

Sonoma Skies

Newsletter of the Sonoma County Astronomical Society
A nonprofit scientific and educational organization

www.sonomaskies.org



November 2006

Volume XXIX No. 9

2007 Board Elections

Several Board positions are open for the coming year—among them President and Vice President, and all positions are available for nominees to challenge an incumbent. The election will be held at the December meeting—details to follow in the December newsletter. Consider putting your name forward. Thanks!

Striking Sparks 2007 Update

by Larry McCune, Striking Sparks Coordinator

The Striking Sparks Program is off to a good start with the entry packages sent to 145 Sonoma Schools in search of some grade 1 to 8 applicants for the telescope awards. This year the applicants will need to attend one or more Young Astronomers Meetings or Robert Ferguson Observatory Public Nights in order to qualify for entering the contest.

The deadline for submissions is January 13.

Be alert for applicants attending those functions so you can give me some feedback about the applicants and their astronomy interests. The attendance and essays will be evaluated by the judges to select the contest winners.

We have a few members that have stepped forward to sponsor telescopes for the 2007 event and will need additional sponsors. Orion Telescopes and Binoculars has again offered the 6-inch Dobsonian Telescopes at a discount for the SCAS Striking Sparks Program, so we will not need to build the telescopes this time.

We will need some volunteers to pick up, assemble and deliver the telescopes to the awards presentation after the judging and some other tasks along the way. Let me know if you would like to participate and if you would like to sponsor a telescope in this worthwhile program to create a Spark of Interest in Astronomy and Science.

COMING TO SCAS NEXT MONTH: DR. CHRISTOPHER P. MCKAY

Dr. McKay, Planetary Scientist with the Space Science Division of NASA Ames, will talk about “Going to the Moon, Going to Mars: How and Why.” The meeting will be held December 13 at Proctor Terrace School as usual.

An Evening with John Dobson, The “Sidewalk Astronomer”

SCAS November 8 Meeting, Santa Rosa Junior College

While many of you may know of John Dobson, if only as the root of the term “Dobsonian” telescope, it may be that most people may not realize all the facets of the unique and wonderful, flesh-and-blood person that Dobson is. While I’m sure that he would quickly defer to how wonderful and multifaceted is the universe that fascinates him, in one way or another it may be that the “Sidewalk Astronomer” has exposed more people to the wonders of that universe than anyone else. At our next meeting we have the chance to meet the man in person.



Dobson’s biography has been written many times before. He would probably rather we talk about all the cosmic things that absorb him rather than his life. He was born in China to academic parents, and although he has traveled

through much of the world has called San Francisco his home for most of his life. After receiving his degree from UCB in Chemistry, it was not long before he undertook a monastic life in the Vedantic tradition of the Ramakrishna order. His deep interest in the underpinnings of the universe through both fields of study, as well as his simple lifestyle devoted to service, have been the hallmarks that define him and have led him on his life path.

Always and still the deep and original thinker, his interest in the cosmos was not hindered by his poverty, which led to his novel use of inexpensive materials and clever design to develop a simple alt-azimuth mount for an inexpensive, homemade Newtonian telescope. Quickly the view this gave him inspired Dobson to share this view with anyone who would look. Some call this the Dobsonian telescope, but he has preferred to simply refer to them as “sidewalk telescopes”. It’s been said that he places the greatest value of a telescope on the number of people who have been able

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Young Astronomers See page 6

Sonoma County Astronomical Society (SCAS)

Membership Information

Meetings: 7:30 PM on the second Wednesday of each month, in the Multipurpose Room of Proctor Terrace Elementary School, 1711 Bryden Lane at Fourth Street, Santa Rosa, unless otherwise announced in this publication. The public is invited.

Dues: \$25, renewable June 1 of each year. New members joining between December 1 and May 31 pay partial-year dues of \$12.50.

Star Parties: See the Events section for dates and times.

Rental Telescope: Members are eligible to borrow the club's 80mm refractor with tripod. Contact any Board member listed below.

