

Valley Skies

The Monthly Newsletter of the Stockton Astronomical Society
and the San Joaquin Delta College Clever Planetarium

Volume No. 61

April 2011

Issue No. 4

Stockton Astronomical Society: founded November 1950 by Clarence P. Custer, M.D., 1906-1998
(Meetings of the Stockton Astronomical Society are held on the second Thursday of each month, and are open to the public.)

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General Meeting:

Olson Hall, Room 120, at UOP

Thursday, April 14, 2011 – 7:30 p.m.

Stockton Astronomical Society

presents

"Astro-Jeopardy"

There'll be no Big Blue computer at our April 14 meeting. "Thanks, but no thanks" was the response when we invited "Watson." (Probably decided to quit while it was ahead!)

Just as well. The competition has been tough at our previous runs of Jeff Baldwin's version of the popular TV game show. (This will be the fifth time we've run the program—first one was August 1997.)

This promises to be another fun evening. As either a contestant or part of the "studio" audience, you'll have the chance to test your knowledge of all things astronomical.

It's all in fun, but who knows...maybe Jeff will come up with a few prizes, or surprises...

Come join the fun!

...Dennis LeClert, Program Director

Visit the SAS Web Site at: www.stocktonastro.org

STOCKTON ASTRONOMICAL SOCIETY

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(All numbers are area code 209 except as noted)

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Non-commercial advertising of astronomy-related products or services will be printed free of charge for members, for up to three months if necessary. Submission deadline is the 15th of each month.

Unless identified by a byline or other credit, all text is by the editor and does not necessarily reflect the opinions of the Stockton Astronomical Society.

EDITOR'S CORNER...



The speaker for our March meeting was SAS member Claudio Arena, a 16 year old high school exchange student from Italy, living in Sonora. We had a strong turnout for his talk on photometry. His presentation, with Powerpoint illustrations, was interesting and well received. He demonstrated how amateurs with modest size telescopes can make a significant contribution to the body of knowledge about stars with apparent orbiting bodies, be they binaries or possibly planetary systems.

At a time when we hear reports that a shamefully low percentage of Stockton high school students graduate, and that only a small percentage of graduates meet UC or Cal State admission requirements, it was refreshing to hear a young student offer a competent technical program. It was particularly impressive when you consider that the presentation was in English – not his native language.

Congratulations Claudio! A job well done!

* * *

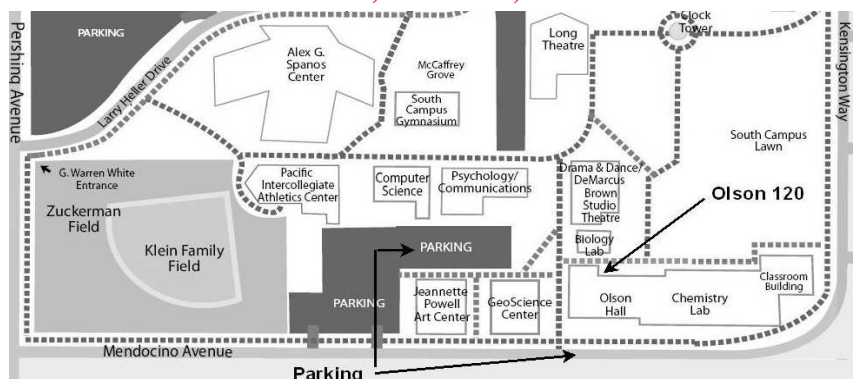
Last month I wrote briefly about the “Striking Sparks” program of the Sonoma County Astronomical Society. Jeff Baldwin has been pushing for ways to bring more young people into the SAS and he is keen to see us establish a similar program here in Stockton.

Program Chair Dennis LeClert is arranging for a speaker from the SCAS to come tell us how the program is set up, how it is coordinated through the schools and how effective it has been in sparking the interest of young recipients in careers in science.

Maybe next month? Stay tuned.

[For more information about the SCAS and “Striking Sparks” go to: http://www.sonomaskies.org/Newsletter/Mar.11_SonomaSkies.pdf]

**SAS Meeting: April 14 (7:30 p.m.):
Olson Hall, Room 120, at UOP**



(April meeting refreshments kindly provided by Darlene Wheeler)

Stars R Us...

