

★ ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

Vol. 60, No. 7 - July 2012

Wednesday, July 18, 2012 – General Meeting

Randall Museum . 199 Museum Way . San Francisco

7:00 pm Doors Open . 7:30 pm Announcements . 8:00 pm Speaker

SFAA's General Meetings occur 3rd Wednesday of each month (except January)

JOHN DILLON

Curator (Retired), Randall Museum

Past President, San Francisco Amateur Astronomers

GALILEO RECONSIDERED



Three years ago the world celebrated the 400th anniversary of Galileo's telescope and the revolutionary observations he made with it. The legend was retold of how his discoveries challenged the ancient authority of Aristotle, the Universities, and especially the Church – inevitably leading to his infamous trial and personal disgrace but defiantly opening the way for “modern” science. The popular account often ignores recent work by historians of science that reveals a subtler, more complex, and more interesting story. John Dillon will weave the most recent research into a review of the intricate relationship between Galileo, telescopes, the Church and the emergence of “modern” science.

John Dillon retired as Curator of the Randall Museum and is a Past President of the SF Amateur Astronomers. He did his graduate work in Zoology and Philosophy as a NASA Fellow at Duke University and studied History of Science at Cambridge University. For many years he has been teaching extension classes in the History and Philosophy of Science at UC Berkeley, SF State, and Stanford University.



San Francisco Amateur Astronomers

2012 Lecture Series

Upcoming Lectures

Randall Museum Theater . Randall Museum
199 Museum Way, San Francisco

7:30 p.m. . Free & Open to the Public

August 15 **JAMES McBRIDE, UC Berkeley, Graduate Student**

MEGAMASERS, MAGNETIC FIELDS AND DENSE GAS IN STARBURST GALAXIES

Megamasers provide a fascinating probe of the conditions at the centers of galaxies that are in the midst of a burst of star formation.

The speaker uses radio telescopes, including Arecibo, the largest dish telescope in the world, for his research.

September 19 **ANNE METEVIER, PhD, Physics and Astrophysics, UC Santa Cruz**
Lectures at UC Santa Cruz, Hartnell College, Sonoma State University

MILKY WAY GALAXIES ACROSS THE UNIVERSE

October 17 **RITA WECHSLER, Department of Physics, Stanford University**

CONNECTING GALAXIES, HALOES, AND STAR FORMATION ACROSS COSMIC TIME

WELCOME TO THE



SFAA – 2012 YOSEMITE STAR PARTY AT GLACIER POINT – JULY 20-21

**GO to the SFAA website and view the Yosemite page to sign up.
Be sure to put “Yosemite Sign Up” in the subject line to reserve your campsite.
Sign up soon - It's filling up fast!**

All spaces for this trip are currently filled

The trip is available to MEMBERS ONLY. Since this is a Public Viewing Event that the SFAA attends as guests of the National Parks, all campers are expected to bring a telescope and be willing to host public viewing. The club aims to bring one telescope for every two SFAA members attending.

About the Trip:

The SFAA is provided with FREE admission to Yosemite National Park as well as FREE reserved, shared campgrounds at Bridalveil Group Campground.

The campsite is 8.5 miles away from Glacier Point.

We will host two public star parties at Glacier Point, on Friday and Saturday night. We have the public (about 200 – 300 people) from twilight for a few hours, and then the rest of the night (and all day) to ourselves; this is a mighty good deal, considering how some folks come 12,000 miles to see these rocks. The National Park Service limits astronomy clubs to a maximum of 30 SFAA campers. Please do not ask if your friends can come ...unless they are SFAA members and have telescopes.

Observing site at Glacier Point-

The observing area is mostly open, with incredible views from about NNW to the east, around to due south. The horizon from south around to the west is partly blocked by tall trees.

Still, there is a lot of open sky, and typically, the seeing and transparency are excellent. It has warm temperatures of 70 to 90 during the day, and cool to chilly 40's at night, due to the elevation of 7200 feet.

Star Party-

One of the rangers does a sunset talk, and then delivers the

crowd to us. Following that, a member of the club will give an evening talk, (want to volunteer?) The public will have white flashlights, and we need to be tolerant of that. We will have 3 club members with red brake light tape to politely cover the offending flashlights. Expect many questions from the public.