Egroup URL: Connect with other members about going observing, observing reports and chat about astronomy and news items from AANC and *Sky & Telescope*. Hosted by Robert Leyland at r.leyland@verizon.net. Any SCAS member is welcome to join. Visit <http://groups.yahoo.com/group/scas> and click the "Join" button, or send an email to scas-subscribe@yahoogroups.com

Discount Subscriptions: For *Sky & Telescope*, new subscribers may send a check for \$32.95 payable to "SCAS", with your complete mailing address, directly to: Larry McCune, 544 Thyme Place, San Rafael, CA 94903. For renewals, send him your check with the completed renewal card and return envelope. Discount subscriptions to *Astronomy* Magazine occur annually in October. Check *Sonoma Skies* for details.

Library: SCAS Librarian Joan Thornton hosts a library of astronomy books that may be checked out by members at SCAS meetings, to be returned at the next meeting. Videotaped lectures on astronomy may be rented for \$3 per month.

Sonoma Skies is the monthly newsletter of the Sonoma County Astronomical Society (SCAS). Subscription is included as part of membership. Articles and member announcements are welcome and are published on a first come, first served basis, space permitting, and may be edited. **The deadline for submissions is the last Wednesday of each month.** Mail to: Editor, SCAS, P.O. Box 183, Santa Rosa, CA 95402, or email publications@sonomaskies.org

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Visit us on the web at:
www.sonomaskies.org

SCAS MEMBERS PROVIDE PUBLIC ASTRONOMY

We thought you'd like to know what our members have been doing for the public. Often we don't mention their efforts, but events like these go on all year. Listed at bottom are some upcoming November events, if you'd like to join in.

Oct. 17: Len Nelson did a PowerPoint presentation to 45 7th grade students.

Oct. 18: Rincon Valley Middle School attracted 61 people. SCAS members who staffed it were: Lynn A, Merlin C, Frank S, David S, Loren C & John W, to whom we are most grateful. It was a clear evening & the ISS put on a spectacular performance at 8:00.

John Whitehouse adds that "we had nice clear and fairly dark skies (Milky Way prominent), a very enthusiastic audience of students, parents and supportive teachers. Lots of good questions were asked. We got to see Comet Swan as well as a great pass of the ISS. I was able to glimpse and briefly track the ISS that night, I did distinctly see 2 white lobes of the craft as well as the 2 very golden colored solar panels on the sides."

Oct. 22: Many volunteers provided public astronomy at Mt. Taylor for "Land Paths Excursions," a group that previewed the new park area which will open to the public next year. Dickson Yeager coordinated volunteers. For those who have been wondering where the park is (including me), it will be accessible by following Kawana Springs Road east from Petaluma Hill Road in Santa Rosa. We'll let you know when it opens.

Oct. 25: Len Nelson provided public astronomy at Grant School in Petaluma

Upcoming

There will be a number of Mercury Transit events on Nov. 8: Lynn Anderson at Austin Creek Elementary; Len Nelson at Old Adobe Elementary and later Meadows Elementary in Petaluma; and John Dobson & John Whitehouse at Santa Rosa Junior College.

Later in November, John Whitehouse will provide public astronomy at Sonoma Mission Inn.

Help Find Exoplanets!

UCSC astronomers are seeking the public's help to find and understand planets outside our solar system. But you don't need an advanced degree or even a telescope to participate—just a computer, access to the Internet, and an interest in astronomy.

The project, called Systemic, enlists volunteers to help astronomers better understand what kinds of planetary systems inhabit our galaxy, the Milky Way, and whether systems like our solar system are common.

Astronomers have already found nearly 200 extrasolar planets orbiting other stars. But according to Gregory Laughlin, associate professor of astronomy and astrophysics at UCSC, the types of planetary systems astronomers are finding may not represent the full range of what is out there.

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November Observing Notes

- 11/5 Full Moon ("Hunter's Moon")
- 11/8 Mercury transits the Sun: 11:12AM (leading edge contact inward); 11:14AM (trailing edge contact inward); 4:08PM (leading edge contact outward); 4:10PM (trailing edge contact outward).
- 11/12 Last Quarter Moon
- 11/13 Moon near Saturn
- 11/14 The second-brightest asteroid Iris is at opposition and reaches magnitude 6.8, providing a good opportunity for telescope observers. It is located in Aries.
- 11/17 Leonid meteor shower peaks
- 11/20 New Moon
- 11/20 Zodiacal Light visible in East around 5:30 AM through Nov. 2
- 11/25 Mercury at greatest elongation W
- 11/27 First Quarter Moon
- 11/28 Lunar occultations: phi Aqr disappears (dark limb) at 5:33PM and reappears at 6:47. Between, at 5:54PM, a mag 7.5 star will disappear. At 9:08PM, 96 Aqr disappears, followed by a mag 7 star at 10:31PM.