SAS Star Party News

April:

New Moon: Sun., Apr. 3, 7:34 a.m. PDT

Saturday, Apr. 2 **Hi-Alt**

Sunset: 7:29 p.m. PDT

Moonrise (Sunday): 6:30 a.m. PDT

Saturday, Apr. 23 **Hwy 4**

Sunset: 7:49 p.m. PDT

Moonrise (Sunday) 1:45 a.m. PDT

Saturday, Apr. 30 **Hi-Alt**

Sunset: 7:55 p.m. PDT

Moonrise (Sunday): 5:01 a.m. PDT

May:

New Moon: Mon., May 2, 11:51 p.m. PDT

Saturday, May 28 **Hi-Alt or Hwy 4**

Sunset: 8:19 p.m. PDT

Moonrise (Sunday) 3:32 a.m. PDT

Check with the SAS Bulletin Board before you head for the hills

The SAS's new bulletin board group is working well to communicate with each other regarding attendance and weather conditions for upcoming star parties. If you would like to join in, go to

<http://tech.groups.yahoo.com/group/stocktonastro/> and join the group. Once you are approved you will have access to participate in the dialog. (The screening feature allows us to limit access to individuals with a legitimate interest.)

So, get on board. See you on the BB...

...Bald

Directions to SAS Star Party Sites

Highway 4/Shirley Road:

Drive 30 miles east on Hwy 4 from Hwy 99. At the sign for Shirley Road/Telegraph Road, turn right off Hwy 4, then **left at the stop sign**. You will be heading east, parallel to Hwy 4. Drive to the setup area at the end of the road.

4000' Heliport on Highway 88:

Drive 21.8 miles east from Jackson on Hwy 88 till you pass the "Elevation 4,000 ft." sign, (0.4 miles past Amador Station). Turn left at the "Emergency Heliport" sign and double back parallel to the road about 400 feet to the helipad. Set up on the north side.

Please park on N side of road only at both the Hwy 4 and 4000 ft. site.

Peddler Hill: Under 15-20 feet of snow!



Golden State Star Party 2011

**Wednesday June 29
through
Sunday, July 3, 2011**

Four nights under California's darkest skies

The Golden State Star Party is a four-night dark sky event held each summer at Frosty Acres Ranch in North-Eastern California, near Mount Lassen, alongside rural Adin, California. GSSP has dark skies from horizon to horizon, and room for 100s of astronomers.



Adult Registration Fees after March 30 - \$70

On Site Registration - \$75

Adult guests at the same rates as above

Kids under 18 are free.

Attendance this year will be capped at 400.

For information and registration go to:

<http://www.goldenstatestarparty.org/home>

(Be sure to read the FAQ page and the message from the Director regarding changes from 2010.)

The Science Directorate at NASA's Marshall Space Flight Center sponsors the Science@NASA web sites. The mission of Science@NASA is to help the public understand how exciting NASA research is and to help NASA scientists fulfill their outreach responsibilities.

Best Jobs In Science: NASA Concept Illustrators Turn Raw Data Into Art

We talked to the Spitzer Space Telescope's visualization team about the challenges and rewards of rendering the mission's reams of non-visual data into something that catches the public eye. Plus: a gallery of their all-time favorite works.

By [Clay Dillow](#) Posted 08.17.2010 at 12:56 pm

Saturn's Largest Ring [Click here for an annotated gallery](#) of Hurt and Pyle's all-time favorite illustrations. NASA/JPL-Caltech/R. Hurt (SSC)

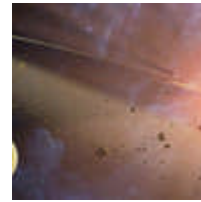
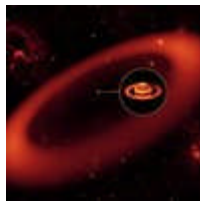
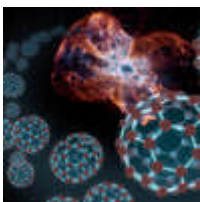
In a shared office on the southern edge of Caltech's campus, Robert Hurt and Tim Pyle are making art out of science. Armed with the industry standards—Photoshop, Illustrator, After Effects—it's their job to break down the Spitzer Space Telescope's complex scientific data into visualizations that are accessible and meaningful to the average viewer. But their artistic challenge is unique: Human eyes have never seen the objects they are creating.

All they have is the spectral data: numbers and line graphs denoting wavelengths of light far outside the visual spectrum. Only a trained spectroscopist could see the larger story it tells. That's where Hurt and Pyle come in.