The Reward-

By around 9:30 or so, we will have the place to ourselves, and can stay until dawn if you so choose. Scopes must be removed when we quit, then set up again on Saturday. Some of us may set up sun scopes during the afternoon, show Half Dome festooned with rock climbers, and invite people to come back again after sunset.

Gastronomic Astronomic-

Early Saturday eve is the traditional potluck meal and is always tons of fun. Please provide enough food for ~ say 3 or 4 people. Salads, main courses, pu pu's and desserts are all welcome. The question is: Who will have the best astronomical gastronomic theme of incredible edibles this year? Remember the Brown Dwarfs? Prizes will be awarded!

Please remember this repast takes time. It's better to start our own gastronomic party early so that there's no need to rush for set up Saturday evening on Glacier Point.

Check the [National Weather Service](#) for up-to-date weather info on Yosemite Park current weather and conditions.

See you at the campsite.

Ken & Dave



MT. TAMALPAIS STATE PARK
MT TAMALPAIS INTERPRETIVE ASSOCIATION
2012 ASTRONOMY PROGRAMS -- OUR 24TH SEASON ON THE MOUNTAIN

The big scientific news has been the possible discovery of the long searched for Higgs Particle. But if you attended our June program, this was no surprise to you! Dr. Kuhlen of UC Berkeley “leaked” this announcement to our audience during his talk on “*The Milky Way As Dark Matter.*” Be sure to stay informed of new developments in astronomy and physics by attending our series. Our speakers are active researchers at the top of their fields who share their latest results with you. Immediately following each month's lecture, the audience is invited to remain in the Mountain Theater for a brief Night Sky Tour by the Urban Astronomer, highlighting the prominent constellations, stars and planets visible in the night time sky, before enjoying the observing session (star party) conducted by the San Francisco Amateur Astronomers in the Rock Springs parking lot.

All programs are FREE, open to all, and sponsored by your State Park. Please dress appropriately (it can get cold), bring a flashlight and car pool if possible. If the weather is iffy on the program date, check our **hot line, 415-455-5370**. The message is updated about 3:00pm IF there is any change in the schedule. Note that while observing is affected by clouds, the fog usually does not reach our observing area and generally dissipates after sundown. Lectures are cancelled only in cases of rain or if fire danger closes the park.

You can find more information and a listing of the entire season (April through Oct) on our website: www.mttam.net/astronomy. Follow us on Facebook.

Thanks for informing others of our programs. See you on the Mountain - and bring a friend!

July 21
8:30pm

Dr. David J. Des Marais, NASA-Ames Research Center
“Astrobiology Investigates Life in the Context of Space”

How does life begin and evolve? Does life exist beyond Earth? What is our future, here and beyond? Research and space exploration effectively pursue these questions in inspiring ways.

August 18
8:30pm

Ransom W. Stephens, Ph.D.
“The Reality Interface”

Every emotion, memory, concept-however abstract or concrete, everything you know is derived from your five senses. Learn how the brain processes sensory data and affects your perceptions of reality.