—Most of above info courtesy of Jack Welch

TRANSIT OF MERCURY LIVE WEBCAST FROM KITT PEAK NOV. 8

If our weather fails locally, or for school classroom activity, here's a backup link for the Exploratorium webcast: www.exploratorium.edu/transit

On November 8, 2006, Mercury will slowly slide across the face of the sun during an event known as a transit. A transit of Mercury is relatively rare—there are only about a dozen in a century.

The Exploratorium's Live@ crew will be at the Kitt Peak National Optical Astronomy Observatories, and, with the Kitt Peak staff, will webcast the transit — a live five-hour telescope-only feed beginning at 11:00 am PST.

The transit will take place from 11:12am PST until 4:10pm PST. Because of Mercury's diminutive size, the transit cannot be seen with the

unaided eye, but it can be viewed with a telescope (with the proper filter) or with a homemade optical projector.

OTTEWELL ASTRONOMICAL CALENDAR 2007

Ottewell's legendary calendar is a giant-size (11" x 15") yearbook that features day-by-day summaries of celestial events, monthly sky charts, and an abundance of helpful diagrams explaining basic astronomical concepts. It includes finder charts for many interesting naked-eye and telescopic objects and events.

Lynn Anderson will be taking orders and money for the purchase of the *2007 Astronomical Calendar* at the November meeting. The group discount price is \$19.95 for each calendar.

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by
Herb
Larsen



"Nah! Small, mostly water,
only one moon, unremarkable
.....a very minor planet."

SOCIAL AMENITIES

Thanks to Emilio Ricci for providing coffee and refreshments at the October meeting.

WELCOME MEMBERS!

The SCAS is pleased to welcome new and returning members Bill Romo, Fred Hendrick, Jeff Micheli, William Parr and Shirley White.

OBSERVER'S HANDBOOKS & CALENDARS

The 2007 Handbooks (\$16) and Calendars (\$8.50) have arrived. If you ordered one, please see Len Nelson at the November meeting and bring correct cash or check. Three extra Handbooks are available.

SCOPE CITY New Member Bonus!

Scope City at 350 Bay Street, San Francisco, is offering a **\$25 merchandise discount to new members.**

Manager Sam Sweiss has supported SCAS and Striking Sparks and offers a huge selection of telescopes, accessories and more. Obtain a receipt from Walt Bodley, Membership Director, showing you have paid the \$25 SCAS membership dues. To arrange for your merchandise discount, contact Sam at 415/421-8800 or at sanfrancisco@scopecity.com

Events

ROBERT H. FERGUSON OBSERVATORY

Public Viewing Thursday, November 16
Leonid Meteors

Weather permitting, we spend the night watching the meteor shower. First, deep sky observing in the evening with the RFO telescopes. Then, bundle up with LOTS of layers, bring thermoses of hot beverages, cots, lounges, sleeping bags, blankets, munchies and whatever else you need to stay warm and comfortable. Best meteor display is from 2 to 4AM.

Public Viewing Saturday, November 18

Solar Viewing: 11:00 AM - 3:00 PM

Night Viewing begins 6:00 PM

Public Viewing Friday, November 24

Solar Viewing: 11:00 AM - 3:00 PM

The Observatory: Three scopes are operating: The 14-inch SCT with CCD camera in the East wing, the 8-inch refractor under the dome and the 24-inch Dobsonian in the West wing. No admission fee for the solar viewing, but donations are appreciated. The Park charges \$6 per vehicle for entry. A \$2 donation is requested from adults 18 and over for admission to the observatory during night viewing sessions.

SCAS members may set up telescopes in the observatory parking lot to assist with public viewing. Auto access closes at dusk; late arrivals must carry equipment from the horse stable parking area.

