

## OCA BOARD NOMINATIONS DUE DECEMBER 9TH!!!



This image of Mars with the Seven Sisters (Pleiades) was taken from the Desert View campground on the Grand Canyon's South Rim by Wally Pacholka on September 3rd using a 35 mm Fuji digital camera with 50 mm equivalent lens at f/2. It was selected as NASA's Earth Science Picture Of The Day for October 31st and is aptly titled 'Martian Halloween'. (courtesy Wally Pacholka)

### OCA CLUB MEETING

The free and open club meeting will be held Friday, December 9th at 7:30 PM in the Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. The featured speaker this month is yet to be arranged as of press time. Please check [www.ocastronomers.org](http://www.ocastronomers.org) for more details

NEXT GENERAL MEETING:

January 13th

### STAR PARTIES

The Anza site will be open this month on December 3rd and December 31st. The Black Star Canyon site will be open this month on December 24th. Members are encouraged to check the website calendar, for the latest updates on star parties and other events.

Please check the website calendar for the outreach events this month! Volunteers are always welcome!

*You are also reminded to check the web site frequently for updates to the calendar of events and other club news.*

### COMING UP

The next session of the Beginners Class will be held on Friday, December 2nd (and next month on January 6th) at the Centennial Heritage Museum at 3101 West Harvard Street in Santa Ana.

GOTO SIG: TBA (contact coordinator for details)

Astrophysics SIG: Dec. 16th, Jan. 20th

Astro-Imagers SIG: Dec. 20th, Jan. 17th

EOA SIG: Dec. 26th, Jan. 23rd

Dark Sky SIG: TBA (contact coordinator for details)

# December President's Message

Welcome to the December edition of the Sirius Astronomer.

Can you believe the Holiday Season is here again and 2005 is almost over! How quickly the year has passed. This year "2005" will be remembered for some of these astronomical milestones: the intentional collision of a comet; the landing of a probe on Titan; many new close up discoveries of moons like Hyperion and lakes on Titan; Tycho's Supernova remnant in Cassiopeia found; the return to flight for the Shuttle program; unprecedented views of Mars in 3D from Mars Express; and Messenger on its way to Mercury. 2005 has seen an explosion of astronomy-related accomplishments and will be hard act to follow for the coming years.

OCA has also seen noteworthy milestones in 2005 like newly completed observatories; a new county approved Anza Site Plan which will allow expansion, paving the way for new pads and observatories for members; restructured Anza site guidelines known as ASCR's; organized weed cleanup of Anza by many supportive members; and Handicap access to Anza House.

Much more is planned for 2006.

## Board Notes

At our last board meeting, we discussed the acceptance of our new Anza Site Plan. For over 2 years the board has been working to get county approval. Now that's happened, so we will be presenting this plan to you during future meetings and publications. The new site plan envisions over 70 new pads and 28 observatories. One development is a proposal for a new "Members Observatory" which will house a 17.5" fork-mounted Newtonian donated recently by the Mills family. More to come regarding this exciting venture.

Other immediate discussions involved our financial condition of the club. We have major expenses coming in 2006 such as the OCA Observatory Roof Replacement, northwest fence repair, grading for the northwest territory (new pads and Observatory sites), AstroImage 2006 and Anza maintenance-related issues. OCA has a sound financial state but we will need to fundraise and prepare for these ambitious programs.

## Anza Notes

Special Thanks to Barbara Toy for coordinating the reconditioning of the OCA Observatory. This involves minor repairs to the roof, lots of prep work for painting, and reconditioning areas related to the roof roll-off structure. Barbara along with others spent the last two star parties making these needed repairs.

## Monthly Awards

Our November general meeting brought us more deserving recipients. **Karen Schnabel** was selected by the board as our November recipient. The OCA recognizes the countless hours of devotion that Karen gives each month as our Librarian and RTMC liaison. Our Library is a considerable contribution to the club and we appreciate Karen's leadership.

**Bill Patterson** is our September recipient recognized for his service as the AstroImagers SIG Captain. Bill has headed up this important SIG and has accelerated it to one of OCA's largest and still growing Special Interest Groups.

## Elections

I know we just voted but I promise that this election won't cost us \$50 million! This year's election shows to be promising. We have many *new* and *seasoned* members who have been nominated for all positions. I can't remember the last time we didn't have to beg folks to sign up! Nominations close at the December meeting so there is still room for any member wishing to be a vital part of the club. It's fun and rewarding to serve a club of this size!

Thanks for reading and see you at Anza and the December meeting!

**Dave Radosevich**  
**OCA President**

AROUND OCA  
**By Barbara Toy**

As I write this, I'm still on an Outreach "high" from the Sally Ride Festival, one of our rare daylight outreaches, which was on Sunday, November 13. This festival is aimed at keeping girls interested in science, math and related areas during the vulnerable period from fifth to eighth grades, when a lot of girls tend to drop out of those areas of study. Dr. Ride herself is an active participant in these events, and I got to watch her in action at the end of the festival, graciously giving interviews to a number of people, including Larry Evans of the Orange County Space Society (see picture). OCA had a real booth at the "Street Fair" portion of the event this time in addition to around ten solar telescopes of different types (and one that showed Venus). I spent most of my time at the booth, answering questions and talking to the girls who were attending, their parents, some teachers, and even other exhibitors. Almost all of the girls who came by the booth had really good questions, and were genuinely interested in learning more – and they were all exceptionally well-behaved, even asking if they could take pamphlets and other materials I had out on the table before taking them. Besides the fun of dealing with the girls and other people attending the event, we had a lot of fun looking at the other booths and talking to the other exhibitors – our position was right between the booths for the Mars Society and Meade Instruments, and the Orange County Space Society was only two booths away, so we were well located among really compatible folks.