Spitzer's infrared instruments return reams of data to Earth as the orbiting observatory gathers light from far reaches of the universe, light that is invisible to the naked eye. Imaging instruments capture some visual data that specialized software can cobble together into composite images, but often Spitzer's most interesting discoveries come from regions of space too distant or obscure for the imagers to capture. In those cases, all they have is the spectral data; numbers and line graphs denoting wavelengths of light far outside the visual spectrum. Only a trained spectroscopist could look at that data and see the larger story it tells.

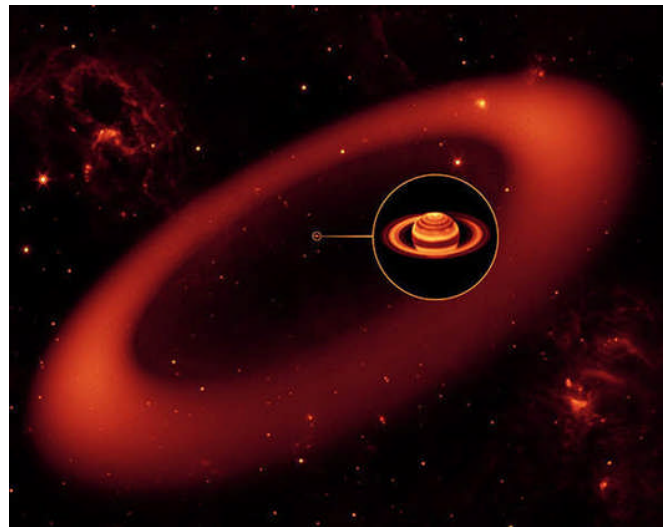
That's where Hurt and Pyle come in. Dr. Hurt is the Spitzer Science Center's visualization scientist. Along with animator and graphic artist Tim Pyle, it's his job to convert the cascading numbers and EKG-like line graphs that are the core of Spitzer science into images and animations that make sense to those of

us who can't see the remnants of a supernovae or a planetary debris ring in the data. Those illustrations and animations end up everywhere from press releases to educational materials to the History Channel.

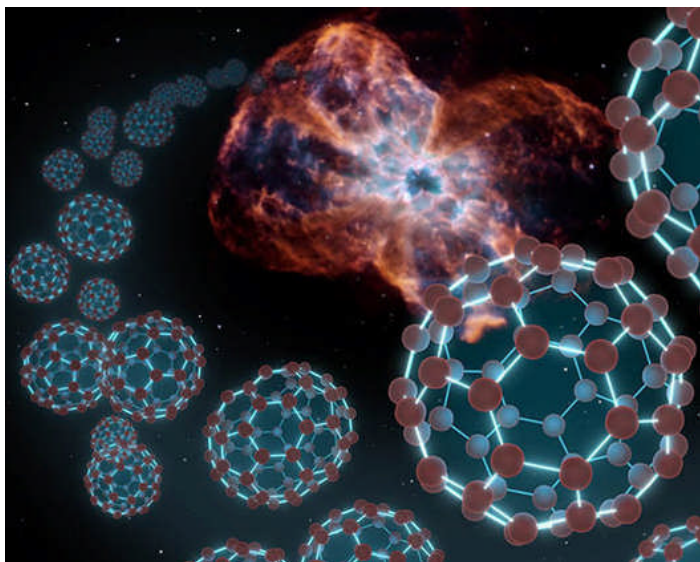


[Click here for an annotated gallery](#) of Hurt and Pyle's all-time favorite illustrations.

"We take data and try to make it visually interesting," Hurt says of their work, which includes turning invisible light into colors that we can see, while employing a restrained brand of artistic license that must constantly balance hard science with aesthetic appeal. "You have to make these things interesting enough so someone will read your story. If your image is flat and dull, no one is going to read the text."



Buckyballs in Space: [Click here for an annotated gallery](#) of Hurt and Pyle's all-time favorite illustrations. NASA/JPL-Caltech/T. Pyle (SSC)



Doing so can be easier said than done. For instance, Spitzer's [recent discovery of buckyballs in space](#)—rare 60-atom carbon molecules that had never before been seen outside of Earth—provided them with an opportunity to attempt a stunning illustration: complex atomic structures backlit by a beautiful planetary nebula. But by a less romantic description, the task was to visually render individual molecules floating loose in space some 6,000 light years away.

“A lot of the stuff we’ve never seen, and that opens up creative choices,” Hurt says. “The difference between us and a Hollywood blockbuster is that we have to keep it tied to the science as closely as possible.”

To do so, the duo plays to each other's strengths. Hurt, a trained astronomer with a Ph.D. in Physics from UCLA, works closely with the principal researchers at Spitzer to

define the scientific constraints for a given illustration. Pyle then begins making the artistic decisions that will get them from raw data to visualization.