CLASSES, OTHER EVENTS

Nov. 14 Night Sky Fall Series, 7:00 PM

Classes are held at the Observatory. Reservations recommended. (707) 833-6979, <http://www.rfo.org> or nightsky@rfo.org

SILICON VALLEY ASTRONOMY LECTURE SERIES

Nov. 8, 7:00 PM: “The Planet Pluto: Maligned but Not Forgotten”—Astronomer Dale Cruikshank, NASA’s Ames Research Center

Recognizing Pluto’s importance to our understanding of the outer regions of the Solar System, NASA launched the New Horizons spacecraft in January, 2006. Dr. Cruikshank is one of the world’s foremost authorities on the outer solar system. He and his colleagues discovered the ices that make up Pluto’s surface and evaporate to form its thin atmosphere. As a former amateur astronomer, he has a knack for explaining scientific ideas in simple, direct language.

Arrive early—seating is limited. Location: Smithwick Theater, Foothill College, El Monte Road and Freeway 280, Los Altos Hills. Free and open to the public. Parking \$2. Info: 650/949-7888

SRJC PLANETARIUM

“Comets, Asteroids, and Planet Earth” — thru Nov. 19

**“Our Winter Holiday Sky” —
Nov. 24 - Dec. 17**

Join us as we take you on a tour of the winter sky. We’ll help you find the major stars and constellations, star clusters, star forming regions, and the most distant object your eyes may be able to see in space. You’ll learn about the astrological phenomenon that may have been interpreted as the Star of Bethlehem.



Shows are held at Santa Rosa Campus, Lark Hall, Room 2001, on Fridays and Saturdays at 7:00 PM and 8:30 PM, Sundays at 1:30 PM and 3:00 PM during the Fall and Spring semesters. Admission is \$5 General; \$3 Students and Seniors (60+). Tickets are sold at the door only, beginning 30 minutes before show time. A parking permit is required and is included in the Planetarium admission price. Pick it up at the planetarium when you pay admission. Please arrive early enough to place your permit on your vehicle’s dashboard before the show starts.

Info: 527-4372, <http://www.santarosa.edu/planetarium/>

MORRISON PLANETARIUM DEAN LECTURE SERIES

Nov. 27, 7:30 PM: Spitzer - “The Last of the Great Observatories”—Dr. George Rieke, Deputy Director, Steward Observatory, University of Arizona

Over 20 years after starting the project, NASA launched the Spitzer infrared telescope into space as the last of the great observatories that began with the Hubble Telescope. Why did it take so long? Was it worth it? This talk will illustrate Spitzer’s capabilities by showing what we have learned about other planetary systems. Spitzer results are revealing new aspects of how the Earth formed and about the collisions that still occur among planets and asteroids.

Location: Kanbar Hall, Jewish Community Center, 3200 California Street (at Presidio). Parking in the UCSF Laurel Heights campus parking lot is \$1.25/night. Parking in the JCC garage is \$1.25 per half-hour. Tickets \$4 at the door or by email. Contact: 415/321-8000, <http://www.calacademy.org/planetarium/dean.cfm>

Events

UC BERKELEY ASTROPHYSICS CLUB

Institute for Particle Astrophysics Journal Club Seminars

Nov. 3—**Jason Wright** (UCB) speaking on discovering exoplanets via the radial velocity method

Nov. 10—**Francisco Prada** (IAA-CSIC) discussing the progress we have made on the knowledge of the properties of dark matter halos of isolated galaxies. Using the SDSS, we probe the halo mass distribution at large radii, by studying the motions of satellites around isolated galaxies. We find direct observational evidence of the dark matter density decline in the peripheral parts of galaxies as predicted by the Λ CDM paradigm; we also note that this result contradicts alternative theories of gravity such as MOND. We measure the virial mass-to-light and virial-to-stellar mass ratios of L^* galaxies and study the evolution in their halo masses between $z=1$ and $z=0$ by combining data from the DEEP2 galaxy redshift survey and the SDSS. Other properties of satellites will be discussed in addition to the study performed on the outer structure of galactic dark matter halos and their mass growth in high-resolution cosmological simulations.