Last year we were clouded out through almost the entire festival, but this year the weather cooperated and so did the sun by providing a sizable sunspot and a good amount of activity along the limb. We were able to show different aspects of the sun through different filters, and we even had the two large prints that Dr. Tom Spirock, our November speaker, brought to the meeting to help illustrate his talk. Dr. Spirock generously gave them to Mike Bertin, who's a docent at Palomar, to use in some of the events he does at Palomar, and they were a perfect addition to what we were doing for the festival. We had an excellent turnout of members with their equipment for this event, and I would like to thank Paul Kreitz and his wife, Don Lynn, Dan Iler, Val and Linda Akins, Matt Ota, Joe Busch, Arnie Grimm, Mike Bertin and Pamela Beach for their help (and if I forgot someone – I do apologize!).

This festival has been such a success at UCI that it looks like it'll be repeated, so, if you missed it this year, keep posted and plan to come along next year – you won't regret it!

Of course, we have a lot of outreach events going on this winter besides the Sally Ride Festival. During this season, most of them are at schools, and at night – so we can show the kids and their families at least the brightest objects in the night sky. Take a look at the calendar on the club's website for the upcoming events, and plan to come to at least those that are near you – it's a wonderful way to spend an evening, and we have it on reliable authority that the kids will be talking about it for months (*continued next page*)



*Sally Ride is interviewed by Larry Evans of OCSS at the end of the festival at UCI*

afterward. You can contact Jim Benet to be put on his email list for notices about upcoming outreaches, and you can talk to him, or me, or any of the regular outreachers if you have questions about what's involved. Or just take a chance, come out, and see for yourself...

Turning now to slightly more mundane matters...

### **Board Election for 2006 –**

Here we are at election season again – the OCA election, that is. This is the time when the Board of Trustees for the coming year is selected, and we all do our best to encourage new people to run for the Board. If you want to keep track of who's running, please check the website – as Member Liaison, I've taken on the task of collecting nominations and I've posted a list of the candidates to date. I'll keep that updated as I receive new nominations, and I'm also asking the candidates to provide campaign statements, which I'll also post together on a single page on the website. I'll be sending all of the statements that I receive by the December deadline for the Sirius Astronomer to Steve Condrey as well, to be included in the January issue of the newsletter.

As of this writing, all of the members of the 2005 Board are running again, with the possible exception of Tony Obra, and I'm very happy to report that we also have two new candidates for the Board, Alan Smallbone and Leon Aslan. Alan is a relatively new member of the club, but has been very active in the AstroImage group and has been providing the presentations at the AI meetings geared toward less experienced imagers. He's also agreed to do the Beginners' presentation on DSLR imaging for the AstroImage 2006 conference (something to keep in mind if you're interested in learning to use a digital SLR camera for astrophotography!). He's volunteered to help fine-tune the Kuhn, and is also participating on the Anza Site Planning Committee. Leon has been active with the AstroImage group for several years, and has provided presentations at the meetings and also served as co-chair of the group. I'm sure many of you are familiar with him through his imaging activities and his participation in the AstroImage email group, among other things. Both Leon and Alan would be excellent additions to the Board, and I'm delighted they've agreed to run.

For those of you who are interested in running for a position on the Board, you can email me to be added to the list of candidates (btoy@cox.net), or you can be formally nominated at the general meeting on December 9. Nominations formally close at end of the December meeting, so be sure you get your nomination in before then! You can nominate other people by emailing me, but please be sure you have their consent – we once had a candidate who first found out he'd been nominated when he saw his name on the ballot. He was a good sport about it, but we don't want that to happen again.

As I've said at length in various past columns, serving on the Board is a great experience, and gives you a perspective on the club and its operations that you can't get any other way. Put that way, it may not sound all that thrilling, but it really is – you'll learn about events and opportunities you wouldn't be able to find out about any other way, and, if you take advantage of some of those opportunities, you'll meet people you wouldn't have met otherwise, and get involved in projects you might never have learned about otherwise. And, of course, as a trustee you get to play a major role in determining the future course of the club – and there's incredible satisfaction in doing that job well. So – why wait any longer? Put your name out there and run for trustee! And, if you've served for a year on the Board at any time – consider running for President or Vice President!

As to the election process itself, I'll finalize the ballot after the close of nominations at the December meeting, and you should be able to download a copy from the website shortly after that. A copy of the ballot will also be included in your January Sirius Astronomer, and ballots will be available at the January meeting. You can vote by mail (directions should be on the ballot), or at the general meeting on January 13, 2006. The election closes at the end of the January meeting, so make sure you post your ballot so that it's postmarked no later than January 13, 2006, or put your ballot in the ballot box at the front of the auditorium at the January meeting.

I'm told that Bob Evans has been in charge of running the election process at the January meetings, verifying the ballots, and counting the votes for over twenty years, and he's agreed to handle these important functions again for this election. We all owe him tremendous thanks for taking care of all of these election details and doing it so well.

