

## REMINDER: APRIL MEETING RESCHEDULED TO APRIL 16!!!!



Moon & Venus over beach on Feb 23rd taken with 50mm lens on a Fuji S2 camera set at 10 seconds, F/4, ISO 400. A flash was used to freeze the up close wave action and a flashlight was used to illuminate the rocks. (photo courtesy Wally Pacholka). Your images are always welcome in the Sirius Astronomer, so be sure to send them in!!!!

### OCA CLUB MEETING

The free and open club meeting will be held Friday, April 16th 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 Mike Simmons, on 'Amateur Astronomy in Iran'.

### STAR PARTIES

The Black Star Canyon site will be open this month on April 10th. The Anza site will be open April 17th. 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 April 2nd (and next month on May 7th) at the Centennial Heritage Museum (formerly the Discovery Museum of Orange County) at 3101 West Harvard Street in Santa Ana.

GOTO SIG: Apr. 2nd

Astro-Imagers SIG: Apr. 20th, May 18th

EOA SIG: Apr. 21st, May 19th

Astrophysics SIG: Apr. 9th, May 21st

# President's Message

By Barbara Toy

By the time you read this, spring should be in full swing, with temperatures climbing and more people thinking about spending nights out under the stars. Daylight Savings has started, the nights are getting shorter – there's always that tradeoff, more comfortable viewing but less time to do it in. Unless, of course, you're into solar viewing...

Well, more than the season of the year is changing – here are some items of current concern around the club:

## **A Reminder - the April General Meeting is April 16<sup>th</sup>, not April 9<sup>th</sup>!**

In hopes this reaches you before April 9<sup>th</sup>, which would be the usual date for the general meeting – we won't be a Chapman University that evening due to lack of power. Please plan to come the 3<sup>rd</sup> Friday of the month, not the 2<sup>nd</sup> Friday.

And if that leaves you at loose ends for the 2<sup>nd</sup> Friday – come to the Astrophysics meeting! We're switching the usual meeting date with that of the general meeting, so it will meet on April 9<sup>th</sup> at 7:30 p.m. in the classroom behind the Centennial Heritage Museum, at 3101 W. Harvard S., Santa Ana. Harvard is between Edinger and Warner, and the museum is about a block west of Fairview. The driveway is at the western edge of the property.

## **A Few Words About the Centennial Heritage Museum...**

Until recently, the Centennial Heritage Museum was known as the Discovery Museum, and there are still signs and other reminders of the earlier name. Our club has had a long-standing and very valued relationship with the museum, which has a strong focus on community education and environmental sciences. Our own community education goals and concerns about protecting the quality of the night sky and learning more about what's out there fit well with that part of the museum's goals.

This is very fortunate for us, as the museum allows us to use its classroom for the Beginners Class and the Astrophysics meeting each month, and also to use the classroom and the parking areas around it for our periodic "How to Use Your Telescope" classes (which are now given as part of the Beginners Class) – it's hard to know how we could have such a successful Beginners Class, in particular, without the use of this facility. In the past, we had the use of another building on the museum premises for meetings and storage that has since had to be demolished, but I've seen minutes of Board meetings reflecting that, among the many activities that were centered there, it provided a meeting place for the Board.

For those who are not familiar with it, when you look at the museum from the street, you see a wrought iron fence with a Victorian house visible through the trees of an orchard. It takes closer inspection to see how much else is there. There are actually two Victorian houses with strong historical associations that have been moved to that property. Kellogg House is regularly open for tours, and Maag House is undergoing restoration; the museum also has a strong program devoted to local history. The administrative offices are in what used to be the Carriage Barn for Maag House, and the gift shop is in what used to be the water tower and there's a blacksmith's forge as well as the classroom in the back. There are formal gardens laid out around the houses, including a very picturesque arbor area with a gazebo that is a popular site for weddings. The museum is generally closed on Saturdays for weddings and other events, which are a significant and welcome source of revenue.

The museum property extends a surprisingly long way behind the buildings toward Centennial Park, and a lot of that area is a Nature Garden, designed and planted to show the local natural habitat. The main use of the museum's classroom is programs for visiting students from local schools. Besides teaching about local ecology, these try to increase awareness of the need to recycle with fun projects to encourage children to think in those terms. Ralph Whitford, the person in charge of the classroom programs, says they always have a need for castoff jewelry, lace and other things that can be used to decorate "ecology hats" and for other projects – if you have anything you'd like to donate for this, please feel free to give it to me at the general meetings and I'll be happy to deliver it to Ralph's classroom.

The museum is going through a difficult period right now, as a new high school is under construction behind it, and part of their property is tied up in the construction. In spite of the inevitable irritations and inconveniences, the people there are a pleasure to deal with, and I'm hoping we will be able to develop more joint activities with them in the future.

If you have never had a chance to see this little-known treasure of Orange County, please plan to visit this museum, which has a lot to interest both adults and children; for more information, please see their website, <http://www.centennialmuseum.org/>. And, on behalf of the club – thank you, Centennial Heritage Museum, for all the help you've given us over the years!

## Anza House

Anza House is a wonderful facility at our Anza site – but it's something of a work in progress, and still shows many signs of the hard life it had before Gary Schones got it for the club. I'm happy to report that a couple of improvements that I've wanted to see for a long time will soon be done, and may be finished by the time you see this.

Our new Anza House Coordinator, Larry Carr, is putting vinyl flooring in the three bathrooms in place of the carpet that's there now, which should make it much easier to keep them clean. As part of that project, he'll put in the new toilets that Gary got for us a couple years ago that were never installed because we wanted to do it when the new flooring went in. The new toilets shouldn't get clogged as often as the existing ones – so, when this work is finished, we should have a lot fewer problems with

the bathrooms, and they'll look a lot better, too!