Sept 22
7:30pm

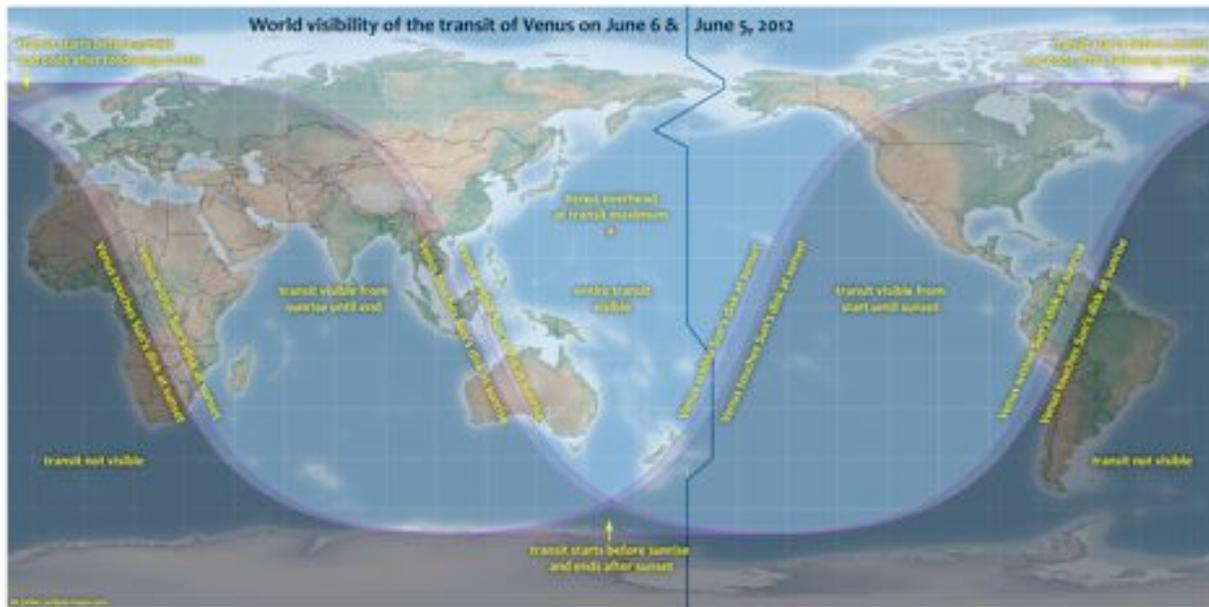
Dr. Seth Shostak, Senior Astronomer SETI Institute
“What Happens if We Find ET?”

Searches for signals from intelligent extraterrestrials are getting better as technology improves. So a signal might be discovered in your lifetime. But then what? Would you be told, and would it be dangerous?

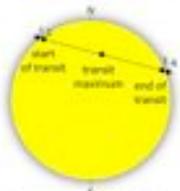
Oct 20
7:00pm

Dr. Chris McKay NASA-Ames Research Center
“MSL and the search for organics on Mars”

NASA's Mars Science Laboratory will arrive on the red planet in August. How can the mission's rover, Curiosity, with unprecedented research tools to study the early environmental history of Mars, contribute to the search for evidence of life on Mars



Venus in transit across the Sun's disk



Never look directly at the Sun without proper eye protection

General circumstances of the transit

- 22:09:41 UT 1 Venus touches Sun's disk at start of transit (egress, exterior contact)
- 23:07:30 UT 2 Venus within Sun's disk at start of transit (ingress, interior contact)
- 00:09:37 UT 3 Transit maximum (minimum separation)
- 04:30:44 UT 4 Venus within Sun's disk at end of transit (egress, interior contact)
- 04:49:31 UT 5 Venus touches Sun's disk at end of transit (egress, exterior contact)

Times given in Universal Time (UT) for locations where Venus is overhead. Contact times around the world vary as much as nearly seven minutes because of parallax. For local transit times, see <http://transitofvenus.nl/wp/where-when/>

Earth from the perspective of Venus



start of transit (egress, exterior contact)

greatest transit (minimum separation)

end of transit (egress, exterior contact)

FOR US -- THE LAST DANCE

Bob Haberman

The last dance of Venus across the face of the Sun, for us, turned out to be quite a happening up on Grizzly Peak Boulevard in Berkeley. Located just above the UC Berkeley campus, it has the advantage of a very low horizon and convenient turnouts for parking and observation. Unfortunately, as my last two images reveal, I failed to get the benefit of the low horizon for the transit since the Sun went behind Grizzly Peak itself. Oy! Another unplanned for detail was a cloud that chose to materialize right above where we set up. It was a highly localized orographic cloud caused by the uplift of air by the slope itself. Woof! Furthermore, it was a factor at the first contact portion of the imaging session, which is where my real focus was. Fortunately, everything did work out, as the images show. There was a fair amount of shooting through the thinner portions of the cloud, but, in my opinion, it made for some visually interesting images.

For me the major highlight of this event was the visit from Holland of my best friend Jason Hatton. He had wanted to see the transit of 2004 but was unable to, since it coincided with his move from Mill Valley to the Netherlands to start his new career with ESA. This time he was determined not to miss it, and joined me for another one of our collaborations. The company of people coming up for the event made for a very enjoyable experience, indeed! A wonderful time was had by all!