### **The Presidency Revisited...**

Even though I've rather enjoyed my sabbatical from the Board this past year, and I've been kept pretty busy with other club activities, after a lot of consideration I've decided to run again for President. My main reason for this is that my time away from the Board has allowed me to think about such things as Board practices and procedures from a broader perspective, and I  
(continued next page)

# An Arizona Astronomical Adventure

Craig Bobchin

My job requires that I travel. Sometimes a lot, sometimes not so much. Sometimes I'm lucky like the times I had to spend five months in Monterrey, Mexico and got to skies so dark I was able to see my shadow by the light of the Milky Way, or when I spent 3 days in Hanford, Washington and was able to hook up with the local astronomy group at one of their meetings. The skies in Hanford are pretty dark and you can easily see the winter Milky Way from the center of town.

Other times I'm not as lucky, such as having to go to San Francisco, or Dallas, or Houston. Since I have my nights free, whenever possible I use this travel time to view the skies from places other than light polluted Orange County.

Since the middle of September through the first week of November, I've been on the road, this time to Scottsdale, Arizona. Now anyone who has been to the Scottsdale/Phoenix area knows that it is almost as light polluted as O.C. But if you are willing to drive a little bit, there are pretty dark skies in reach.

When I first got to Scottsdale I was there for a week of training. I brought along my Canon 20d, a couple of lenses, and a small table top tripod as well as a pair of 7X50 binoculars. The first night I went in search of darkness. I found a decent place on a dirt road on an Indian reservation and set up the camera. I spent a few hours there and took a few shots. Unfortunately the site was not as dark as I wanted so the next night I decided to go in a different direction.

After looking at the Clearsky clock's light pollution map I decided to head north on Highway 87 and see what I could find. After about 20 minutes of driving I found a dirt road (Arizona seems full of them) and pulled off. I looked up and was amazed. Even with the nearly full moon hanging overhead I was able to make out the Milky Way with ease. Overall the sky was as dark as I see at Anza, although the west and south had encroaching light domes. I again set up the camera and started taking pictures. The binocs were nice, but really needed a tripod or parallelogram mount. I really missed having a telescope with me. I was able to see many of my favorite objects such as M13, M15, M31 was there but washed out by the rising growing moon.

I went out every night that week savoring the views and thinking that if I have to travel this is not too bad, and that I wonder what it would look like without the moon hanging over head. Little did I know that I would soon get a chance to find out. But that story will have to wait until next month.

*(continued from previous page)*

realized that there are things I would like to do to improve member accessibility to the Board that I can do most easily as President. These include such things as establishing firm procedures so agendas are regularly posted on the website before Board meetings, making minutes of Board meetings more readily available to the general membership, and establishing a regular practice of reporting Board actions to the general membership. The President's Message is one way this could be done, but I would be interested in suggestions others might have to make this an effective process that can be easily used by future Boards, as well as mechanisms to make sure that it does continue to be used.

I would also like to develop a regular process that will ensure that any member whose interests would be affected by a proposed Board action automatically receives direct notice of the proposed action and has a meaningful opportunity to participate in the discussion leading to the final decision. This has been done on a rather hit-or-miss basis in the past, but, as we increase the variety of activities that club members are engaged in, and as we increase the numbers of pads and observatories at our Anza site, among other things, we have ever-increasing numbers of members who could be directly affected by Board actions. Having a more formalized process will help ensure that rights of individual members are protected, and will also get more complete information to the Board as it considers these issues, which should lead to better decisions overall.

These are some of my goals, and I would be very interested in hearing what all of you think about these issues, as well as suggestions you might have for what could be done to help bridge the gap between the Board and the general membership. Of course, one of the best ways the bridge that gap would be for more members to get involved with the Board – as candidates for office, visitors at Board meetings, or even as volunteers interfacing with Board members. Most Board members are pretty accessible a lot of the time, and many of them can be found at Special Interest Group meetings or at Anza or Black Star Canyon for the star parties, and I expect that will continue regardless of who is ultimately elected for next year. It's good to get to know at least some of the people who are deciding club policy, and talking to them about issues before the Board will often give you a different a perspective on the Board itself, what it does and why. Regardless of what happens with this election, the 2006 Board will be making important decisions that will affect all of the members in one way or another – so I hope you'll take advantage of whatever information is available to learn more about your governing body and the issues before it, and that you'll participate in meetings where issues of concern to you are on the agenda. We'll all benefit if you do.

© Barbara Toy, November, 2005

# Observatories at the Anza Site - Part One

Dave Kodama

Regular visitors to the OCA's Anza observing site know that the past decade has seen a significant expansion of the facilities — concrete pads with electricity on the Football Field, Anza house, a new pad area called Mars Hill, and satellite internet access. The site infrastructure has grown significantly since the days when there was only one stoplight between the freeway and the Anza site!

Perhaps less publicized has been a parallel growth boom in the members' observatory area. It is probably no surprise to anyone that all of the recent observatories were built by members primarily for the purposes of doing imaging. The increasing equipment complexity and precision required to do serious imaging is no doubt a big factor in this trend. With a permanent setup, much less time is spent in setup and teardown, and much more in doing actual image acquisition. As in the case of observing pads, individual members privately fund and build these structures after submitting plans for approval by the OCA's board of trustees.