The other project is painting the outside of the house, which Gary plans to do when the weather warms up enough and his schedule allows. It will certainly be different to have both of the double-wide trailers that were combined to make Anza House painted the same color – one trailer is currently white and the other brown – but I think we'll get used to it pretty fast. Besides protecting the buildings, the paint will make the entire building look a lot better.

Larry is planning other projects for Anza House, and can also use help with the more mundane tasks of cleaning and other regular maintenance. If you would like to help out, please contact him at [LarryCarr@sbcglobal.net](mailto:LarryCarr@sbcglobal.net).

A big "thank you" is due to Larry Carr and Gary Schones for all their hard work, and for their willingness to give us the benefit of their expertise and equipment with these and their other projects at Anza. And thanks is also due to Stephen Eubanks for all of his efforts to improve Anza House while he was coordinator, which you can see in such things as the improved lighting (with red lights) throughout the house.

## The MOCAT

Most people don't realize that the club has a second observatory, the small "clamshell" located just west of Anza House, which is the MOCAT observatory. We have the building thanks to Tony Obra, who saved it from being junked at Mt. Wilson and who transported it to Anza. It was assembled and made functional by members of the EOA, who also installed all of the necessary wiring for computer control from the back room at Anza House along with a work bench. If you wonder why you've never seen the control room, it's kept locked, as it also houses our weather station and other equipment – by necessity, it's a limited access area.

At its most basic, the MOCAT project will allow people to use a telescope in the MOCAT observatory from the comfort and warmth of the control room at Anza House, "viewing" through a CCD camera on the telescope connected to a computer in the control room – many people find this comfort factor particularly attractive! This system is obviously meant for imaging, and we hope people will use it for serious research as well as for general imaging. If all goes as planned, in its final form the MOCAT will use a custom mount that was donated to the club and that still needs a lot of work, but that is built around a large Byers gear that is in excellent condition and should give it tremendous tracking accuracy.

Why "MOCAT"? According to the Board minutes when the project was approved, this stands for "Multiple Use Orange County Astronomers Telescope," but I'm told the name went through some variations, and nobody has ever referred to it by that name

(continued on Page 4)

in my hearing – it's just "the MOCAT," the project that has been central to the EOA's activities over the last four years. The "EOA" is the Electronically Oriented Astronomers, one of the club's long-standing special interest groups. Wayne Johnson, past president of the club among other things, was one of the project's early enthusiasts, but he then moved to Arizona, and other people who had committed to various parts of the work also left for various reasons – MOCAT has been plagued by all of the problems that occur when a complicated project relies on volunteers to do all of the work.

We therefore owe a special thanks to the group who has hung in there, done the actual work, and gotten the project to its current state – Craig Otis, Jim Windlinger, James Thorp, Delmar Christiansen, JV Howell and Ken MacLeod. Of these, Ken deserves special recognition for all of his efforts to keep the project moving over the last three years as the EOA Coordinator, especially as he originally only agreed to be a temporary coordinator for about three months. In spite of having his term in office extend well beyond that, Ken has handled the position with tremendous tact, perseverance and energy, and the MOCAT would not be as far along as it is without his involvement. Much to our sorrow, he has now had to leave that position and to drop out of regular participation in the EOA because of his other responsibilities – he is very much missed, and we all hope things will change for him and he'll be able to rejoin us soon.



Why tell you all this about the MOCAT now? Because I'm really excited about new developments with the project, which we expect will give us a working telescope in the MOCAT observatory controlled from Anza House by the time the summer observing season gets into full swing. It turns out we have a pier in storage that is just the right height to put an LX200 in the optimal viewing position in the MOCAT observatory, John Hoot has donated an LX200 we can use for this purpose, Bob Buchheim got us a donated computer that can be used as the controller, James Thorp convinced Software Bisque to donate a copy of TheSky that we can use to control the telescope, and the EOA has a CCD camera that was donated for the MOCAT that we can use (an ST6), so all of the major pieces we need to get this to work are falling into place, and the only significant additional cost to the club for this interim installation is for a remote focuser.

The plan is to get all of this together and working as a basic system – and then see what we want to add to increase its

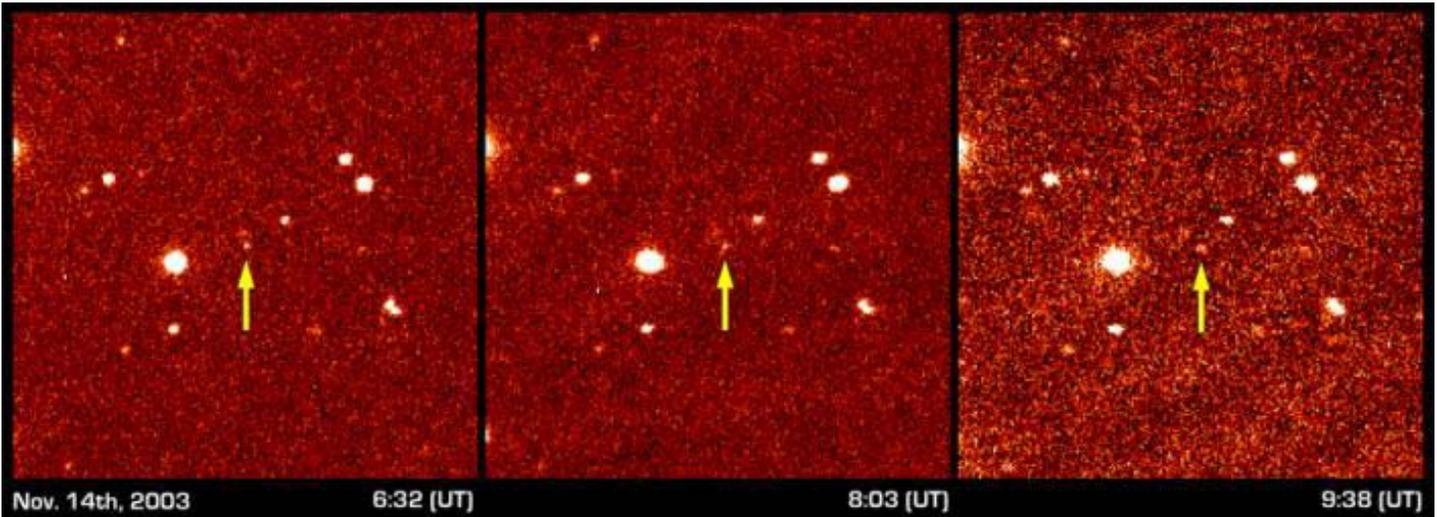
flexibility and otherwise improve it as we gain experience working with it. When the MOCAT mount is finished and fully tested, assuming that it works as well as we think it will, we will then replace the LX200 with the MOCAT mount, telescope and controller per the original plan; a lot of what we're using for the LX200 setup will be directly transferable to the final MOCAT installation. In the meantime, the facility will be in use, and we will all gain experience with it that should help a lot when we do the final installation.