Nov. 17—**David Williams** (UCSC) speaking on atmospheric Cherenkov astronomy

Dec. 1—**Kristen Shapiro** (UCB), “Testing Mass Assembly in the Early Universe”

I will present recent results from the SINS study of spatially resolved galaxy kinematics at $z\sim 2$. This observing program is made possible by the new class of integral-field spectrographs that operate in the infrared with high spatial and spectral resolution. I will discuss how these instruments, coupled with recently-available adaptive optics systems on 10-m class telescopes, enable us to probe in detail galaxy formation in the early Universe. Such studies reveal a surprising Universe, in which massive disks are already in place, after an apparent very rapid assembly. I will focus primarily on our observations of BzK-15504, which represent the highest spatial resolution study of a $z\sim 2$ galaxy to date and which give us insight into mass assembly, star formation trigger mechanisms, and bulge formation in the early Universe.

Lectures: 12:00 Noon. Location: Bldg. 50, room 5026, Lawrence Berkeley National Laboratory, 1 Cyclotron Rd., Berkeley. Contact Vitaliy Fadeyev VAFadeyev@lbl.gov. Information: <http://stokstad.lbl.gov/INPA/journalclub.html#aboutjclub>

SAN FRANCISCO AMATEUR ASTRONOMERS

Nov. 15, 7:30 PM: “Results from the Hubble Telescope’s Advanced Camera for Surveys (ACS)”
—Adrienne Cool, San Francisco State University

A member of the Hubble Heritage Team, Dr. Cool presents the latest results from the Hubble Telescope’s Advanced Camera for Surveys (ACS).

Meetings are held at the Randall Museum, 199 Museum Way, San Francisco. For more information go to: <http://www.sfaa-astronomy.org/sfaa/lectures/index.shtml>

SONOMA STATE UNIVERSITY SERIES “WHAT PHYSICISTS DO”

Mondays at 4:00 PM

Schulz Hall Room 3001 (Coffee at 3:30 PM)

Nov. 6—New Views of Hidden Worlds

Dr. Kevin Baines of the Jet Propulsion Laboratory will present new images of Venus and Saturn obtained by the Venus Express and Cassini orbiters, showing how the depths of these cloud-enshrouded worlds are being revealed by modern near-infrared spectral-imaging techniques.

Nov. 13—The View from the Center of the Universe

Dr. Joel Primack of the University of California, Santa Cruz and Nancy Abrams will describe the scientific revolution that is creating humanity’s first picture of the universe that might actually be true.

Nov. 20—Exploring and Manipulating Nanostructures at the Single Molecule Level

Dr. Michael Crommie of the University of California at Berkeley will discuss recent progress in investigating the electronic, magnetic, and mechanical properties of molecular structures using scanning tunneling microscopy.

Nov. 27—The Cosmic Landscape: String Theory and the Illusion of Intelligent Design

Dr. Leonard Susskind of Stanford University will discuss the question, “Why does the world appear to be so well-designed for our own existence?”

Contact <http://phys-astro.sonoma.edu/wpd/>

SSU OBSERVATORY PUBLIC VIEWING

Nov. 17, 7-9 PM: Triangulum Galaxy, M2 and M15 Globulars, The First Planetary Nebula

Dec. 1, 7-9PM: The Moon, Auriga Clusters, M77 (a Seyfert galaxy)

Observatory located inside the stadium area at the SE corner of campus (E. Cotati Ave. and Petaluma Hill Rd., two miles east of US 101 at Cotati). Follow signs to campus. Parking Lot F is most convenient. Call 707/664-2267 before coming if it appears weather may force cancellation. <http://www.phys-astro.sonoma.edu/observatory/pvn.html>

Young Astronomers



YA Meeting

November 17, 7:30 PM at Apple Blossom School

Topic to be announced. As usual, weather permitting, there will be telescope viewing in the upper parking lot after the general meeting. Bring your telescope and a friend!

John Dobson is coming to the SCAS meeting on November 8. He is one of a kind—smart, funny and immensely entertaining. Do consider coming to see him. Be sure to bring dollar bills or quarters to pay for parking. See the front page article and the map on the back page for details on location at the Junior College.

