Smoky Mountain Astronomical Society

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S.C.R.A.P.S.

Society's **C**h**R**onological **A**stronomical **P**aper**S**

Dec. 8th Holiday Banquet

Gondolier Restaurant
130 West End Ave., Farragut
7:00 pm Gathering, 7:30 Dinner

From the President - Lee Erickson

Holiday Greetings!

As usual, we have no monthly meeting in December. Instead we have the **SMAS Holiday Banquet**.
Again the banquet will be at the Gondolier in Farragut.
Like our meetings, we gather at 7:00 or a bit later and plan on placing our food order at 7:30 PM.
Folks attending last year's banquet will know where to go, and for the rest of you here are the directions:

Gondolier Restaurant
130 West End Ave., Farragut
From Kingston Pike, turn north on West End Avenue. Gondolier is 1/2 block on the right.
(Note: West End Ave. and Concord Road are the same road. It just changes its name at Kingston Pike. West End Ave. is also the entrance road for Farragut High School.)
Please don't confuse this Gondolier with another Gondolier on Cedar Bluff road, fairly close nearby.
If you get lost call in to Gondolier at 865-966-5221.

Visit the Gondolier menu web site at:
http://www.knoxmenus.com/ Then navigate the selection in the upper left to Italian Restaurant and scroll down to Gondolier Farragut.
The direct link is messy but here goes:
http://www.knoxmenus.com/menu.asp?m=133&n=0&d=1&q=Gondolier%20Italian%20Restaurant%20and%20Pizza%20-%20Farragut

SMAS members, spouses, family and acquaintances are all welcome.
The room has seating for quite a few more than we had last year, so anyone interested should be invited.
Unfortunately, Santa is NOT picking up the tab again this year!

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In other news Pete Bush has asked that we find a replacement editor for our newsletter, SCRAPS. Pete has shouldered this task for about three years now, and I thank him for his contribution. I ask that all other members thank Pete too.

The SCRAPS newsletter editor's position requires a person to assemble the content which comes regularly and irregularly from SMAS officers, SMAS members and some outside sources. As a voluntary position, the newsletter editor is given wide discretion for the form, content, and frequency of the publication. There are a few persons receiving SCRAPS by regular post, but most members are receiving SCRAPS by email. I would like to ask any person interested in assuming the newsletter editor's responsibilities to contact me or any other SMAS officers, Mike Littleton the Vice President, Bill Dittus the Secretary or Scott Byers the Treasurer. My phone number is 865-977-1242.

The Holiday's correspond roughly to the winter solstice. The winter solstice is where the apparent motion of the sun through the sky begins to return northward, or higher for us in the northern hemisphere. Ancient peoples used geometric methods to track the solstice and to accurately measure the length of the year. Important to such methods is to have some flat ground and a very tall object casting a shadow which can be accurately and durably marked. I have read speculation that tall mounds in Europe may have been toped by now lost poles to cast such shadows. Perhaps the Egyptian pyramids served a similar function, if only secondary to their function as a funeral monument to the Pharaoh.

Here is how I think it works:

If you mark on the ground the spot of the shadow for the tip of the pole throughout a day and find the place it is nearest to the base, you can extend a line from the base to that point to find exactly the true north/south line. You can find this line on any day, not just the solstice days. If on that line you mark the location where the shadow crosses the north/south line throughout the year, you can find the longest and shortest shadows of the year. The dates of these events correspond to the solstices. It is by such methods that calendars were built in antiquity.

Calendars were important for humans once they began to depend on agriculture to feed larger populations than could be supported by hunting and gathering lifestyles. The appearance in the sky of certain stars at a particular time of day, such as dawn, were also used to roughly gauge the seasons. Agriculture began in the Middle East, and there the accent Sumerians (aka Babylonians) recorded both these kinds of events.

After the passage of some time, and with the Sumerian records Hipparchus, the Greek astronomer of the 2nd century, discovered that the relation of the appearance of stars and the seasons had shifted. We refer to this phenomena as the precession of the equinox. Hipparchus was the first person to understand this and to calculate that it would take about 26,000 years for the stars to make a full circle through the seasons. 360 degrees in 26,000 years works out to just about 0.0138 degrees per year. Over a human life span of 70 years this totals to just about 1 degree. Not enough for a typical individual to casually notice.

We may not notice that the stars have shifted by 0.0138 degrees since last year, but after the 21st of December the noon-day shadows will again begin to lengthen, telling us of the eventual return of warmer weather.

Minutes from SMAS general meeting 11/10/06

Right Side, Front to Back: Bob Arr, Janice Erickson, Dennis Hutcheson & Cassie Morgan, Michael McCulloch, Joe Baldwin

Attending members were: Lee Erickson, Scott Byers, Bob Arr, David Fields, Tim Hunt, Joe Baldwin, Brent Holt, Michael McCulloch, Bill Dittus, and new members Kenny & Shelia Pridgen

Attending were Visitors: Dennis Hutcheson and Cassie Morgan.