In the case of the buckyballs illustration, the constraints were fairly straightforward; they needed to show that the molecules are in space, that they have a unique and interesting molecular structure, and that they are associated with a faraway planetary nebula. But beyond that, the science didn't lend very many cues as to how a visual depiction should come together. After all, a buckyball is very tiny, and the universe is very big.

“What looks cool and what's real don't always line up,” Hurt says, “but generally we can find a compromise.” For the buckyballs, Pyle turned out a simple but mesmerizing rendering of the buckyballs magnified in the foreground to relay the idea that they are tiny (in this case, microscopic) relative to the vast expanse of space behind, which is slightly out of focus to drive home the sense of perspective. The cloud of gas and dust behind the buckyballs isn't actually the same nebula where the buckyballs were discovered, but rather a Hubble Space Telescope image of a nearby nebula. Spitzer's composite image of the actual cosmic backdrop simply didn't convey the crisp, dazzling canvas that the data described.

When images alone can't capture the full significance of the data, Hurt and Pyle turn to animation to breathe further life into their work. Buckyballs, for instance, have a unique spherical structure of atomic bonds that create a hexagon-pentagon structure (like that of a soccer ball) with atoms residing at the vertices. That structure is flexible rather than rigid, so the molecules jiggle like Jell-O as they move about.

Hurt and Pyle did a few animated test renders of these molecular vibrations just to see what they looked like in motion. Not only did the other researchers at the Jet Propulsion Lab like what they saw, but they realized that to their knowledge no one had done a really good buckyball animation before. These are the kinds of stories Hurt and Pyle tell best. Readers could pore over academic papers about the physical properties of buckyballs, but a 16-second animation describes their motion more easily and arguably more thoroughly.

Once complete, their work goes directly into the public domain via NASA, and it often turns up in unexpected places. Aside from the venues one might expect to find detailed NASA artwork—their representations routinely appear on television series like the “The Universe” and “Known Universe”—they've spotted their work in a Microsoft graphics benchmarking program, in advertisements shilling everything from dental services to opera performances, and even tacked to the wall of the set of the television show “The Big Bang Theory.”

Hurt and Pyle don't so much mind where their work ends up as long as it's doing its job. Even if it's in an ad for a dentist's office tacked up in the D.C. subway, their work distills distilling Spitzer's complex data into something we civilians can appreciate, stoking our interest in space science along the way.

“We're just very interested in using imagery to bring scientific data to life,” Hurt says. “It's a great educational calling.”



GOES-R, Zombie Fighter

by Dr. Tony Phillips

On April 5, 2010, something eerie happened to the Galaxy 15 telecommunications satellite: It turned into a zombie.

The day began as usual, with industry-owned Galaxy 15 relaying TV signals to millions of viewers in North America, when suddenly the geosynchronous satellite stopped taking commands from Earth. It was brain dead! Like any good zombie, however, its body continued to function. Within days, Galaxy 15 began to meander among other satellites in geosynchronous orbit, transmitting its own signal on top of the others'. Satellite operators scrambled to deal with the interference, all the while wondering *what happened?*

In horror movies, zombies are usually produced by viruses.

"In this case, the culprit was probably the sun," says Bill Denig of the National Geophysical Data Center in Boulder, Colorado. He and colleague Janet Green of NOAA's Space Weather Prediction Center recently led a study of the Galaxy 15 anomaly, and here are their conclusions:

On April 3rd, a relatively minor solar flare launched a cloud of plasma toward Earth. Galaxy 15 had experienced many such events before, but this time there was a difference.

The Galaxy 15 communication satellite was "brainless" for several months in 2010 after being exposed to a geomagnetic storm. The new GOES-R satellite will warn of such dangers.



"Galaxy 15 was just emerging from the shadow of Earth when the cloud arrived and triggered a geomagnetic storm," explains Denig. Suddenly exposed to sunlight and the ongoing storm, "the spacecraft began to heat up and charge [up]."

Electrons swirling around Galaxy 15 stuck to and penetrated the spacecraft's surface. As more and more charged particles accumulated, voltages began to rise, and—zap!—an electrostatic discharge occurred. A zombie was born.

"At least, this is what we suspect happened based on data collected by GOES satellites in the vicinity," he says. "We'll be able to diagnose events like this much better, however, after GOES-R is launched by NASA in 2015."