A dozen years ago (as I recall it) there were 3.1 observatories on the site besides the club's observatory. The 0.1 observatory factor comes from the pile of construction material that was in the observatory area, intended for an observatory which was never built. The other observatories were the concrete block structure near what is now the Mars Hill area, and two observatories across the main site road in the official observatory area, which, for lack of an official name, I'll call the "Observatory Plateau."



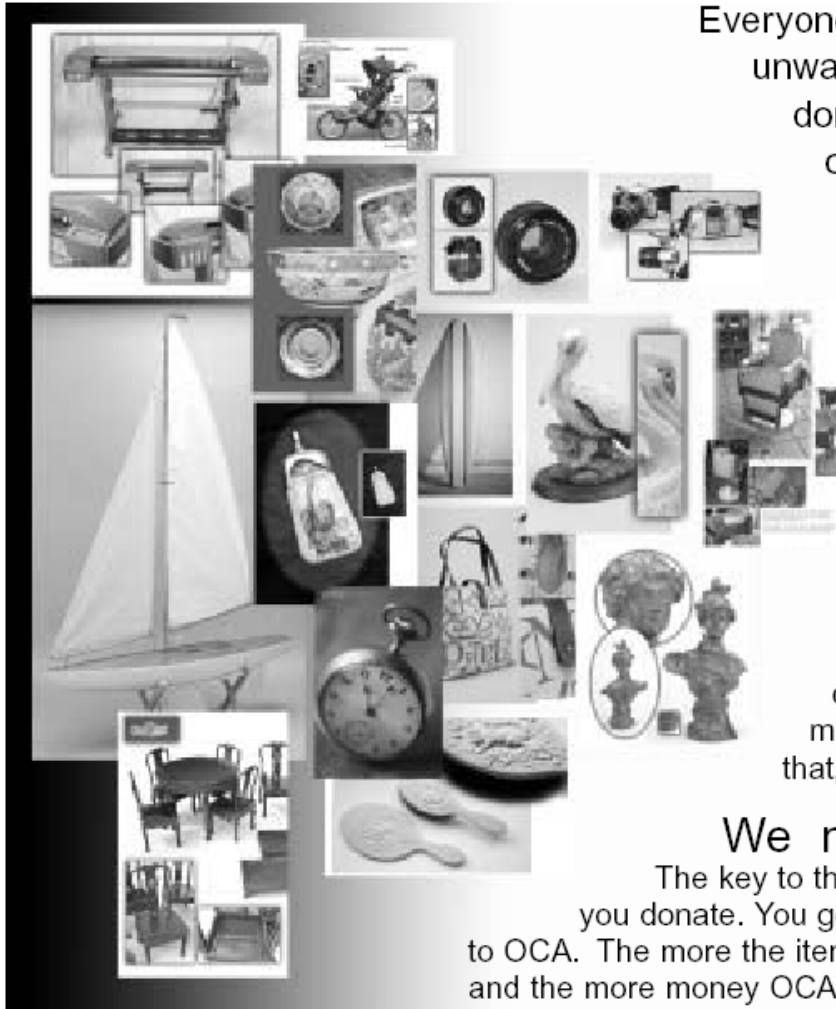
By the time I had an opportunity in 2002 to start my own observatory project, 5 additional observatories had been constructed — one next to the club's observatory (Russ Sipe's *Star Cruiser*), and four on the Observatory Plateau (above).

By 2005 when I could finally declare my own observatory "complete," besides my building, there were 3 more new ones, bringing the count up to 10 on the Observatory Plateau.



Having all of these different examples in one place and being able to talk to the builders was of tremendous value to me as I pondered my own design options, so it occurred to me that a virtual tour of the observatories might be of interest to other members contemplating their own observatories. So stay tuned as we take a tour of the OCA observatories!

# Don't Forget! Bring In Your Items for the OCA Auction!



Everyone in the club has some unwanted items that they don't use at home or at the office that are too valuable to throw away, so they just get stored forever!

We are asking you to clean out your closets, dust off these items and donate them to OCA .

We will turn these items into cash by putting them in eBay auctions. There are over 800 members in OCA. Our goal is to just get one good item to auction from each member. If you would like to donate more, that,s wonderful!

## We need your help!

The key to the OCA auction is the quality of the items you donate. You get a tax deduction on anything you donate to OCA. The more the item is worth the better the deduction you get and the more money OCA gets for the needed ANZA repairs

### Some Suggested Types Of Items

Antiques • Business & Industrial Equipment • Cameras & Accessories • Cars & Accessories  
Clothing, Shoes & Accessories • Collectibles • Computers & Networking • Electronics  
Jewelry • Memorabilia • Musical Instruments • Sporting Goods • Sports Memorabilia  
Hobbies • Video Games • Astronomy

We will collect your items at the general meetings. If you can't come to the meetings or if you have trouble getting your items here because they are too large you can make arrangements to have them picked up.

If you have any questions concerning this OCA eBay fundraiser we ask that you email Wendy Adams at [wadams@clearpointadv.com](mailto:wadams@clearpointadv.com)  
Please put OCA eBay in the subject line.

To setup a pickup time call Larry McManus at Clearpoint.