It's an exciting time for MOCAT and the EOA, and I'm glad to say that we've recently had more club members express interest in this project. If you would like to become part of it, the easiest way is by coming to the EOA meetings, which is where we plan the work, or you can talk to me or the other members of the EOA about it. Meetings are usually at 7:30 p.m. on the third Wednesday of the month, at Coco's at the junction of Holt and Newport Ave. in Tustin (it's a good idea to check the website before coming in case of changes). Del Christiansen, the EOA Liaison, has posted a number of pictures as well as minutes of recent meetings on the website, if you want more information about the group and the project. I plan to post notices on the website calendar and the homepage when we set up work parties, especially when we could use more help – so keep an eye out for the notices, and please feel free to offer your assistance!

The only downside to all this for me personally is that it looks like I'll be losing my carefully-guarded status as a non-imager...

### In Closing...

Only two people have pointed out to me that I said "Challenger" when I meant "Columbia" in the February President's Message. I don't know if that means that only two people read it, only two people noticed, or only two people felt compelled to mention it (which they both did very diplomatically!). My apologies for not having proofed it better, but at least I know the reason for the mind glitch – a conversation with our June speaker, Keith McInnis, which touched on Columbia, and then shifted to the Challenger disaster and investigation as seen by someone with close ties to those who designed and built the shuttles and kept them flying. It was very interesting – but here's hoping that I didn't overlook something equally obvious this month!



These three panels show the first detection of the faint distant object dubbed "Sedna." Imaged on November 14th from 6:32 to 9:38 Universal Time, Sedna was identified by the slight shift in position noted in these three pictures taken at different times. Subsequent observations at longer time intervals provided the information necessary to deduce the nature of Sedna's 10,500 year orbit around the Sun. The field of view of each frame is 3.4 arcminutes square, and each pixel is 1.0 arcsecond. (Credit: NASA/Caltech)

## ANSWERS TO LAST MONTH'S CROSSWORD PUZZLE

- |                   |               |
|-------------------|---------------|
| Across:           | Down:         |
| 2. Constellations | 1. Perihelion |
| 6. Scharzchild    | 3. Nebula     |
| 8. Superior       | 4. Andrameda  |
| 9. Zenith         | 5. Vernal     |
| 10. Ganymede      | 7. Azimuth    |
| 11. Opposition    |               |
| 12. Aphelion      |               |

**REMINDER:** Articles and other submissions are due on the 15th of each month. Send all material to [SiriusAstronomer@OCAstronomers.org](mailto:SiriusAstronomer@OCAstronomers.org) in PDF, MS Word, or plain text format. Non-members may submit material, but priority for publication will be given to OCA members. No more than one page of commercial ad space will be included in any given issue on a first-come, first-served basis (private party want-ads are free for members). Inquiries regarding rates for ad space should be addressed to Charlie Oostdyk, OCA Treasurer, at the contact listed on the back page. Reviews of equipment, books, vendors, etc. represent the views and experiences of the reviewer and should not be construed as an endorsement by OCA or the Sirius Astronomer.

## HELP NEEDED FOR OCA'S BOOTH AT RTMC

by Karen Schnabel

With RTMC slowly creeping towards us the library needs your help getting books to our booth up there. I'm looking for volunteers who will be attending RTMC on Friday morning to help transport books. As most of you know, OCA Library has participated in RTMC by hosting a booth to help raise funds for new library purchases. This year is no exception! Unfortunately, the OCA Librarian chose this year to purchase a very small car, so transporting books in my car is limited. Currently, I have approximately 20-25 cases of books and magazines. Can anyone help by taking some cases up for me? My contact information is on the back of the Sirius Astronomer. Thanks for your help!

For Sale (all in like new condition)

- Meade LX 200 8" SC Telescope with Telrad and spotter scope.
  - Televue 16mm Nagler type II eyepiece
  - Televue 22mm Panoptic eyepiece
  - Meade Series 4000 26mm eyepiece
  - Meade Series 4000 9mm Illuminated Reticule eyepiece
  - Parks GS-5 15mm eyepiece
  - Meade 4000 #140 Achromatic Barlow 1.25"
  - Meade Off axis guider
  - Meade 4000 f 6.3 Focal Reducer / Flattener
  - Meade Variable Proj. Tele-Extender
  - Parks ALP SC rear cell Broadband filter
  - Lumicon UHC 1.25" filter
  - Lumicon Oxigen III 1.25" filter
- All for \$3000.00, Please serious inquiries only. (909) 924-6652

# All The Stars Disappeared

by Keith McInnis

At the age of 9 I witnessed the most spectacular non-destructive man made event in history—the launch of a Saturn V at night.