I brought along two of my telescopes, one for imaging and the other for eyepiece observation. I did my shooting with my 4" Maksutov, with my Nikon D-5000 attached at prime focus. I resurrected my old C-90 for the eyepiece observation. Full aperture glass solar filters were employed on both. Many people showed up with welder's goggles, but one person, Melody, had a welder's hood that sported a fancy paint job that you typically see on trick racing helmets. Styling! A lot of people got to view the event through the C-90. It is an ideal instrument for this, and the ooh-ah factor was high. Jason enjoyed answering the many questions and some new friends were made. After the transit itself had passed, we still didn't leave right away. The view from here is to die for! If you get the opportunity to visit this site do it! Otherwise you are welcomed to join me up here again for the next transit in about 105 years from now. Cheers!





TRANSIT OF VENUS VIEWING SITE – NASA AMES
Joe Heavey



Above
SFAA at NASA AMES



Left
Solar Telescope View of Venus



Above
Space Suit Joe

Right
Sun Gun Close-Up



NIGHT SKY NETWORK
JULY 2012 - THE EVENING SKY

May Sky Map: <http://skymaps.com/skymaps/tesmn1207.pdf>
 May Sky Calendar: <http://skymaps.com/articles/n1207.html>

BAY AREA ASTRONOMY EVENTS

Kenneth Lum

<http://tech.groups.yahoo.com/group/bayastro/?v=1&t=directory&ch=web&pub=groups&sec=dir&slk=94>

<p>Wednesday, July 18 11:00 AM - 02:00 PM</p> <p>Lawrence Hall of Science 1 Centennial Drive Berkeley, CA 94720</p>	<p>THE TELESCOPE MAKERS' WORKSHOP is held every Friday night from 7pm - 10pm, excluding major holidays (e.g. Christmas Day and New Year's Day) that fall on Fridays. The Workshop is always closed on Memorial Day Weekend. Attendance every Friday night is not mandatory, and members work at their own pace. The Workshop meets at Chabot Space & Science Center, 10000 Skyline Blvd., Oakland. Contact us for more specific details:</p> <p>Contact: E-mail Richard Ozer (rozer@pacbell.net) or (510) 406-1914</p>
<p>Wednesday, July 18, 7:00 PM - Note later time</p> <p>SETI Institute Colloquium Series 189 Bernardo Ave Mountain View, CA</p>	<p>EXPLORE THE NIGHT SKIES AT THE CHABOT OBSERVATORIES For more information: http://www.chabot.space.org/</p> <p>Free Telescope Viewing Regular hours are every Friday & Saturday evening, weather permitting: 7:30pm - 10:30pm Come for spectacular night sky viewing the best kept secret in the Bay Area and see the magnificence of our telescopes in action!</p> <p>Daytime Telescope Viewing On Saturday and Sunday afternoons come view the sun, moon, or Venus through Chabot's telescopes. Free with General Admission. (weather permitting) 12pm - 5pm: Observatories Open</p>
<p>Wednesday, July 18 7:30 PM</p> <p>San Francisco Amateur Astronomers General Meeting</p> <p>Randall Museum - Theater 199 Museum Way San Francisco Geared for adults All ages welcome</p> <p>Info: 415.554.9600 or www.randallmuseum.org</p> <p>Cost: FREE Donations encouraged</p>	<p>Foothill Observatory is open for public viewing every clear Friday evening from 9:00 p.m. until 11:00 p.m. Visitors can view the wonders of the universe through the observatory's computer-controlled 16-inch Schmidt-Cassegrain telescope. Views of objects in our solar system may include craters and mountains on the moon, the moons and cloud-bands of Jupiter, the rings of Saturn, etc. Deep space objects including star clusters, nebulae, and distant galaxies also provide dramatic demonstrations of the vastness of the cosmos. The choice of targets for any evening's viewing depends on the season and what objects are currently in the sky.</p> <p>The public viewing programs at Foothill are free of charge and are open to guests of all ages. Please note that the observatory is closed when the weather is cloudy. Also note that visitor parking permits are available from the machines in the parking lots for \$3.00.</p> <p>Come to Foothill Observatory and join us in the exploration of our Universe!</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$3.00.</p>
<p>Friday, July 20 7:00 PM</p> <p>The Telescope Makers' Workshop</p> <p>Chabot Space and Science Center 10000 Skyline Boulevard Oakland, CA 94619-2450</p>	<p>Solar observing with a Hydrogen alpha solar telescope every clear Saturday morning. This allows spectacular views of solar prominences and unusual surface features on the Sun not otherwise visible with regular white light telescopes. Admission is free.</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd. exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$ 3.00.</p>