Strange Moonlight

Not so long ago, before electric lights, farmers relied on moonlight to harvest autumn crops. With everything ripening at once, there was too much work to do to stop at sundown. A bright full moon—a "Harvest Moon"—allowed work to continue into the night. The moonlight was welcome, but as any farmer could tell you, it was strange stuff. Here's how:

1. Moonlight steals color from whatever it touches. Regard a rose. In full moonlight, the flower is brightly lit and even casts a shadow, but the red is gone, replaced by shades of gray. In fact, the whole landscape is that way. It's a bit like seeing the world through an old black and white TV set.

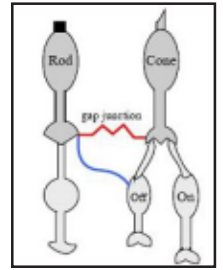
2. If you stare at the gray landscape long enough, it turns blue. The best place to see this effect, called the "blueshift" or "Purkinje shift" after the 19th century scientist Johannes Purkinje who first described it, is in the countryside far from artificial lights. As your eyes become maximally dark adapted, the blue appears. Film producers often put a blue filter over the lens when filming night scenes to create a more natural feel, and artists add blue to paintings of nightscapes for the same reason. Yet if you look up at the full moon, it is certainly not blue. (Note: Fine ash from volcanoes or forest fires can turn moons blue, but that's another story.)

3. Moonlight won't let you read. Open a book beneath the full moon. At first glance, the page seems bright enough. Yet when you try to make out the words, you can't. Moreover, if you stare too long at a word it might fade away. Moonlight not only blurs your vision but also makes a little blind spot. (Another note: As with all things human, there are exceptions. Some people have extra-sensitive cones or an extra helping of rods that do allow them to read in the brightest moonlight.)

This is all very strange. Moonlight, remember, is no more exotic than sunlight reflected from the dusty surface of the moon. The

only difference is intensity: Moonlight is about 400,000 times fainter than direct sunlight.

So what do we make of it all? The answer lies in the eye of the beholder. The human retina is responsible. The retina is like an organic digital camera with two kinds of pixels: rods and cones. Cones allow us to see colors (red roses) and fine details (words in a book), but they only work in bright light. After sunset, the rods take over.



Rods are marvelously sensitive (1000 times more so than cones) and are responsible for our night vision. According to some reports, rods can detect as little as a single photon of light! There's only one drawback: rods are colorblind. Roses at night thus appear gray.

If rods are so sensitive, why can't we use them to read by moonlight? The problem is, rods are almost completely absent from a central patch of retina called the fovea, which the brain uses for reading. The fovea is densely packed with cones, so we can read during the day. At night, however, the fovea becomes a blind spot. The remaining peripheral vision isn't sharp enough to make out individual letters and words.



Finally, we come to the blueshift. Consider this passage from a 2004 issue of the *Journal of Vision*: "It should be noted that the perception of blue color or any color for that matter in a purely moonlit environment is surprising, considering that the light intensity is below the detection threshold for cone cells. Therefore if the cones are not being stimulated how do we perceive the blueness?"

The authors of the study went on to propose a bio-electrical explanation—that signals from rods can spill into adjacent blue-sensitive cones under conditions of full-moon illumination (see the diagram, right). This would create an illusion of blue. "Unfortunately," they point out, "direct physiological evidence to support or negate the hypothesis is not yet available."

So there are still some mysteries in the moonlight. Look for them during the next Full Moon.

—Dr. Tony Phillips, Science@NASA

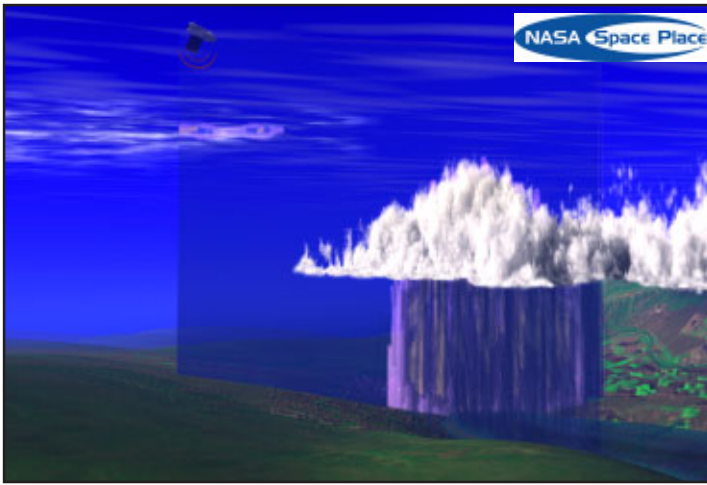
YA INFORMATION

Meetings: 7:30 PM the second Friday of each month of the school year, at Apple Blossom School, 700 Water Trough Road, Sebastopol, in the Multipurpose Hall. Open to all Sonoma County students.