GOES-R is NOAA's next-generation Geostationary Operational Environmental Satellite. One of the instruments it will carry, a low-energy electron counter, is crucial to "zombie fighting." Low energy-electrons are the ones most likely to stick to a spacecraft's surface and cause brain-frying discharges. By monitoring these particles in Earth orbit, GOES-R will provide better post-mortems for future zombie outbreaks. This could help satellite designers figure out how to build spacecraft less susceptible to discharges. Also, GOES-R will be able to issue alerts when dangerous electrons appear. Satellite operators could then take protective action—for example, putting their birds in "safe mode"—to keep the zombie population at bay.

Meanwhile, Galaxy 15 is a zombie no more. In late December 2010, after 9 months of terrorizing nearby spacecraft, the comsat was re-booted, and began responding to commands from Earth again.

All's well that ends well? True zombie fighters know better than to relax. Says Denig, "we're looking forward to GOES-R."

You and the kids in your life can learn about space weather at <http://scijinks.gov/space-weather-and-us>.

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

Public Astronomy

Astronomy in the Park - Sat. March 12

As the Sun set Pamela Reyes & James Rexroth prepared the Information/Indoor Activities at the Nature Center. Our platoon of telescope volunteers were busy readying their scopes and the 2011 season of Astronomy in the Park was off to a great start. The people lined up at the scopes sometimes 15 and 20 deep waiting their turn at the eyepiece as our expert volunteers dazzled the public with their vast knowledge of this ancient science.

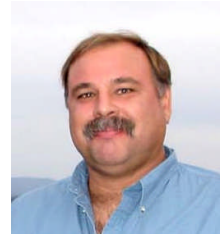
We waved goodbye to Jupiter in the early evening and later that night welcomed Saturn to our viewing schedule. The nebula in Orion was spectacular in Mike Lavieri's big Dobsonian and Bret Ford was able to pick out one of Bode's Galaxies even with some thin clouds

The next Astronomy in the Park will be on Saturday, April 9.

Here's an Idea...

Susan Lavieri brought up a wonderful suggestion for our next get together on April 9. Why don't we get together an hour or so BEFORE Sunset and have an informal picnic???? We ALL enjoy each others' company. We ALL need to eat before the show. SO... lets trade a few emails and phone calls, set a time, (sunset is at 7:35) 6:00?? 6:30?? I will make potato salad. What are you bringing???? There are some tables

overhead. Also helping out for the evening - Jim & Pam Schuknecht, The Wheelers, Shawn Kerns, Karen Soares, & Dave Parker.



We have a fantastic crew of telescope volunteers for this venue every month but Pamela & James need a few more volunteers to help inside at the Nature Center. If you, one of your family members, or friends would be willing to help them inside with kids activities one or two times a year PLEASE call or email Pamela and let her know you can help.

nearby but they may be taken by the time we get there so we may need to bring our own. Join us, bring the family, bring your other friends!!!! And don't forget April 9, BRING your telescope.

Sue Lavieri: sue_lavieri@yahoo.com

Pamela Reyes: pamela_r_reyes@yahoo.com

School Star Party Reports

Thursday February 17 Marshall Elementary

Our first attempt of the year was rained out. Marshall Elementary teacher Craig Wedegaertner scheduled a Science Night for February 17. The inside activities went great but with nothing but clouds visible outside, our SAS volunteers were not needed.

Thursday March 8 Commodore Stockton Skill School

The skies were almost completely clear as Dave Jacobi, Dave Parker, and I set up our scopes.

This was the fourth year in a row that the school has asked for a Star Party and the experience showed. The students and parents were lined up in orderly rows, waiting patiently.

We started the evening with the Moon as the only thing visible but as twilight approached Mr. Parker was able to show Jupiter to the people lining up to his scope. Mr. Jacobi & I stayed on our Moon until it got dark enough for me to swing the club's 13" Dob toward the nebula in Orion.

A few minutes before 7:30 we had a nice fly over from the International Space Station (always a crowd pleaser) and following about a minute or two behind was the Shuttle Discovery which had undocked earlier and was scheduled to land in Florida the next morning.

By 8:30 the 150 or so kids and adults had all had their turn at the eyepiece and the three of us packed our equipment and headed home.

Wednesday March 9 Linden Elementary

The skies were completely cloudy as I called Patty Barroso to see if she still wanted our services at her Science Night. She asked if we could set up a scope inside and show how they work and answer questions about the night sky. I called my trusty volunteers and told them that I could handle this one since I was sure that there would be no telescope viewing that night.