<p>Friday, July 20 Saturday, July 21</p> <p>Chabot Space and Science Center 10000 Skyline Boulevard Oakland, CA 94619-2450 (510) 336-7300</p> <p>Children under 10 not admitted.</p>	<p>MUSIC OF THE SPHERES - VIRGINIA KRON, SINGING STRINGS Lick Observatory hosts its 32nd season of Music of the Spheres summer concerts in 2012. Concerts feature a wide variety of music. Programs include the concert, a talk by a University of California astronomer about current research, and (weather permitting) viewing through the historic Great Lick Refractor and the Nickel 40-inch telescope. Knowledgeable local amateur astronomers outside the buildings provide additional telescopes and informal astronomy discussions.</p> <p>RICHARD KRON, University of Chicago THE PLURALITY OF INHABITED WORLDS: ASTRONOMY AND POPULAR IMAGINATION, 1800 – 1917</p> <p>Tickets on sale at: http://www.ucolick.org/public/sumvispro.html</p>
<p>Friday, July 20 9:00 PM</p> <p>Foothill Observatory Foothill Community College 12345 Moody Rd. Los Altos Hills</p>	<p>SUMMER FUN DAY: EXTREME SPACE</p> <p>What Wonderful Worlds: Exploring our Solar System with Imke de Pater, professor and Chair, UC Berkeley Department of Astronomy.</p> <p>Discussion from 11:00a.m.-12:00p.m. Space activities from 12:00-2:00p.m.</p>
<p>Saturday, July 21 10:00 AM – 12PM IF IT IS CLEAR</p> <p>Foothill College Observatory Foothill Community College 12345 Moody Rd. Los Altos Hills, CA</p>	<p>THE GEOLOGY OF THE TERRESTRIAL PLANETS: PERSPECTIVES ON THE EARTH JIM HEAD, Planetary Geosciences Department, Brown University</p> <p>The dynamic nature of the Earth (erosion and plate tectonics) has largely destroyed the record of the formative years of our own Home Planet. Revealed on the other Earth-like planetary bodies (Moon, Mercury, Mars, and Venus) are startling and diverse landscapes recording the geological record of this early history, the very chapters that are missing from Earth. Results from the first half-century of solar system exploration have unveiled a vision of our formative years, where we have been, and indeed, where we may be going in the future.</p>
<p>Saturday, July 21 11:00 AM - 12:00 PM</p> <p>UC Berkeley Room 100 Genetics & Plant Biology Bldg. Berkeley, CA 94720</p>	<p>GALILEO RECONSIDERED A Presentation by JOHN DILLON, Former Curator of the Randall Museum & Past SFAA President</p> <p>Join John Dillon for a presentation - Galileo Reconsidered. Three years ago the world celebrated the 400th anniversary of Galileo's telescope and the revolutionary observations he made with it. The legend was retold of how his discoveries challenged the ancient authority of Aristotle, the Universities, and especially the Church – inevitably leading to his infamous trial and personal disgrace but defiantly opening the way for “modern” science. The popular account often ignores recent work by historians of science that reveals a subtler, more complex, and more interesting story. Dillon will weave the most recent research into a review of the intricate relationship between Galileo, telescopes, the Church and the emergence of "modern" science.</p> <p>John Dillon retired as Curator of the Randall Museum and is a Past President of the SF Amateur Astronomers. He did his graduate work in Zoology and Philosophy as a NASA Fellow at Duke University and studied History of Science at Cambridge University. For many years he has been teaching extension classes in the History and Philosophy of Science at UC Berkeley, SF State, and Stanford University.</p>
<p>Saturday, July 21 7:30 PM - 11:00 PM</p> <p>Mt. Diablo Astronomical Society Mt. Diablo State Park Lower Summit parking lot Walnut Creek, CA 94598</p>	<p>THE TELESCOPE MAKERS' WORKSHOP is held every Friday night from 7pm - 10pm, excluding major holidays (e.g. Christmas Day and New Year's Day) that fall on Fridays. The Workshop is always closed on Memorial Day Weekend. Attendance every Friday night is not mandatory, and members work at their own pace. The Workshop meets at Chabot Space & Science Center, 10000 Skyline Blvd., Oakland. Contact us for more specific details:</p> <p>Contact: E-mail Richard Ozer (rozer@pacbell.net) or (510) 406-1914</p>
<p>Saturday, July 21 Sunset: 8:27 PM</p> <p>San Mateo County Astronomical Society Star Party</p> <p>Crestview Park San Carlos</p>	<p>EXPLORE THE NIGHT SKIES AT THE CHABOT OBSERVATORIES For more information: http://www.chabotspace.org/</p> <p>Free Telescope Viewing Regular hours are every Friday & Saturday evening, weather permitting: 7:30pm - 10:30pm Come for spectacular night sky viewing the best kept secret in the Bay Area and see the magnificence of our telescopes in action!</p> <p>Daytime Telescope Viewing On Saturday and Sunday afternoons come view the sun, moon, or Venus through Chabot's telescopes. Free with General Admission. (weather permitting) 12pm - 5pm: Observatories Open</p>