As I held my father's hand we marched down a short wooden pier past red ribbons, put up to keep others out. We were only a handful of people beyond those ribbons. My dad seemed so tall then. Everyone seemed so tall then and everything around me so large (at the time, the vehicle assembly building was the largest man-made structure on Earth)

We walked to the end of the pier. It was dark; I was tired and grumpy and the calves of my legs were painfully cramped from a recent growing spurt. My father pointed across a wetlands canal to a brightly lit steel structure. It looked like one of the erector sets my friend, BJ, had built every week I knew him. Approaching 800 feet in height the steel surrounded great Saturn V rocket assembly that was Apollo 17.

On the pier, everyone focused on the launch pad. All their chatter, some of it trivial, some of it not, had stopped. Talk about their children, their jobs, their cars, their home mortgages had stopped. Talk about the weather and stock market had stopped. Even their breathing, it seemed, had stopped. People paused to look and listen all over the country, all over the planet. In the mirror-still water, the reflection of the illuminated Saturn V waited. Billows of "smoke" (supercold gas) could be seen from our vantage point, even some 3 miles distant. In 10 minutes, Apollo 17, the last mission to carry men to the Moon, would be on its way.

"T-minus 9 minutes, 55 seconds, and counting" the loudspeakers crackled on this humid Florida night as the countdown resumed. The bustle of our crowd got less chaotic; more synchronized, like everyone was breathing together, watching, waiting. I wondered what was taking so long. A small bird, or bat, hit the water with its wing tips, the reflection of the rocket wavered, distorted like some movie special effect. My legs felt better dangling over the edge of the pier. My mother, a nurse, had always packed them in moist hot towels, but she was not here now. I was swinging my legs back and forth until they felt better. The water ripples moved outward. The image of the rocket was smooth once again.

I knew from the other launches I had watched that I would feel them first and wondered if this pier, with all these people standing on it, its pillars sunk into the water, would keep me from feeling the rumble as the five F-1 rocket motors ignited for lift off.

I had turned to ask my dad if the ground would shake but he was already gone. He always left during a launch. Usually it was his work, but today he got to play. At the nearby cobbled-together shack, he was listening to launch control and

the astronauts and broadcasting to other "HAMS" around the world. (I was almost 12 before I knew the word "HAM" was also a kind of meat, not just someone who played with radios. How could it be a ham without an antenna?). Amateur radio operators ("HAMS") would listen and give their names, call signs, and mailing addresses so they'd receive a postcard (called a "QSL" card) from the "ham shack" of the cape, so years later they could say they were there too, talking to station WB4ICJ, while a moon launch was in progress. From all over the world they radioed in. Later I learned a lot of geography by helping fill out those QSL cards to send to remote places from nearly every continent. Some of the contacts only received mail a few times a year! We were as anxious to get cards back from them as they were to get some from us.

At some point, the loudspeakers were no longer so loud but the voices of launch controllers were still chattering. Some of it I understood but mostly I wanted them to be reverently quiet. A handful of people moved out to the edge of the pier near me. They had discovered my special spot but remained an arm's-length away respectful of my space. Some of them had small portable radios that repeated the voices of the loudspeakers but with a slight delay, like an echo. From the surrounding swamp a frog or gator bellowed in reply.

Someone hands me a pair of binoculars, they're heavy and won't fit my eyes so I close one eye and peer through them like a telescope. The black on white Saturn V wiggles in my newly found view but I don't care, it looks incredible. I try to spot the astronauts inside then remember that there aren't any windows yet, they have to get into space first. I asked my dad once how the astronauts can see to fly without any windows. He pulled out a compass and flashlight and killed the porch light. Carefully we made our way across the back yard to his radio antenna. He said that's about the same as the astronauts do, except their compass is fancier and they have a lot of help on the ground, but in a pinch, they could do it just like this too, and did once. I still thought they should have windows. Every once in a while, usually when my dad was working late and my mom was making supper I'd take advantage of the last moments of twilight, the time I was supposed to be inside, and peer real closely at the compass and "navigate" my backyard, imagining I was in space

I turned to hand the binoculars back to the person who had given them to me but he was no where to be found; I kept peering through the lens until my eyes hurt from squinting.

"T-minus 1 minute, 55 seconds and counting" I wondered what was taking so long and looked back toward the small wooden building which was the "radio shack" where all the HAMS gathered. I couldn't see the door because of the people but I could just make out the silhouette of the antenna.

Everywhere I looked fireflies glowed, I thought they were excited too

Someone grabbed the binoculars and I turned quickly—I must have looked angry because I thought it was someone

trying to take them then I realized it was the man who gave them to me and I nodded and said "thanks mister" and started to giggle. He crouched to peer through them over my shoulder. I giggled because I called him "Mister" I had a German shepherd named Mister once. A woman joined the man and she had another set of binoculars, he handed back the original set to me and said he was a friend of my dad's and I should return them to the radio shack; I nodded agreement while peering through one eyepiece; it knocked my eyebrow, again.

Then, everything got totally still and quiet. I looked down at the water and saw it vibrate all over, then I felt a slight trembling and I knew—I looked up to see the fiery rocket motors igniting and used the binoculars again, more carefully this time. Five engines ignite, each spewing hundreds of thousands of pounds of high energy rocket fuel in a fantastic burst of yellow-white light. As the Saturn V slowly rose I saw the giant gantry arms of the tower swinging away to free the rocket from its perch. Just as the rockets flame was about to come into the view my binoculars someone bumped me and knocked them into my eye again and this time it really hurt and I yelled. I was mad too because I wanted to see the rocket flame up close—I forgot all that as the sound, tremendous and overwhelming finally got to us. I stood up and again noticed the reflections in the water. I looked around and could see everyone now, the color of their clothes and their faces frozen and amazed or terrified, it was not like faces I'd ever seen before. I glanced back to the radio shack and now the antenna was clear and crisp, day light was rising. The light spread outward as it climbed higher, a man made sunrise in fast motion—dusk going to noon day sun in seconds.