Telescope viewing is held in the upper parking lot after the meeting. **Directions:** From Hwy. 116 in Sebastopol, turn west onto Bodega Ave. Continue on Bodega Ave. almost two miles to Water Trough Rd. Turn left and go about 1/3 mile to the school, on your right. From Hwy. 12, go straight through Sebastopol, past Main Street, and continue as above.

YA ELECTED OFFICERS

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CloudSat is one of the Earth observing satellites collecting data that will help develop and refine atmospheric circulation models and other types of weather and climate models. CloudSat's unique radar system reads the vertical structure of clouds, including liquid water and ice content, and how clouds affect the distribution of the Sun's energy in the atmosphere. See animation of this data simulation at www.nasa.gov/mission_pages/calipso/multimedia/cloud_calip_mm.html.

The Planet in the Machine

by Diane K. Fisher and Tony Phillips

The story goes that a butterfly flapping its wings in Brazil can, over time, cause a tornado in Kansas. The “butterfly effect” is a common term to evoke the complexity of interdependent variables affecting weather around the globe. It alludes to the notion that small changes in initial conditions can cause wildly varying outcomes.

Now imagine millions of butterflies flapping their wings. And flies and crickets and birds. Now you understand why weather is so complex.

All kidding aside, insects are not in control. The real “butterfly effect” is driven by, for example, global winds and ocean currents, polar ice (melting *and* freezing), clouds and rain, and blowing desert dust. All these things interact with one another in bewilderingly complicated ways.

And then there's the human race. If a butterfly can cause a tornado, what can humans cause with their boundlessly reckless disturbances of initial conditions?

Understanding how it all fits together is a relatively new field called Earth system science. Earth system scientists work on building and fine-tuning mathematical models (computer programs) that describe the complex inter-relationships of Earth's carbon, water, energy, and trace gases as they are exchanged between the terrestrial biosphere and the atmosphere. Ultimately, they hope to understand Earth as an integrated system, and model changes in climate over the next 50-100 years. The better the models, the more accurate and detailed will be the image in the crystal ball.

NASA's Earth System Science program provides real-world data for these models via a swarm of Earth-observing satellites. The satellites, which go by names like Terra and Aqua, keep an eye on Earth's land, biosphere, atmosphere, clouds, ice, and oceans. The data they collect are crucial to the modeling efforts.

Some models aim to predict short-term effects—in other words, weather. They may become part of severe weather warning systems and actually save lives. Other models aim to predict long-term effects—or climate. But, long-term predictions are much more difficult and much less likely to be believed by the general population, since only time can actually prove or disprove their validity. After all, small errors become large errors as the model is left to run into the future. However, as the models are further validated with near- and longer-term data, and as different models converge on a common scenario, they become more and more trustworthy to show us the future while we can still do something about it—we hope.

For a listing and more information on each of NASA's (and their partners') Earth data-gathering missions, visit science.hq.nasa.gov/missions/earth.html. Kids can get an easy introduction to Earth system science and play Earthy word games at spaceplace.nasa.gov/en/kids/earth/wordfind.

—This article was provided by the JPL/NASA

Help Find Exoplanets! *(continued from Page 2)*

The technique most often used to find extrasolar planets relies on measuring slight wobbles in a star's motion caused by the gravitational tug of an orbiting planet. This technique favors configurations in which the orbiting planet is not only large, like Jupiter, but also close to the star. As a result, so-called “hot Jupiters” are overrepresented in the current census of extrasolar planets.

Other potential biases arise from factors that limit how observations are made.