714 731 5542

# ASTROSPACE UPDATE

November 2005

Gathered by Don Lynn from NASA and other sources

To find out more on these topics, or those of past months' columns, through the World Wide Web, send your Web browser to our OCA Web site (<http://www.ocastronomers.org>), select Space Update Online, and the topics are there to click on.

**Cassini** (Saturn mission) made its only planned close (310 miles) flyby of the moon Dione in October. It showed a heavily cratered surface like other Saturnian moons, but differed with its streaky terrain. The fine streaks cross all other features, so must have been created last. The streaks are seen to be cracks and fractures when viewed close-up, and were probably made by tectonic movement of the surface. The cracks appear to be older versions of the cracks found on Enceladus, which have been dubbed "tiger stripes". The ultraviolet spectrograph detected water ice, as expected. Ice in the cracks appears different than the ice in surrounding terrain, and the difference is believed to be caused by different sizes of ice grains. The fields and particles instruments found no evidence of atmosphere at Dione. This would imply that it is not a source of material making up the E-ring, even though it orbits within that ring. If Dione were giving off material, some of it would hover as a thin atmosphere. Further study will be made of the data gathered during the flyby to determine if colliding with E-ring material is affecting the moon's surface.

Following the Dione flyby, the best images ever were made of the tiny moon **Telesto**. It is an irregular potato-shaped chunk of ice. Next was another flyby of **Titan**, this time targeting Cassini's infrared and radar instruments onto the area where the Huygens spacecraft landed last January. This produced the highest resolution Cassini images of the area, and some features seen have been matched to features seen by Huygens during its descent.

Other recent findings about **Titan** concerned its **weather**. Methane clouds form only in some areas of Titan's middle latitudes, and near the south pole. One theory for the mid-latitude clouds is that ice volcanoes exist there and are throwing out excess methane, which condenses into clouds. Each cloud is long, forms and then rises to about 25 miles altitude, then takes about half an hour to dissipate. It probably does so by raining methane. Another theory is that rising air currents form the clouds. There is no evidence to support other theories, such as that tidal effects, mountains, or lakes form the clouds.

**Hubble Space Telescope** (HST) has discovered 2 more moons orbiting Pluto. This is the first body in the Kuiper Belt found to have more than 1 moon. Planetary scientists modeling the formation of Kuiper Belt objects, and Pluto in particular, will have to be able to show how 3 moons could happen. It may complicate the ongoing effort of the International Astronomical Union to define a planet. The new moons are more than 9 magnitudes fainter than Pluto, and are estimated to be between 40 and 125 miles across. They are about 2 to 3 times as far from the planet as Charon, the previously known moon. The HST images were capable of showing moons down to about 10 miles across, so it is unlikely that there are more than 3 moons, unless they are quite small. Follow up observations will be made in February.

**Chandra** (X-ray space telescope) has found a neutron star that apparently formed from a star of over 40 times the Sun's mass. Theory says such a massive star, even after throwing out material in the late stages of its life, should have enough mass to end in a supernova explosion that forms a black hole. The neutron star was found in a huge cluster known as Westerlund 1, which like most dense clusters, is believed to have formed all its stars at once. Since more massive stars reach the end of their lives faster than less massive stars, all stars that have become neutron stars or black holes should be older than all the ordinary stars remaining in the cluster. The oldest stars remaining in Westerlund 1 are about 40 times as massive as the Sun, so the neutron star just found had to be more massive when it was an ordinary star. Theorists must now come up with ways that at least some stars of about 40 times the Sun's mass can lose far more mass before they go supernova. This implies that massive stars can send much more than previously thought of their heavy elements into space to eventually get incorporated into a future generation of stars. It also means fewer black holes are formed than thought. This will affect theories of star formation and galaxy formation. More observations need to be made to find neutron stars and black holes in this and similar clusters to answer some of the questions raised by this find.

**Cloudshine** – Very long exposures made with infrared using ground-based large telescopes have imaged in detail clouds of dark nebulas (dark in visible light) illuminated by starlight from outside the gas clouds. All previous images of gas clouds have been made by the light from stars within the cloud, but many clouds do not have such stars within. We know there are many clouds without stars within because they obscure the stars or nebulas behind them, such as the dark lanes in the Trifid Nebula. The newly seen phenomenon, lit from outside, has been named cloudshine. It is believed that this technique will revolutionize the way astronomers map stellar birthplaces. Hints of cloudshine have been seen with other techniques, but with nowhere near the clarity now seen.

**Spitzer** (infrared space telescope) has spotted the beginnings of planet formation around brown dwarfs, stars that never grew large enough to sustain nuclear burning of hydrogen that powers regular stars. Clumps of microscopic dust grains and tiny crystals were found orbiting 5 brown dwarfs, out of 6 that were examined. Many planetary scientists doubted that the same planet-forming processes would occur around such small stars as happens with normal-sized stars. This implies that planet hunting, which has been so successful at Sun-like stars, should be applied to brown dwarf stars too. The stars studied ranged from 40 to 70 times the mass of Jupiter and from 1 to 3 million years old. Besides finding relatively large grains of dust, other evidence that planet formation had begun included crystals of olivine and flattening of the dust disk.