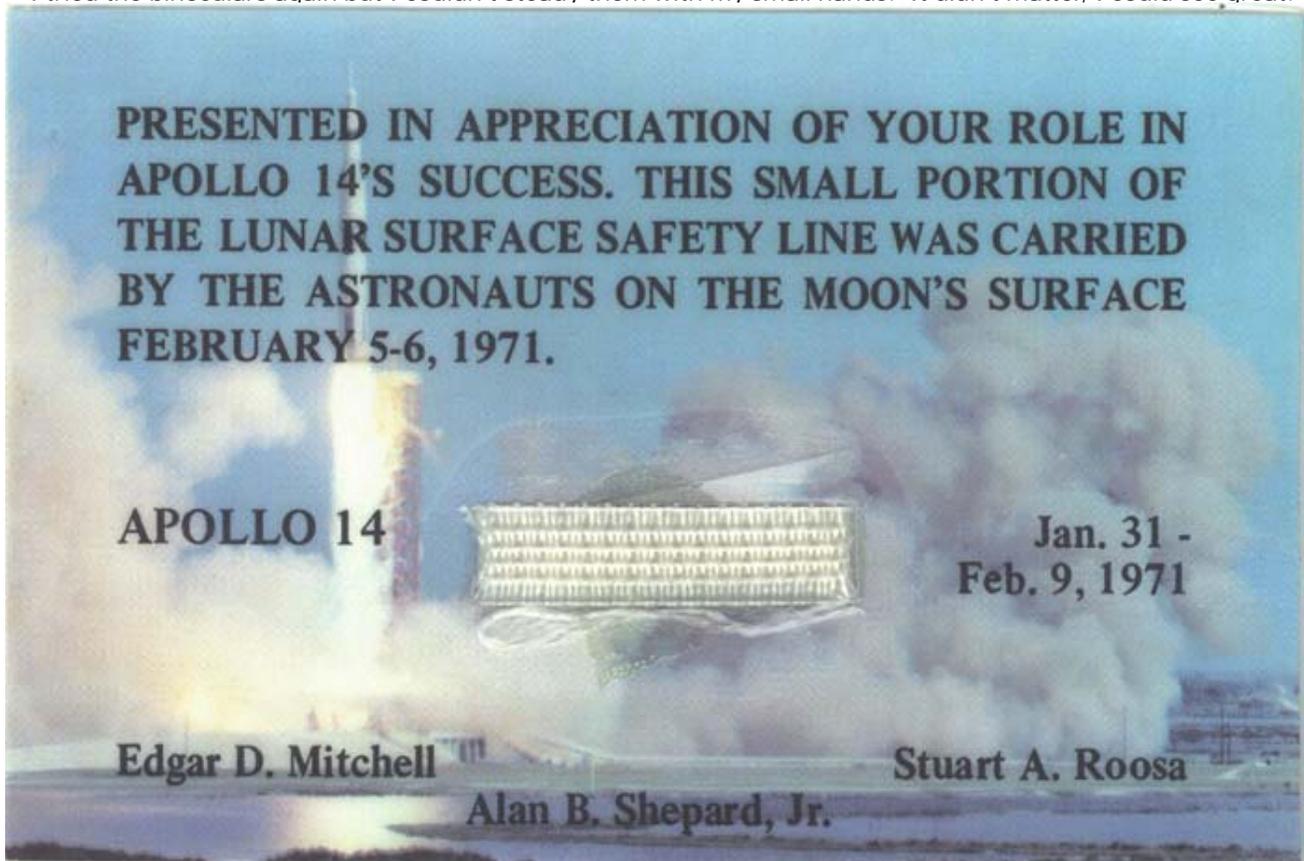
As Apollo 17 reached for the moon, all the stars disappeared.

Lots of people were trying to yell "Go, Go, Go" but it was muted by the noise and the surreal light—I couldn't speak, only watch, mouth and eyes wide and wondering. The strange thought came to me that at this moment, I had a better view than the astronauts. I noticed the crickets had stopped chirping, I guess they were watching too.

It got brighter still until for a few moments it was daylight all around. The artificial day created by man's last mission to the moon seemed to linger for minutes, then it began to fade, slowly at first then quickly as the first stage breached the thinnest reaches of the earth's atmosphere.

Two hands lay across my shoulder and I turn around to see my father; he's come to be with me to watch. He is stoic but I know very proud and also a little sad at this last mission. My eyes still hurt so are a little blurry. We stood together in that swamp that is Kennedy space center and watched men go to the Moon.

I tried the binoculars again but I couldn't steady them with my small hands. It didn't matter, I could see great.



# ASTROSPACE UPDATE

April 2004

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.

Mars - **Spirit and Opportunity, the Mars Rovers**, have continued to take spectacular images, analyze rocks with 3 types of spectrometers, and make new discoveries. As I write this, Spirit is nearing the end of the life of 3 months that it was designed for, but both rovers are in such good shape that they are now expected to exceed the predictions considerably. It has examined rocks and soil in the vicinity of the landing, next an area called Laguna Hollow, and has reached the rim of Bonneville Crater, an impact crater over 200 yards across, lying about 300 yards from the landing point. Roving got a bit steep climbing up to the crater rim, and was littered with obstacles thrown out by the impact that formed Bonneville. The far side of Bonneville appears to have interesting rock features on the far wall, but not the bedrock layers seen in front of the other rover's landing spot. Spirit has found evidence of minerals formed by water seeping through (or possibly standing water on) volcanic rocks.