Members and guests began arriving at the usual location, room 223 Alexander Building, PSTCC, beginning about 7:00 pm and the meeting was called to order by our president Lee Erickson.

First order of business: Lee brought a motion to accept the date of Dec. 8th for our annual SMAS holiday banquet to be held at Farragut Gondolier Restaurant. The motion passed with everyone attending saying they enjoyed the gathering and food last year.

Announcements:
November 18th at Tamke-Allen Observatory
December 16th at Tamke-Allen Observatory
Please Note: ALL scheduled Star Parties are subject to local weather conditions.

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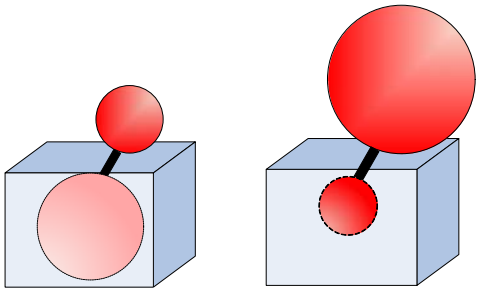
Bob Arr made a presentation on Variable Stars

Definition:
Variable stars **are stars that change brightness. The brightness changes of these stars can range from a thousandth of a magnitude to as much as twenty magnitudes over periods of a fraction of a second to years, depending on the type of variable star.**

Bob pointed out there are two basic type of Variable stars:
Intrinsic – Changes brought about by internal processes within the star
Extrinsic- Changes brought about by external forces outside the star

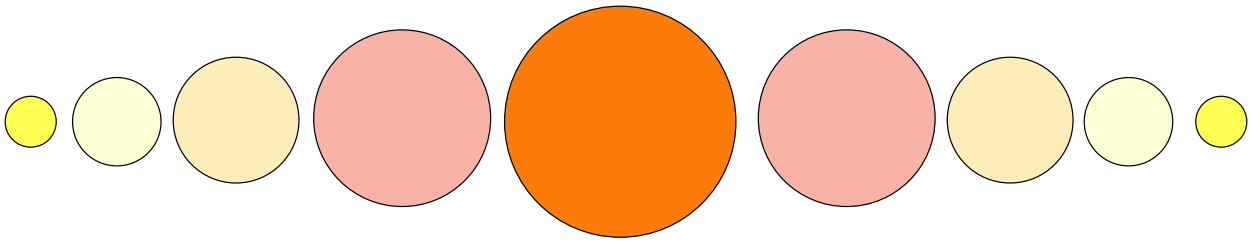
Bob brought a visual aid to demonstrate the different types of variable star: two partially filled balloons, a box, and a piece of tubing. (*Illustration to the right*)



The Balloon outside the box represents the variable star. By squeezing the bottom balloon, (hidden from the audience) he could change the size of the balloon outside the box.

Bob went on to elaborate that one type of variable star known as Cepheid's are used by astronomers to calculate distances.

The diagram below shows the star getting bigger and cooler, then smaller and hotter. Cepheid's are brightest when they are hottest, close to the minimum size. Since all Cepheid's are about the same temperature, the size of a Cepheid determines its luminosity.
A large pulsating object naturally has a longer oscillation period than a small pulsating object of the same type. Thus there is a period-luminosity relationship for Cepheid's.
If we have two Cepheid's with periods that differ by a factor of two, the longer period Cepheid is approximately 2.5 times more luminous than the short period one.



Since it is easy to measure the period of a variable star, Cepheid's are wonderful for determining distances to galaxies.
Furthermore, Cepheids are quite bright, so they can be seen in galaxies as far away as the Virgo Cluster.
Bob also discussed the **Hertzsprung-Russell diagram**. It was created in the period 1911-1913 by Ejnar Hertzsprung and Henry Norris Russell to categorize the size (Magnitude) and temperature (Color) of stars.
In 1913 they determined the distances to several Galactic Cepheid stars by statistical parallax, and were thus able to calibrate the relationship discovered by Henrietta Leavitt between Cepheid period and luminosity.

Many thanks to Bob for a VERY enlightening presentation on variable stars and their properties.

Left Side, Front to Back: Tim Hunt, Kenny & Shelia Pridgen, and Mike Littleton

Martian Devils

by Dr. Tony Phillips

Admit it. Whenever you see a new picture of Mars beamed back by Spirit or Opportunity, you scan the rocks to check for things peeking out of the shadows. A pair of quivering green antennas, perhaps, or a little furry creature crouched on five legs…? Looking for Martians is such a guilty pleasure.

Well, you can imagine the thrill in 2004 when scientists were checking some of those pictures and they *did* see something leap out. It skittered across the rocky floor of Gusev Crater and quickly disappeared. But it wasn't a Martian; Spirit had photographed a dust devil!

Dust devils are tornadoes of dust. On a planet like Mars which is literally covered with dust, and where it never rains, dust devils are an important form of weather. Some Martian dust devils grow almost as tall as Mt. Everest, and researchers suspect they're crackling with static electricity—a form of "Martian lightning."