Astronomers are often limited to blocks of telescope time lasting only a few days, which means they cannot observe prospective planetary systems as often as they would like. The limited geographic locations of telescopes also limit what parts of the sky astronomers can observe. As a result of these kinds of restrictions, some planetary systems are studied more than others, and so the current data on extrasolar planets does not yet fully reflect what is really out there.

To get a better handle on these problems, Laughlin and his collaborators launched the Systemic project, in which public participation will help create a virtual database of extrasolar planetary systems.

The project involves a sophisticated simulation of the search for planets. The researchers created a data set of 100,000 stars, complete with many diverse planetary systems. Participants can analyze this virtual galaxy with software available on the project web site. Using the software, volunteers can analyze the data for a target star, varying planetary properties like mass, orbital shape, and period to find a configuration that best fits the data. The web site includes a tutorial on the software, called the Systemic Console, as well as a blog, which Laughlin updates regularly.

Full article at: <http://currents.ucsc.edu/06-07/10-16/systemic.asp>

Systemic web site: <http://oklo.org/>

John Dobson (continued from Page 1)

to look through it. Since cofounding the Sidewalk Astronomers, his whole life has been dedicated to public outreach and education.

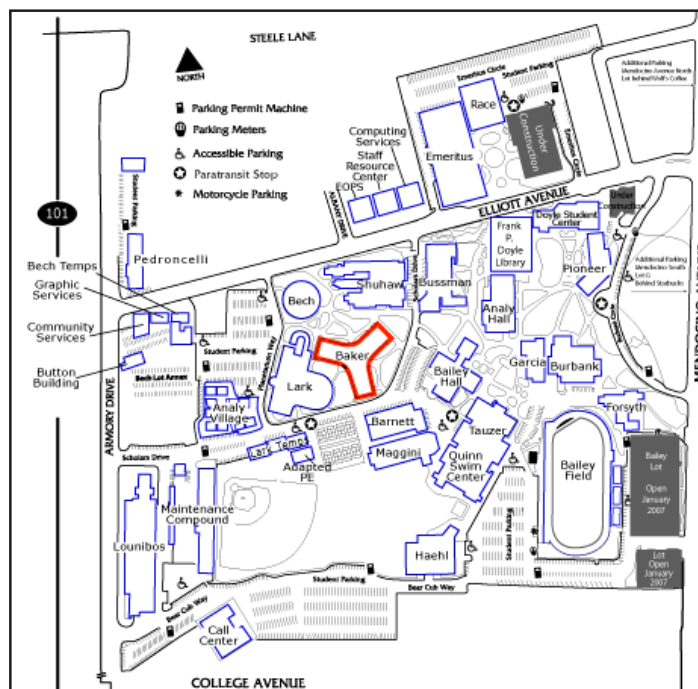
There is much more to John Dobson than telescope maker, designer, scrounger. His non-materialistic view of the cosmos, coupled with a keen native intelligence, has freed him to approach the universe with a very original—some would say radical—point of view. He encourages others “to look...and to think”, for themselves, and not to consider mainstream science as another dogma to accept without question. Come bring your questions and meet the man with us November 8th.

Important Notice: This meeting with John Dobson will be held at Santa Rosa Junior College. We will meet at our usual time, 7:30 P.M., at Baker Hall, Room 1809. Baker Hall is located just north of the JC planetarium, and is the complex of buildings with the decorative arches around its perimeters. Our room is in the central, round building in the middle of the complex. Please refer to the map of the Junior College at right.

Parking is an issue: Parking on the JC campus costs \$3.00, with permits purchased from machines on each of their lots. This will be a class night, and may be *very difficult* to find parking. The Bech lot off Elliott Street is the closest lot, but is small. Parking is available in the larger lot by Emeritus Hall near the old (Plover) library, the campus police lot on Armory, and near the Stadium by the main JC entrance off Mendocino. Both would entail a bit more walking. Parking on the nearby surface streets is time limited (1 hour), but

is OK after 8:00 P.M. I believe if you park after 7:00 you *should* be OK. Be creative, come early and consider carpooling! (The evening will be worth it!)

—John Whitehouse



Sonoma County Astronomical Society

P.O. Box 183
Santa Rosa, CA 95402



Sonoma Skies

November 2006

NOVEMBER 8
John Dobson
The “Sidewalk
Astronomer”