**Opportunity** found minerals and formations that can only have been formed by standing water for long periods. The spherules, nicknamed blueberries, which are tiny rocks (smaller than a BB) almost spherical in shape, are part of this evidence, now that analysis of them has ruled out volcanic theories of their formation. Other evidence included jarosite, sulfate salts and chloride or bromide salts (usually left when standing water dries up), vugs (thin flat holes within rocks caused by mineral deposits from water, that are later eroded to leave the holes), stripes on the spherules matching the surrounding rock (implying they formed in their present location). It is not yet known how long ago the water stood on Mars, nor for how long it persisted. But it did persist far longer than water can stay liquid under today's conditions on Mars (low pressure and temperature). Hematite, a mineral usually formed by standing water, as expected from previous orbital data, is everywhere around the crater that Opportunity landed in, but is somewhat rarer within that crater, which indicates the hematite formed in a shallow layer that was punched through by the formation of the crater.

Opportunity, as I write this, is still examining rocks and soil in its "landing" crater, taking so long because there is so much rock uncovered by the impact formation of that crater long ago. When finished there, Opportunity will probably head for a crater about 3/8 mile east. Both rovers have drilled holes in rocks to analyze their interiors, and dug as much as 4 inches deep into the soil to see how subsurface material differs. This digging is done by locking 5 of the wheels, and spinning the other one. Opportunity found under the surface the soil was brighter, finer grained, and contained spherules that were very shiny. Spirit found evidence that the subsurface soil may have been soaked in brine (salty water) in the past. Both rovers have now taken pictures of their parachutes and other landing litter, which dropped about a quarter mile away. Opportunity had to roll up near the edge of the crater it landed in to see over that crater rim before its parachute could be seen. The rovers have also done some sky observing, including images of the Earth, Orion, and both Martian moons transiting in front of the Sun.

**Beagle 2, the European Mars lander**, was reported officially lost in this column last month, has now been found. Images from orbiting Mars spacecraft have located what appears to be the Beagle in several pieces on the surface. This would most likely be the result of a failure in any of the landing systems (parachutes, etc.) meant to slow the craft for a soft landing.

**Most distant quasars - The Sloan Digital Sky Survey**, done by an automated telescope in Arizona, has discovered several of the most distant quasars ever found. Light that we see now left them when the Universe was 6% of its current age. A quasar's light is produced by material falling into a black hole with the mass that is millions or billions of times that of our Sun. Some of these newly discovered quasars had black holes of billions of solar masses, and theory had predicted that such large black holes would not have had time to form until later in the life of the Universe. Also found in these newly found quasars were more heavy elements than theory had predicted so early. Clearly the theories have to be reformed.

**Most distant galaxy** - A galaxy was found so distant that its light left when the Universe was only 5.5% of its current age, using the **Hubble Space Telescope (HST)** to find it within a gravitationally lensed image, and the Keck 10-meter telescope in Hawaii to determine its redshift. This is even farther than the farthest known quasar announced the day before. It is rare that the farthest galaxy is farther than the farthest quasar because quasars are generally far brighter than galaxies, and so can be seen much farther away, all other factors being equal. But gravitationally lensed objects appear brighter than they would normally, because the gravitational lens concentrates light on the way to us. In this case, the light was brightened by about 25 times. A gravitational lens occurs when light on the way to us passes quite close to a massive object (in this case a relatively near galaxy cluster called Abell 2218), and the mass bends the light, as Einstein's General Relativity predicted. The newly discovered galaxy is quite small, only 2% the diameter of our Milky Way, which supports the theory that the first galaxies were small and grew later. The galaxy is forming new stars at a furious rate. The ultraviolet light from newly formed stars is redshifted all the way

to infrared by the expansion of the Universe.

Using the same technique, but with a different gravitational lens, a team using the VLT 8-meter telescope in Chile announced 2 weeks later that they have found a galaxy whose light left there when the Universe was 3.4% of its current age, breaking the distance record again. This galaxy also was quite small, having 1/10,000 the mass of our Milky Way.

**Even more distant galaxies** - Not to be outdone by 3 announcements of the most distant object in just over 2 weeks, another team of HST astronomers released a new Deep Field image (called the Hubble Ultra Deep Field, or HUDF), which showed galaxies so distant that the light from them left when the Universe was only 3% of its current age. These are the dimmest objects ever imaged. This new image is like the famous Hubble North and South Deep Fields made several years ago, except done with the ACS camera, which has a larger field of view and is more sensitive to dim objects than the old WFPC2 camera used for the older Deep Fields. ACS was installed by astronauts on the last Hubble service mission. HUDF also was done in infrared, in addition to visible light, by the NICMOS camera, and a spectrum of the entire field was taken, a capability of ACS that WFPC2 did not have. The spectrum was what allowed redshifts to be measured, and therefore distances and ages to be assigned. About 10,000 galaxies were found in HUDF, about 4 times as many as in each of the old Deep Fields. Like galaxies in the old Deep Fields, many of the newly imaged ones have odd shapes due to the more chaotic conditions in the early Universe. The new and old Deep Fields were each made with about 11 days of total exposure time, spread out over several months.

**HST** has continued to monitor changes in the aftermath of the 1987 supernova in the Magellanic Cloud. The shock wave expanding outward from the supernova has reached a cloud of gas that was thrown off by the star 20,000 years before the supernova, causing the gas to glow in a ring. Because of density variations in the gas, the appearance is what has been described as a "ring of pearls". It is expected in the next few months or years that the shock wave will fully enter the gas and produce a continuous ring of light, and after that the light will spread out through the gas cloud to show its structure.