NASA is keen to learn more. How strong are the winds? Do dust devils carry a charge? When does "devil season" begin—and end? Astronauts are going to want to know the answers before they set foot on the red planet.

The problem is, these dusty twisters can be devilishly difficult to catch. Most images of Martian dust devils have been taken by accident, while the rovers were looking for other things. This catch-as-catch-can approach limits what researchers can learn.

No more! The two rovers have just gotten a boost of artificial intelligence to help them recognize and photograph

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dust devils. It comes in the form of new software, uploaded in July and activated in September 2006.

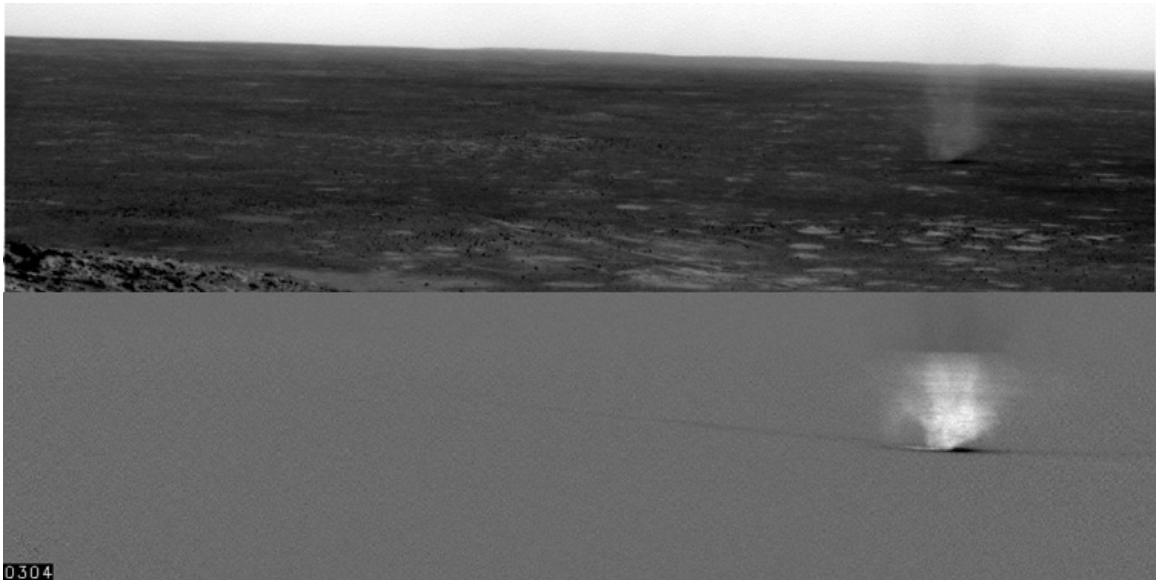
"This software is based on techniques developed and tested as part of the NASA New Millennium Program's Space Technology 6 project. Testing was done in Earth orbit onboard the EO-1 (Earth Observing-1) satellite," says Steve Chien, supervisor of JPL's Artificial Intelligence Group. Scientists using EO-1 data were especially interested in dynamic events such as volcanoes erupting or sea ice breaking apart. So Chien and colleagues programmed the satellite to notice change. It worked beautifully: "We measured a 100-fold increase in science results for transient events."

Now that the techniques have been tested in Earth orbit, they are ready to help Spirit and Opportunity catch dust devils—or anything else that moves—on Mars.

"If we saw Martians, that would be great," laughs Chien. Even scientists have their guilty pleasures.

Find out more about the Space Technology 6 "Autonomous Sciencecraft" technology experiment at nmp.nasa.gov/st6/TECHNOLOGY/sciencecraft_tech.html, and the use of the technology on the Mars Rovers at nmp.nasa.gov/TECHNOLOGY/infusion.html. Kids can visit spaceplace.nasa.gov/en/kids/nmp_action.shtml and do a New Millennium Program-like test at home to see if a familiar material would work well in space

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



The top half of this image is part of a series of images of a passing dust devil on Mars caught by Spirit. In the bottom half, the image has been filtered to remove everything that did not change from one image to the other. Notice the faint track left by the dust devil. Credit NASA/JPL/Mark T. Lemmon, Univ. of Arizona Lunar and Planetary Laboratory.

December 2006

SUN	MON	TUE	WED	THU	FRI	SAT
					1 UTK	2 TAO
3	4	5 *Full Moon*	6	7	8 **SMAS Holiday Banquet 7:00 pm**	9
10	11	12	13 Geminid Meteor Shower	14	15 Hanukkah Begins UTK	16 **SMAS Star Party @ TAO**
17	18	19	20 *New Moon*	21 Winter Solstice	22 Urisid Meteor Shower	23
24	25 Christmas	26	27	28	29	30
31 New Year's Eve	1	2	3	4	5 UTK	6 TAO