As I drove to Linden a few holes of blue sky peeked thru the clouds. As I pulled into the school there were a few clouds in a hazy sky but our Moon was very visible.

Continued on page 8



See the new digital planetarium in action! Public Shows will be presented one weekend every month on Friday and Saturday. The shows will be approximately 1 hour long. All public shows will include a full dome video and a live presentation of the current nighttime sky. The cost for public shows is \$8 for adults and \$6 for children, seniors, and students. Reserve your tickets at the Delta College box office or purchase them before the show at the planetarium.



Public Shows

April 8 & 9 at 7:30 P.M.



"The Search for Life"

Does life exist anywhere else in the universe? Ancient mythologies and contemporary science fiction have presented imaginative possibilities, but how does modern science approach this question? "The Search for Life: Are We Alone?" begins to answer this intriguing question in a breathtaking new full-dome video show narrated by Academy Award-nominated actor Harrison Ford.

California Skies

The star program will take you on a tour of the evening skies, showing you the bright stars, constellations, planets, and deep sky objects visible in the current nighttime sky.

Field Trips

The planetarium is taking bookings for field trips. If you would like to bring your school group, scout group, youth group or would like to book the planetarium for any special event call the planetarium at **954-5313** or visit our website at www.deltacollege.edu/dept/planetarium.

School Star Party Reports: *continued from page 7*

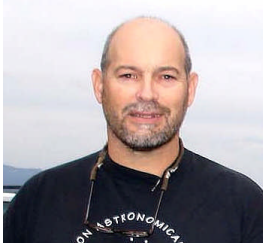
Patty asked if I could set up the scope next to her husband David's telescope on the west end of the school. The nice thing about a simple Dobsonian is you can plop it down, stick in an eyepiece and you are ready to view. Dave Barroso and I were able to show the couple of dozen students and their parents the Moon as it played peek-a-boo thru the clouds.

How many times have I written about making assumptions about the weather? Just because it is cloudy where you are before sunset does not mean that it will

not be clear at the star party site after sunset. ***I really need to take my own advice!***

And Patty's husband Dave....he is a professional astronomer/telescope maker/optical engineer who lives in Linden. He belongs to the Bay Area Astronomy Society because he works in the Bay Area. But he is planning on retiring soon and agreed that Stockton is a lot closer than Hayward. I hope we will be seeing him at other SAS functions in the near future.

...Doug



Amateur Telescope Makers





Our next ATM session will be **Saturday, April 23th from 10 to 3.**

Call Jeff at 594-1894 to confirm.

The shop is at 684 Pioneer Ave. in Lathrop.