**Dark Energy** - Continuing the distant supernova survey that produced some of the evidence that dark energy (a force causing the Universe to expand faster) exists, HST has found several even more distant type Ia supernovas, whose uniform brightness can be used to measure their distance. Because they are more distant, the light left them earlier than the supernova in the previous survey, and so astronomers were able to measure the effect of dark energy on the Universe at an earlier time. The result is that the dark energy has remained constant for over half the life of the Universe. This says that the dark energy behaves more like Einstein's cosmological constant, and less like the Quintessence theory, which theorized that the dark energy changes over time. The supernova measured for this study were found by examining the images taken for the GOODS program, a survey being made with HST to study very distant galaxies. This examination found 42 supernovas, of which 6 were extremely distant.

**Chandra and XMM-Newton (X-ray observatories)** - have imaged the supermassive black hole at the center of a galaxy tearing apart a star, the first time this has been observed while it happened. The object was discovered some time ago by the Roentgen satellite, which found an X-ray burst with even more energy than a supernova would produce. Recent observations with Chandra and XMM-Newton showed the cause of the outburst was a star being torn apart. Only about 1% of the star fell into the black hole, while the rest was ripped apart by tidal forces and flung away, consistent with theoretical predictions.

**Chandra** - Astronomers using Chandra to study X-ray sources that appear similar to stellar black holes or neutron stars but are at lower temperature have announced that such X-ray sources are probably mid-size black holes, having masses that are hundreds of times that of our Sun. Many examples are known of black holes with the mass of a single star ("stellar size"), and many are known with masses of millions or billions of stars ("supermassive" size), but evidence for black holes with intermediate masses is hard to find. The X-ray spectra of stellar black holes (or more precisely of their accretion disks, where material is swirling toward the black holes) indicates that they are 10 to 100 million degrees. The sources in this study, called "quasisoft" X-ray sources, range from 1 to 4 million degrees. The lower temperature is result of the larger (than stellar) size of the black holes. More work needs to be done to rule out the only other theory, that this class of object is actually stellar-mass black holes, but for some reason the clouds of gas glowing in X-rays are farther out than normal, which would cause them to be cooler.

**Chandra** - has detected X-rays from Saturn that ask more questions than they answer. It had been predicted that X-rays should emanate mostly from the poles, like Jupiter, but instead they are concentrated about the equator. The spectrum of X-rays matches that of the Sun, but was stronger than reflection of solar X-rays by the planet should be. The rings should have shown up in X-rays, but did not.

**Rossi (X-ray timing observatory)** - The accretion disk surrounding a neutron star halfway across the Milky Way galaxy has been observed in movie-like fashion by Rossi, when it became illuminated by the explosion of carbon that accumulated on the surface of the neutron star until it became hot enough to undergo nuclear fusion. The whole incident took about 17 minutes. Rossi's ability to take X-ray spectra every few seconds, combined with known temperature versus distance data, allowed reconstruction of events in the accretion disk far too small to directly image. *(Continued next page)*

*(continued from page 9)*

**Winking star explained** - Since its discovery in 1998, a star that winks out for periods as long as 28 days has baffled astronomers trying to explain its behavior. Archived pictures of the star from before its discovery allowed studying how its behavior has changed over time and has led to a theory that explains it. The star is actually a double star, too close to separate, and there is something, probably a dusty disk, in orbit about the pair, which intermittently blocks light from one or both stars. The archived pictures showed that before 1960 neither star was eclipsed, and for periods since then, one or both stars get eclipsed. The theory will be tested by taking spectra to look for the Doppler shift induced by the theorized orbit of the stars about each other. Or we can wait until 2012 when it is predicted that the system will precess such that neither star is visible. The orbit predicted for the 2 stars has them 4 times closer than the Earth is to the Sun, in a period of 48 days, and is highly elliptical.

**Silicates in meteorite** - Using an instrument that analyzes a single speck of material at a time, but can select specks automatically, scientists have sifted through 159,000 grains from a meteorite to find nine specks of silicate material. These scientists had theorized that meteorites formed from stardust that is known to contain silicates, and formed at a low enough temperature that silicates would not have been destroyed. Since silicates had not been found in meteorites, other scientists claimed that meteorites were formed at higher temperatures that destroyed silicates. The new conclusion is that some meteorite material does not get hot enough during formation to destroy the silicates, since some have now been found.

**Massive star formation** - Astronomers using the recently completed adaptive optics system using a laser artificial star at the Lick Observatory have found dust disks and polar jets at 2 massive stars, 2 to 3 times the mass of our Sun. The disks are too small to be seen with ground-based telescopes without adaptive optics. An infrared polarimeter was also used to help dim the glare of the stars in relation to their dimmer dust disks. Theory has it that massive stars form through a process that does not involve a dust disk, unlike stars near the mass of our Sun. The reason is that more massive stars should be so bright that they break up such a disk as soon as it tries to form from matter collapsing from gravity. But it is not certain at what mass the switch occurs. These observations showed that Sun-like star formation applies to stars with at least 3 times the mass.

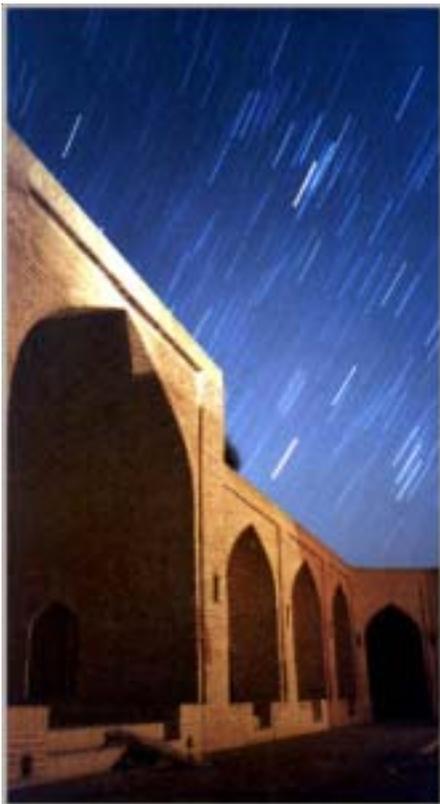
**Europa corrosive** - Future missions are in the early planning stages to land on Jupiter's moon Europa because it was discovered in recent years to have an ocean of liquid water below its frozen surface, making it possible that life could have evolved in that ocean. New measurements of the spectra of Europa indicate that hydrogen peroxide and sulfuric acid, very corrosive chemicals, are found on the surface. The peroxide is probably formed by charged particles hitting the ice, but the sulfuric acid could be a result either of particles from the moon Io hitting the surface or of leakage of the acid from the ocean below. This discovery may require some rethinking of how a spacecraft could survive after landing on Europa. If the acid source is leakage from below, some rethinking may be in order about the chances of life in that ocean.