<p>Saturday, July 21 8:30 PM - 11:00 PM</p> <p>Joseph D. Grant Ranch 18405 Mt. Hamilton Rd San Jose, CA 95140</p>	<p>Foothill Observatory is open for public viewing every clear Friday evening from 9:00 p.m. until 11:00 p.m. Visitors can view the wonders of the universe through the observatory's computer-controlled 16- inch Schmidt-Cassegrain telescope. Views of objects in our solar system may include craters and mountains on the moon, the moons and cloud-bands of Jupiter, the rings of Saturn, etc. Deep space objects including star clusters, nebulae, and distant galaxies also provide dramatic demonstrations of the vastness of the cosmos. The choice of targets for any evening's viewing depends on the season and what objects are currently in the sky.</p> <p>The public viewing programs at Foothill are free of charge and are open to guests of all ages. Please note that the observatory is closed when the weather is cloudy. Also note that visitor parking permits are available from the machines in the parking lots for \$3.00.</p> <p>Come to Foothill Observatory and join us in the exploration of our Universe!</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$3.00.</p>
<p>Saturday, July 21 10:00 AM</p> <p>Foothill Community College 12345 Moody Rd. Los Altos Hills, CA</p>	<p>Solar observing with a Hydrogen alpha solar telescope every clear Saturday morning. This allows spectacular views of solar prominences and unusual surface features on the Sun not otherwise visible with regular white light telescopes. Admission is free.</p> <p>Foothill Observatory is located on the campus of Foothill College in Los Altos Hills, CA. Take Highway 280 to the El Monte Rd. exit. The observatory is next to parking lot 4. Parking at the college requires visitor parking permits that are available from the machines in the parking lots for \$ 3.00.</p>
<p>Saturday, July 21 11:00 AM - 12:00 PM</p> <p>UC Berkeley Room 100 Genetics & Plant Biology Bldg. Berkeley, CA 94720</p>	<p>Dr. Jeff Silverman, UC Berkeley Exploding Stars, Dark Energy, and the Runaway Universe</p> <p>Some of the brightest and most fascinating objects in the Universe are exploding stars known as supernovae. These colossal outbursts result from the deaths of stars and for a time can outshine the entire galaxy in which they are found. Observations of very distant supernovae provided the first evidence that our Universe is accelerating in its expansion, likely due to a repulsive and mysterious "dark energy." It was these observations that were recently awarded the 2011 Nobel Prize in Physics.</p>
<p>Saturday, July 21 07:30 PM - 11:00 PM-Mt. Diablo Astronomical Soc. mtg.</p> <p>Mt. Diablo State Park</p> <p>Lower Summit parking lot Walnut Creek, CA 94598</p>	<p>EXPLORE OUR MAGNETIC SUN Arrive at 7:30 to safely view the Sun through telescopes. Why does the sun have spots? How can it affect cell phones and create auroras? After sunset, we'll watch all the other stars appear!</p>
<p>Saturday, July 21</p> <p>San Mateo County Astronomical Society Star Party</p> <p>Star Parties At Crestview Park, San Carlos</p> <p>Sunset: 8:27pm</p>	<p>STAR PARTIES AT CRESTVIEW PARK - Come out and bring the kids for a mind expanding look at the universe</p> <p>The City of San Carlos Parks and Recreation Department and the San Mateo County Astronomical Society has open Star Parties twice a month. These events are held in Crestview Park, San Carlos California.</p> <p>Note that inclement weather (clouds, excessive wind and showers) will cause the event to be canceled without notice.</p> <p>For more information call Bob Black, (650)592-2166, or send an email to SMCAS@live.com or call Ed Pieret at (650)862-9602.</p> <p>Reasons to Attend If you have kids interested in space or planets bring them here for a real life view of planets, nebula, star clusters and galaxies. If you are thinking of buying a telescope or want help using a telescope you own, come here to talk with experienced users. If you think you might have an interest in astronomy come and talk to experienced amateur astronomers.</p> <p>Cautions Dress warmly and wear a hat. Visitors should park on the street and walk into the park so your headlights don't affect the observer's dark adaptation. Only park in the parking lot if you are arriving before dark and plan to stay until the end of the event. You shouldn't need lights but if you feel you do, only bring a small flashlight with the lens covered using red cellophane or red balloon. Please respect the telescopes and ask permission from the owner if you wish to touch. Parents, please watch your children. The park is residential, and adjacent to homes and backyards, please keep noise to a minimum.</p> <p>Schedule Time Astronomers arrive to set up at around sunset. Observing starts at about one hour after sunset and continues for two to three hours.</p>