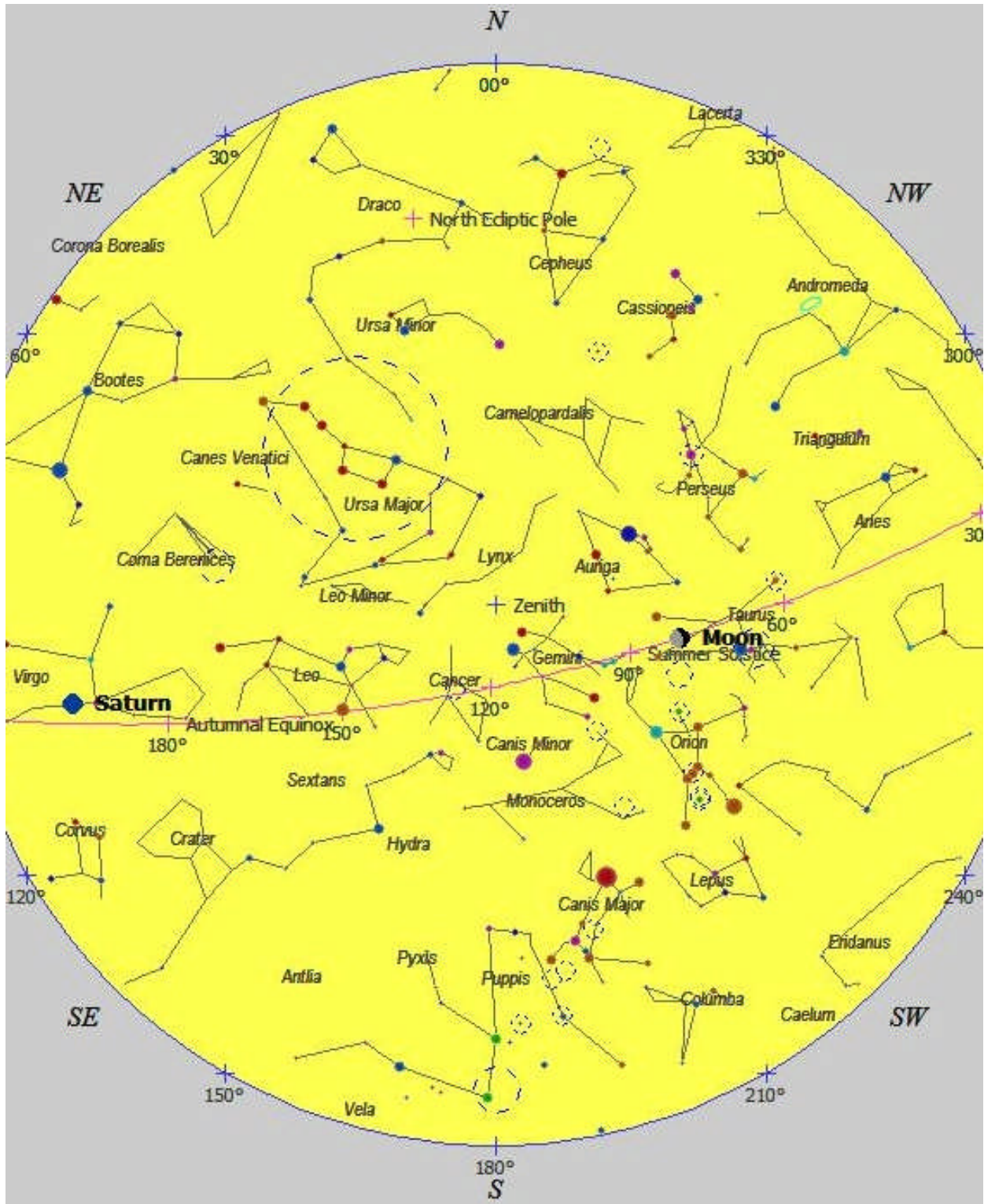
See you there...Bald

April 2011 Sky Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	<p>PLANETS AT DUSK Jupiter: In conjunction with Sun on 6th, reappears in dawn twilight by month end. Saturn: Visible most of night. At opposition on 4th. N side of ring plane tilted 8.7° toward Earth. (Saturn is 72 light minutes from Earth.)</p>	<p>PLANETS AT DAWN Mars: Becomes visible in dawn sky late in month. Mercury: At inferior conjunction on 9th, reappears in dawn sky last half of month. Venus: Brilliant in eastern morning sky. Last ten days: Jupiter, Mars, Mercury and Venus span <20° in dawn twilight.</p>	30	31	1	2
				AM: VENUS 6° S OF MOON.	Moon at apogee.	SAS Hi-altitude Star Party (Sunset 7:29 p.m.) Saturn at opposition.
3 New Moon 7:32 p.m. PDT 	4	5	6 Jupiter in conjunction with Sun.	7	8 Planetarium Show (details on page 8) Sky Tours at Delta College (Shima 2) 8:00 – 10:00 p.m	9 Planetarium Show (details on page 8) Astronomy in the Park Oak Grove Reg. Park (Sunset 7:35 p.m.) Mercury in inferior conjunction.
10	11 First Quarter 5:05 a.m. PDT 	12	13	14 SAS Meeting 7:30 p.m. Olson Hall 120 UOP	15	16
17 Full Moon 7:44 p.m. PDT  Moon at perigee. PM: Saturn 8° N of Moon.	18	19 AM: Mercury 0.8° N of Mars.	20	21	22 GOOD FRIDAY AM: Venus 0.9° S of Uranus. PM: Lyrid meteors peak.	23 SAS Hwy 4 Star Party (Sunset 7:49 p.m.)
24 Last Quarter 7:47 p.m. PDT 	25	26	27 AM: Neptune 6° S of Moon.	28	29	30 SAS Hi-altitude Star Party (Sunset 7:55 p.m.) AM: Uranus 6°, Venus 7° south of Moon.

Stockton Evening Sky for Sky Tours

Friday, April 8, 2011 – 8:00 p.m. PST
(Chart by CyberSky 4.0.7)



Membership Application

**Mark the selected category
and mail check
(payable to SAS)
to:
SAS
P.O. Box 243
Stockton, CA 95201
or bring to the
next meeting.**

SAS Membership: Renewal New

Student Rate: \$10/yr (Full-time student, no age restrictions)

General/Family Rate: \$20/yr (Covers all members of immediate family)

Name(s) _____

Address _____

City/State/ZIP _____

Home Phone _____ Bus. Phone _____

Cell Phone _____

E-mail _____ *

(* Valley Skies newsletter will be delivered by E-mail in pdf format.)