Spitzer has detected infrared light that is probably light from **stars seen earlier** after the Big Bang than any other observed. The light is too distant and feeble to resolve individual objects. The light comes from such a distance that it has been severely redshifted, turning what was originally ultraviolet into infrared. Two theories exist explaining the observation: 1) it is the starlight from the first generation of hot huge stars that formed after the Big Bang, or 2) it is the light from matter falling into the first generation of black holes formed by the deaths of that generation of stars. Those first stars are thought to have formed about 200 million years after the Big Bang, and lasted only a few million years. To reveal the faint glow, a 10-hour observation was made of an area in Draco, and then the light of all the stars and galaxies



in the field were subtracted in the computer. The remaining infrared consisted of giant blobs of very faint light. There were hints of remaining infrared glow in COBE observations, but the Spitzer observation was the first to clearly show it. It is believed that the James Webb Space Telescope, now under construction, will be able to resolve this faint glow into individual star clusters, or perhaps stars.

**Speeding star** – One of the Very Large Telescopes in Chile has found a very massive star (8 times the Sun's) out in the halo of the Milky Way, about 200,000 light-years from here, moving away from us at 1.6 million miles per hour, fast enough to escape the gravity of our galaxy. Massive stars do not form in the halo, so it must have formed elsewhere. The young age of the star is not sufficient for it to have traveled to its present location from any star-forming region within the Milky Way. The Large Magellanic Cloud is within its range, however, so that is probably its birthplace. Stars do not form with speeds as large as this one, so some later event must have kicked it out of its home. The most likely even is the tearing apart of a double star by passage by a black hole. This usually sucks one star of the pair in while throwing the other out at high speed. Another possible, but less likely explanation is that it started out a less massive star (which has a longer life) born within the Milky Way, was thrown out by an encounter with a black hole, then recently collided with another star, raising its mass. The star was found in a survey looking for quasars, but it has also found a number of faint blue stars, including this one. Further observations are planned of the abundance of certain elements in the star and of the speed across our line of sight to confirm one theory. Only the motion in the direction of our line of sight has been measured so far, using a spectrograph to obtain redshift.

**FUSE** (far ultraviolet spectroscopic space telescope) has made the first direct detection of a companion star of Eta Carinae, one of the most massive and unusual stars in our galaxy. The fact that the companion star is far dimmer made it impossible to see at other wavelengths, such as visible light and near ultraviolet. But the companion star is quite hot, and so emits more short-wavelength (far) ultraviolet, so is detectable there. Astronomers had long been looking for a companion star because of changes seen in visible light, X-rays, and radio that seemed to have a period of about 5 years. The X-ray emission was theorized to come from a region near the star where the stellar winds from 2 stars collided. The FUSE observation supports this theory. The companion star is about as far from Eta Carinae as Saturn is from our Sun. An eclipse of the companion star by Eta Carinae was observed by FUSE. The observations were planned for the time that an eclipse was expected from the periodic changes in the X-ray data.

**Mars Odyssey** has taken high-resolution images of mid-latitude areas of Mars revealing landscapes that appear to have been formed by glacier action. Features include trains of debris in valleys, arcs of debris on steep slopes. This is far from the poles, where actual glaciers have been positively identified. The implication is that Mars has climate shifts that at some geological times allow ice to accumulate into glaciers far from the poles. Some scientists believe remnants of glaciers may still exist in these areas, insulated under debris.

**Mars Global Surveyor** (MGS) – A magnetic map of all of Mars has been made with data from MGS. It appears to show that the planet was shaped by great crustal plates being pulled apart or smashed together, much like the tectonic activity on Earth. Magnetic stripes exist like those on Earth created as new material

pushes plates apart during a time when the planet's magnetic field reverses occasionally. Earth's magnetic field reverses a few times every million years. The similar features on Mars appear to have been created long ago, when Mars' magnetic field was probably much stronger than now. This is one more piece of evidence for Martian plate tectonics. The alignment of volcanoes on Mars and the resemblance of Valles Marineris to a rift valley are other pieces of evidence that were previously known.

**Hayabusa** (Japan's asteroid mission) – has mapped the surface of the asteroid Itokawa, and has found rubble that looks like material thrown out of impact craters, but no visible craters. One guess is that seismic shaking is filling the craters with debris. The micro rover Minerva has been released onto Itokawa. It hops rather than moving by wheel power, and is somewhat larger than a softball. By the time you read this, the spacecraft is scheduled to have picked up one or more soil samples, and be headed on the 1.5-year trip back to Earth. However, reaction wheel failures may prevent accomplishing all of the mission objectives.

**Earth's core age** – The age of the Earth's core has in the past been measured by 2 different methods, and they disagree. Both methods use radioactive elements (hafnium and uranium) and their decay products. The age measured should be back to the time when the Earth melted throughout and the heavier material (mostly iron) sank to form the core. Hafnium said that the core formed 35 million years after the Earth formed (4.5 billion years ago), but uranium said it was 80 million years. New research has finally explained this discrepancy. The impact of a Mars-sized planet with the Earth that created the Moon should have melted the lead in the core and in effect restarted the uranium clock.

**Black hole** – Near-infrared images of the active galaxy NGC 1097 obtained with adaptive optics on one of the 8-meter VLT telescopes in Chile show the greatest detail yet seen of filaments of matter spiraling down into the black hole believed to be at the galaxy's center. The adaptive optics achieved a resolution of 1/6 arcsecond, which corresponds to 30 light-years at the distance of this galaxy. Starlight was subtracted by computer processing to reveal the fainter material swirling inward. The patterns of material match those of computer simulations of matter falling into a black hole.