Saturday, July 21
8:30 PM - 11:00 PM

Joseph D. Grant Ranch
18405 Mt. Hamilton Rd
San Jose, CA 95140

STAR PARTY

Join the Halls Valley Astronomical Group for a night of star gazing fun. Knowledgeable volunteers will provide you with a chance to look through high-powered telescopes and ask questions about the night sky. Meet at Halley Hill, across from campsite 22. Park entrance gate closes at 10pm. (408) 274-6121

NASA SCIENCE CAST

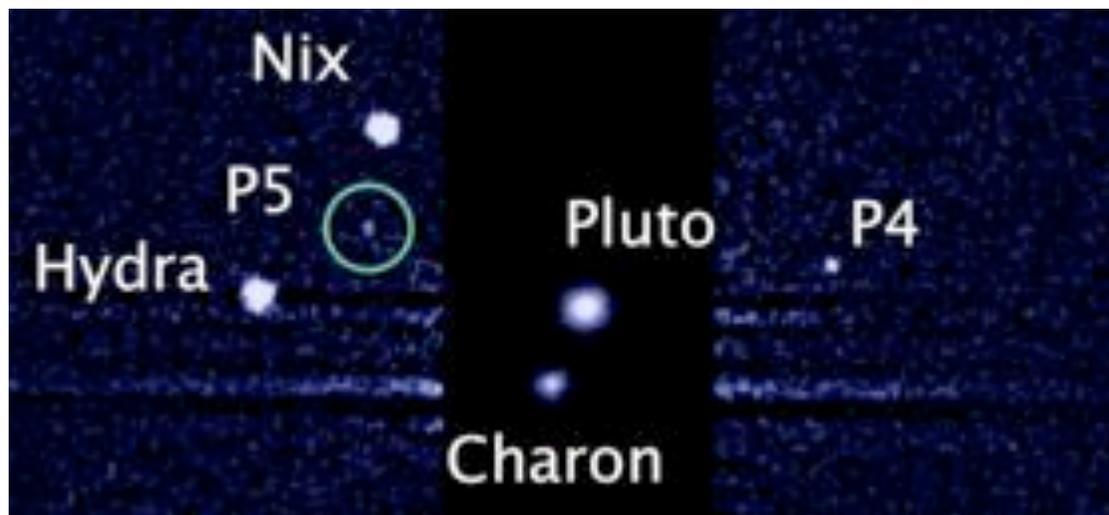
The Science@NASA team is pleased to announce a new product: the ScienceCast. Every week, we produce a short video highlighting a topic in NASA science news. A complete list of ScienceCast episodes may be found on Science@NASA's Youtube channel: <http://www.youtube.com/user/ScienceAtNASA> . Enjoy!

