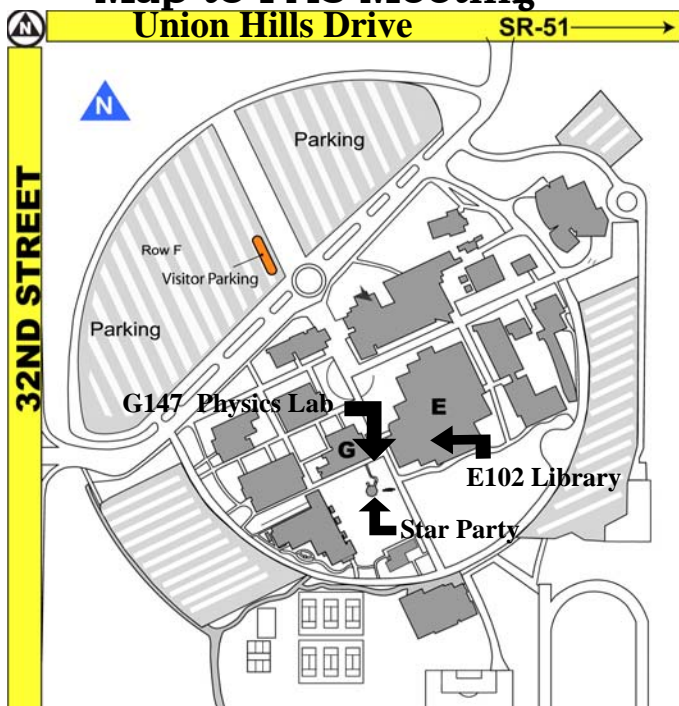
By Terri, Event Coordinator

Ok, so I am the document queen. Yea... I know, I create documents that I think will help PAS members when it comes to upcoming events, and the public... tooo. However, I made a document this month that has all the CHANGING documents listed within it, and links to find them. Why? Mostly for me. I'm tired of having to go to the website to find the link to include in the email or Calendar listing or Forum entry each time I post about something new. So, instead, I made this document: <http://www.pasaz.org/forums/downloads.php?do=file&id=123> to help PAS members find lists they need. It includes ONLY CHANGING documents. Meaning, you

will not find an ad from Kitt Peak, or a map from a Scout group. You will, however, find documents that change as they get updated, such as the PAS UPCOMING EVENTS page, or PAS/PVCC EVENTS page. Those type of documents get updated as new events are added and past events are removed. That is the kind of document you will find within this newly designed DYNAMIC Doc. It is the doc you want to have a copy of on your computer desktop for easy, quick access. As files are updated, the new ones become available, and what's really cool is, the links I provide within this new Doc, do not change!!! That is so awesome and makes it so much easier on me. I

just post the newly updated doc to the original location of the old doc, and you download it when you get a chance, or when you need to know the info from it. Saves paper, time, and is so easy to navigate. This new DYNAMIC Doc is being housed, pinned to the top of the Members ONLY download area. This way, new Members can be introduced to a set of documents that gives them all the upcoming events we have planned, in one place. I can make it accessible to the Public as well. They can't get into PAS Members Only docs without being a member. Hope you enjoy the new doc that is to become the site navigation tool to those Docs you need to know about. Enjoy! \*\*\*\*

# Map to PAS Meeting



# What Can I See Naked Eye?

- February 2: Zodiacal Light in West for next 2 weeks after evening twilight
- February 2: Saturn 8° north of Moon
- February 5: Mars 3° north of Beehive M44 at 1900 hours
- February 8: Anteres 1° north of Moon
- February 25: Mars 5° north of Moon
- February 26: 5° north of Moon

See page 6 for more information

## February

| Sun | Mon | Tue | Wed   | Thu   | Fri | Sat  |
|-----|-----|-----|---|---|-----|--|
|     | 1   | 2   | 3   | 4<br>PAS Meeting 7pm to 9:30pm - Location: G-147 (In Library) | 5   | 6<br>Virtual Star Party at Chris's in Goodyear 7:30pm - ? - PAS Members ONLY |
| 7   | 8   | 9   | 10  | 11<br>Telescope Training Workshop at PVCC                     | 12  | 13<br>Cuttin' Edge Observatory Star Party - PAS Members Only.                |
| 14  | 15  | 16  | 17<br>Chapparral HS Star Party 7p. - 9pm - PAS Members Only | 18<br>Gavilan Peak Star Party 6:30pm - 8pm - PAS Members Only | 19  | 20<br>Wigwam Whole School Star Party 4pm - 10pm - PAS Members Only           |
| 21  | 22  | 23  | 24  | 25<br>MOM   | 26  | 27   |
| 28  |     |     |   |   |     |  |

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

To:

## PAS Speaker Line-up for Winter 2010

By Terri, Event Coordinator

Feb 4, 2010: Jerry Snow: ArcheoAstronomy

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

## What's Up For February?

By Rod Sutter, PAS President

### Planets

| Name    | Date    | Rise  | Set   |
|---------|---------|-------|-------|
| Mercury | 02-1-09 | 06:15 | 16:35 |
| Venus   | 02-1-09 | 07:39 | 18:45 |
| Mars    | 02-1-09 | 16:02 | 06:11 |
| Jupiter | 02-1-09 | 07:42 | 18:53 |
| Saturn  | 02-1-09 | 20:53 | 09:01 |
| Uranus  | 02-1-09 | 08:32 | 20:23 |
| Neptune | 02-1-09 | 07:07 | 18:01 |
| Pluto   | 02-2-09 | 03:44 | 14:12 |

All Times Arizona Time

Feb 15 2009

**Sunrise: 07:17**

**Sunset: 18:10**



**Full: January 30**



**Q3: February 6**



**New: February 14**



**Q1: February 22**