**Venus Express** was launched on a Russian Soyuz rocket for a 5-month trip to Venus, where it is scheduled to go into polar orbit and study the planet for 2 Venusian days, nearly 500 Earth days. The Venusian day is a little longer than its year. Among the mysteries astronomers hope to solve are: what is preventing ultraviolet from the Sun from reaching the planet's surface; whether substantial sulfur dioxide found by the 1983 Pioneer Venus mission is still in the atmosphere or is transient; and whether there are surface hot spots that might be volcanoes. The fast-moving clouds and the solar wind interaction with the atmosphere will also be studied. Venus Express continues the European Space Agency's vigorous exploration of the solar system, as seen in the recent Smart-1 lunar mission, Huygens Titan lander, Rosetta comet mission, and Mars Express. A Mercury mission is planned for 2013. Venus Express carries a visible light/infrared/ultraviolet camera, 2 imaging spectrometers, an atmospheric spectrometer, a radio science experiment, a magnetometer, and a plasma instrument. The spacecraft used 5 spare instruments built for Rosetta and Mars Express. The last Venus mission was the NASA Magellan in the early 1990s, though Cassini did a gravity slingshot at Venus in 1999 on the way to Saturn.

*(continued next page)*

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**NASA competitions** were held to develop technologies for use in a space elevator or other space uses, but the prizes remain unclaimed. One competition was to develop a tether that is 50% stronger than an equal weight of the strongest commercially available material, and one entrant barely missed winning the \$50,000 prize. The other was to develop a cable-climbing apparatus powered only by light (a search light focussed on it), but the best entrant made only 1/5 of the way up a 200-foot vertical cable within the time limit. The competitions will be held again next year, with larger prizes, but stiffer rules.

**Giant Magellan Telescope** – The first of seven 8.4-meter mirrors has been cast for the Giant Magellan Telescope, to be in operation about 2016 in Chile. The University of Arizona’s mirror facility is rebuilding its test tower and building a 12-foot (3.7-meter) test mirror in preparation for figuring these mirrors. The telescope will have the light-gathering power of a 22-meter telescope, and the resolution of a 24.5-meter telescope. It is being constructed by the Carnegie Observatories, headquartered in Pasadena, which runs the Las Campanas Observatory in Chile, and formerly ran the Mt. Wilson Observatory.

**International Space Station (ISS)** on November 2 completed 5 years of continuous human occupation. The 12th flight crew is currently in residence. Those crews accumulated more time in space than all previous US space missions combined. 16 nations have contributed to ISS, the largest and most complex spacecraft ever built. It has about the volume of a 3-bedroom house. 97 people from 10 countries have visited ISS.

**Instant AstroSpace Updates:**

**Hubble Space Telescope** has for the first time observed our Moon, using its ultraviolet capabilities to search for oxygen-bearing minerals, which would be needed to sustain a future human long-term occupation there.

The **Large Binocular Telescope** in Arizona has done its first scientific observations, although with only one of the two 8.4-meter mirrors yet installed. It is planned to achieve the resolution of a 22-meter telescope (using adaptive optics), and the light-gathering power of an 11.8-meter telescope, when completed, surpassing the Keck 10-meter telescopes.

The 4.3-meter mirror blank of ultra-low-expansion glass was completed by Corning for use in the Lowell Observatory **Discovery Telescope**. Though it will be only the 5th largest telescope in North America when completed in 2010, it may be the highest-tech telescope.

Amateur astronomers observing the Moon passing in front of the star Upsilon Geminorum have provided evidence that the star is a **double star**, whose components are too close to have been detected by any other method. The star has been used as a calibration target for interferometers, since its diameter had been calculated from theory, but being a double makes it a bad calibration standard.

The Fourier Spectrometer on **Mars Express** has been put back into operation after its failure, by pinpointing the problem to the pendulum motor in the instrument, and activating the backup pendulum motor. The instrument measures chemical composition

of the Martian atmosphere, vertical distribution of temperature and pressure, and minerals in the soil.

One of the solid-fuel boosters is being replaced on the rocket to launch **New Horizons** (Pluto mission), due to damage sustained during Hurricane Wilma. The optimal window for launch is only 23 days beginning January 11, but the rocket should be ready, even with the unexpected replacement, by working over some of the holidays.

The best-resolved view yet of the area around the **black hole** at the center of the Milky Way was produced by the Very Long Baseline Array of radiotelescopes, operating at the highest frequency yet used on this target. It is within a factor of 2 of the resolution necessary to see the theoretically predicted, but not yet observed, shadow effect of a black hole. ■

## 2006 Anza Star Party Dates

courtesy Don Lynn

### Star Party Date                      New Moon

Jan 28	Jan 29
Feb 25	Feb 27
Mar 25 & Apr 1	Mar 29
Apr 29	Apr 27
May 27	May 26

**Note:** Memorial Day weekend coincides with the May 27 star party, so the club telescope may not be open that night.

Jun 24	Jun 25
Jul 22	Jul 24
Aug 19 & 26	Aug 23
Sep 23	Sep 22
Oct 21	Oct 21
Nov 18	Nov 20
Dec 16	Dec 20

**Note:** Dec 23 has a good moon, but coincides with Christmas weekend, so is not a star party.

## TECHNICAL ASSISTANCE NEEDED FOR OUR WEBSITE

We need someone to handle the technical side of the OCA website. Hassi Norlen is our Website Editor, and deals with content and a lot of the day-to-day maintenance, but we need someone who can deal with the “down-and-dirty programming” aspects of the website. If you have knowledge of VBScript, JScript, Javascript, Access Databases, Microsoft IIS (Internet Information Server) and ASP (Active Server Pages), as well as HTML, and understand and are able to code dynamic web sites running under Microsoft IIS developed using ASP and Microsoft Access databases, you have the necessary skills for this, and we could really use your help.