<http://science.nasa.gov/science-news/>

Fifth Moon Discovered Around Pluto

July 13, 2012: A team of astronomers using NASA's Hubble Space Telescope has discovered another moon orbiting the dwarf planet Pluto.

They say the new moon, Pluto's 5th, is likely irregular in shape and 6 to 15 miles across. Provisionally designated S/2012 (134340) 1, it was detected in nine separate sets of images taken by Hubble's Wide Field Camera 3 on June 26, 27, 29, and July 7 and 9. The moon circles Pluto in a 58,000 mile-diameter orbit.



This image, taken by NASA's Hubble Space Telescope, shows five moons orbiting the distant, icy dwarf planet Pluto. The green circle marks the newly discovered moon, designated P5, as photographed by Hubble's Wide Field Camera 3 on July 7. The observations will help scientists in their planning for the July 2015 flyby of Pluto by NASA's New Horizons spacecraft. P4 was uncovered in Hubble imagery in 2011.

(Credit: NASA; ESA; M. Showalter, SETI Institute)

"The moons form a series of neatly nested orbits, a bit like Russian dolls," notes team leader Mark Showalter of the SETI Institute in Mountain View, Calif.

The Pluto team is intrigued that such a small planet can have such a complex collection of satellites. The new discovery provides additional clues for unraveling how the Pluto system formed and evolved. The favored theory is that all the moons are relics of a collision between Pluto and another large Kuiper Belt object billions of years ago. (The Kuiper Belt is a broad zone of icy Pluto-like bodies orbiting beyond Neptune. Pluto itself is considered to be a Kuiper Belt object.)

The new detection will help scientists navigate NASA's New Horizons spacecraft through the Pluto system in 2015, when it makes an historic and long-awaited high-speed flyby of the distant world.

A ScienceCast video previews New Horizons visit to Pluto in 2015. [Play it](#)



The team is using Hubble to scour the Pluto system to uncover potential hazards to New Horizons. Moving past the dwarf planet at a speed of 30,000 miles per hour, the spacecraft could be destroyed in a collision with even a BB-shot-size piece of orbital debris.

“The discovery of so many small moons indirectly tells us that there must be lots of small particles lurking unseen in the Pluto system,” says Harold Weaver of the Johns Hopkins University Applied Physics Laboratory in Laurel, Md.

“The inventory of the Pluto system we’re taking now with Hubble will help the New Horizons team design a safer trajectory for the spacecraft,” adds Alan Stern of the Southwest Research Institute in Boulder, Colo., the mission’s principal investigator.

Pluto’s largest moon, Charon, was discovered in 1978 in observations made at the United States Naval Observatory in Washington, D.C. Hubble observations in 2006 uncovered two additional small moons, Nix and Hydra. In 2011 another moon, P4, was found in Hubble data.

In the years following the New Horizons Pluto flyby, astronomers plan to use Hubble’s planned successor, NASA’s James Webb Space Telescope, for follow-up observations. The Webb telescope’s infrared vision will be able to measure the surface chemistry of Pluto, its moons, and many other bodies that lie in the distant Kuiper Belt along with Pluto.

For more information about New Horizons and its mission to Pluto visit <http://pluto.jhuapl.edu/>

Production editor: [Dr. Tony Phillips](#) | Credit: [Science@NASA](#)

More Information

[Dwarf Planet Mysteries Beckon to New Horizons](#) -- Science@NASA

[New Horizons Becomes Closest Spacecraft to Pluto](#) -- Science@NASA

[Visit to Pluto](#) -- NASA ScienceCast video

The Pluto Team members are M. Showalter (SETI Institute), H.A. Weaver (Applied Physics Laboratory, Johns Hopkins University), and S.A. Stern, A.J. Steffl, and M.W. Buie (Southwest Research Institute). -- Science@NASA

The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency. NASA’s Goddard Space Flight Center in Greenbelt, Md., manages the telescope. The Space Telescope Science Institute (STScI) in Baltimore conducts Hubble science operations. STScI is operated for NASA by the Association of Universities for Research in Astronomy, Inc., in Washington, D.C.