√ Opt Out: I am not able to receive E-mail. Please deliver Valley Skies newsletter by mail.

- _____ I am willing to help with public outreach activities such as Sky Tours or school star parties.
- _____ I will help any way I can with Society activities.
- _____ I would be willing to serve as an appointed or elected officer of the club.



For new membership or renewal, complete the form above and bring it with your check to the next meeting or mail it to:
SAS, P.O. Box 243, Stockton, CA 95201

Next Sky Tours:

**Friday, April 8, 8:00 – 10:00 p.m.
Shima 2 parking lot at Delta College**

Astronomy in the Park

**Saturday, April 9. Sunset 7:35 p.m.
(Contact Sue Lavieri regarding a picnic before the observing session.)
sue.lavieri@yahoo.com**



SAS MEMBER DISCOUNTS

Scope City at 350 Bay Street, San Francisco, offers a huge selection of telescopes, accessories and more. Manager Sam Sweiss is offering discounted prices and free shipping to all SAS members and, for new members, an additional \$25 merchandise discount. (Obtain a receipt from Jerry Hyatt, SAS Treasurer, showing you have paid the \$20 SAS membership dues.)

To arrange for your merchandise discount, contact Sam personally at 415/421-8800 or at <http://www.scopecity.com>

“What’s Up?”

**Don’t forget to check the “What’s Up”
Podcast by Jane Houston Jones each month.**

Using a combination of NASA images, beautifully clear graphics and her own narration, Jane does an outstanding job of explaining what you can expect to see in the night sky each month.

Bookmark the site:

<http://solarsystem.nasa.gov/news/whatsup.cf>

Stockton Astronomical Society

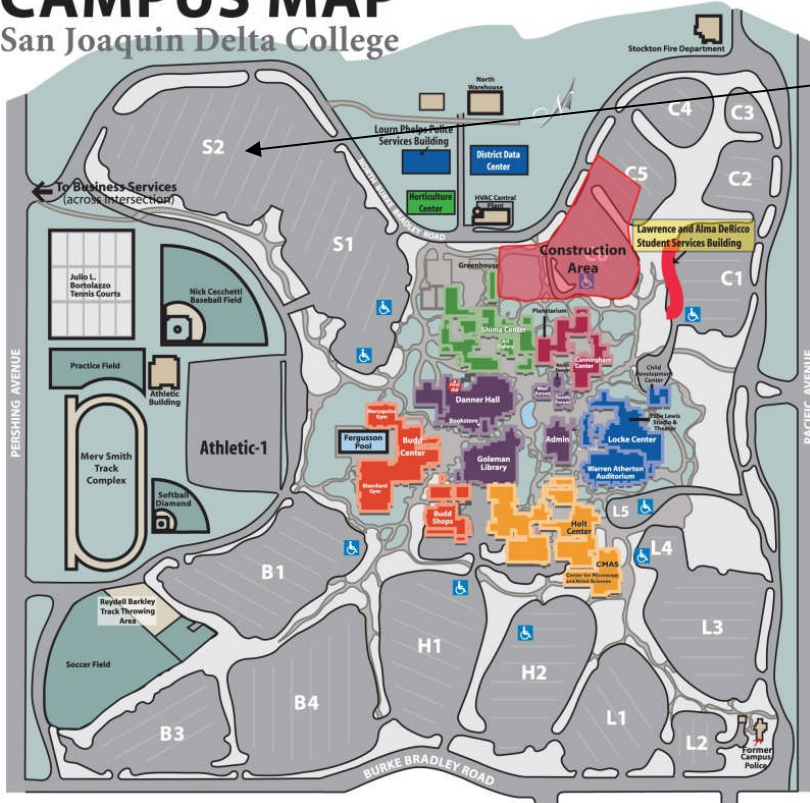
P.O. Box 243
Stockton, CA 95201



**Date Sensitive Material
Please Deliver Promptly**



CAMPUS MAP
San Joaquin Delta College



Sky Tours on April 8
will be in the
Shima S2 parking lot
at Delta College
(8:00 – 10:00 p.m.)

**Picnic (?) and
Astronomy in the Park**
Saturday, April 9 (see pg.7)
**Oak Grove Regional Park
Nature Center**

April 14 Meeting
Stockton Astronomical Society
Room 120 Olson Hall
University of the Pacific

(See UOP map on page 2)