If you can help us out with this, please contact Hassi Norlen ([hassi@norlens.net](mailto:hassi@norlens.net) or 714/710-9444) or Barbara Toy ([btoy@cox.net](mailto:btoy@cox.net) or 714/606-1825).

## Voices from the Cacophony

By Trudy E. Bell and Dr. Tony Phillips

Around 2015, NASA and the European Space Agency plan to launch one of the biggest and most exacting space experiments ever flown: LISA, the Laser Interferometer Space Antenna.

LISA will consist of three spacecraft flying in a triangular formation behind Earth. Each spacecraft will beam a laser at the other two, continuously measuring their mutual separation. The spacecraft will be a mind-boggling 5 million kilometers apart (12 times the Earth-Moon distance) yet they will monitor their mutual separation to one *billionth* of a centimeter, smaller than an atom's diameter. LISA's mission is to detect gravitational waves—ripples in space-time caused by the Universe's most violent events: galaxies colliding with other galaxies, supermassive black holes gobbling each other, and even echoes still ricocheting from the Big Bang that created the Universe. By studying the shape, frequency, and timing of gravitational waves, astronomers believe they can learn what's happening deep inside these acts of celestial violence.

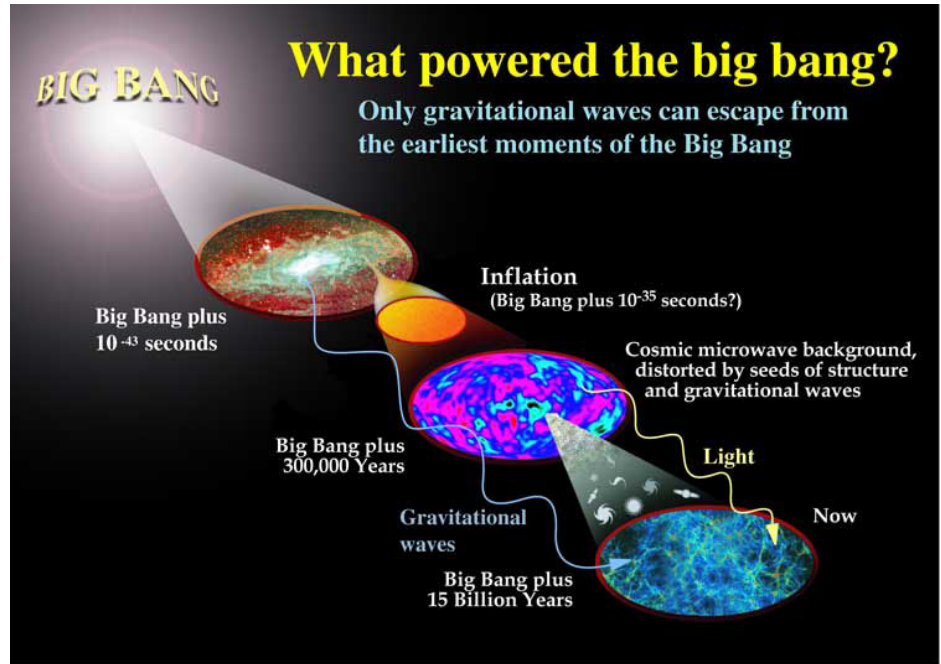
The problem is, no one has ever directly detected gravitational waves: they're still a theoretical prediction. So no one truly knows what they "sound" like. Furthermore, theorists expect the Universe to be booming with thousands of sources of gravitational waves. Unlike a regular telescope that can point to one part of the sky at a time, LISA receives gravitational waves from many directions at once. It's a cacophony. Astronomers must figure how to distinguish one signal from another. An outburst is detected! Was it caused by two neutron stars colliding *over here* or a pair of supermassive black holes tearing each other apart in colliding galaxies *over there*?

"It's a profound data-analysis problem that ground-based astronomers don't encounter," says E. Sterl Phinney, professor of theoretical physics at the California Institute of Technology in Pasadena. Profound, but not hopeless: "We have lots of good ideas and plans that work—in theory," he says. "The goal now is to prove that they actually work under real conditions, and to make sure we haven't forgotten something." To that end, theorists and instrument-designers have been spending time together brainstorming, testing ideas, scrutinizing plans, figuring out how they'll pluck individual voices from the cacophony. And they're making progress on computer codes to do the job.

Says Bonny Schumaker, a member of the LISA team at the Jet Propulsion Laboratory: "It's a challenge more than a problem, and in fact, when overcome, a gift of information from the universe."

For more info about LISA, see [lisa.nasa.gov](http://lisa.nasa.gov). Kids can learn about black holes and play the new "Black Hole Rescue!" game on The Space Place Web site at <http://spaceplace.nasa.gov/en/kids/blackhole/>.

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



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