**Large Kuiper Belt object (KBO)** - Astronomers using the Palomar 48-inch Schmidt telescope have discovered a very large object in the Kuiper Belt, the band of icy asteroids beyond Neptune. The diameter cannot be measured directly, but is estimated from its brightness to be almost 900 miles, probably larger than the current largest known KBO Quaoar. The new object's orbit is tilted about 20 degrees from the plane of the planets, surprisingly large.

**Closest dust disk** - A dim red dwarf star named AU Microscopium has been found to have a dust disk where a planetary system may be forming, the nearest such young still-forming system known, at 33 light-years away. Astronomers found the star while imaging stars that had previously been found to have excessive infrared emission. It is about half the mass of the Sun, and only about 12 million years old. The edge-on disk is large, with a diameter 7 times the size of Neptune's orbit about our Sun. The disk has a hole in the center, which would indicate a planet has formed there and swept away the dust.

**Black hole properties** - It has long been a point of contention whether nearly all properties of matter are lost (except mass and very few others) when that matter falls into a black hole. Many theorists have contended yes, but some claim that black holes have other properties that are a result of the properties of the matter that fell in. A new set of equations based on string theory show that a black hole's matter does not fall to the singularity at the center, as classic theories predict, but remains a tangle of strings that retain their properties from before falling in.

**Searching for Earths** - A new computer model of how planets form suggests that looking at dust rings about stars can tell us about the planets that are forming in the dust, which should be easier with current technology than searching for the planets themselves. The study shows that Jupiter-size planets will clear a ring in the dust disk it is forming from, while Earth-size planets affect the infrared spectrum of the disk. This is caused by certain sizes of planets disturbing the disk in ways that cause more collisions, producing debris that shows up in the infrared spectrum. The distance of the forming planet from its star can be calculated from the dust temperature that is in turn calculated from the spectrum. The study also showed that planets grow faster than previously thought: a Moon-sized planet should take only 20,000 years to form.



## Observe the first transit of Venus in 122 years from one of the world's most fascinating and historic countries

History, culture, nature and astronomy tour to Iran

Iran, a country of unparalleled cultural and historical diversity, is perfectly placed for the first Venus transit in 122 years.

Iran's very enthusiastic amateur astronomy community will gather with international visitors at the Venus transit conference in Tehran. Price for the 18-day tour May 18 to June 14 is \$1950 per person. Shorter options are available; please write for details.

For details on the itinerary, westerners traveling in Iran, making reservations and more on the country and its people from first-hand accounts, visit the web site at [www.vtransit.com](http://www.vtransit.com) or email Mike Simmons at [mike@vtransit.com](mailto:mike@vtransit.com).

Join Mike Simmons for a slide show on Astronomy in Iran, based on his travels around the country, at the OCA meeting on April 16.

### Instant AstroSpace Updates:

The European Space Agency has approved extending the life of the **Ulysses mission** until at least 2008, in order to cover another orbital pass over both poles of the Sun. This will be the 3rd orbit of the Sun since launch over a decade ago, and will be at a sunspot minimum, like the first orbit, but with reversed solar magnetic field.

Ulysses has detected a stream of dust particles emitted by Jupiter's moon Io at a distance of 300 million miles, much farther than expected. The stream pulses every 28 days, so the rotation of the Sun and its solar wind is apparently affecting the stream.

Now that **Rosetta (comet mission)** has been launched, an assessment has been made as to how much fuel can be spent on chasing asteroids on the way to the primary target **Comet Churyomov-Gerasimenko**. It will flyby Steins, a small asteroid, on 9/5/2008, and Lutetia, a 60-mile asteroid on 7/10/2010, both excellent science targets.

On the average, every person on Earth has looked at one image of **NASA's Mars Rover web sites** in the past 4 months, far exceeding the previous record holder among government web sites, the IRS site during tax season. Of course I was bringing the averages up by personally viewing thousands of images on the Rover web sites.

The 3.5-meter (138-inch) mirror blank, made of silicon carbide, has been completed for the **Herschel Space Telescope**, to be launched in 2007 by the European Space Agency. It is the largest single mirror made or planned to be made for use in space. Herschel will operate in far infrared and submillimeter wavelengths.

The **European Space Agency** has selected 2 teams to compete in the design of a rover to be launched to Mars in 2009 and drill into the surface to search for evidence of microscopic life.

**Messenger (Mercury orbiter)** is on schedule to launch May 11 for 5 gravity slingshots at 2 planets in order to go into orbit about Mercury in July 2009 to study the planet for a year (Earth year). Mercury has been visited by only one spacecraft, and never orbited, so much is to be learned there.

## FOR SALE

Dark sky site: 5 acres, 3,550' elev (never snowed in), darker than Anza; w. 1,100 sq ft home: 3b+2ba, only 3 yrs old, tile & wood-laminate flooring, freshly painted interior, extra pad for observatory, etc. All utilities, very safe community. Zoned for adding 2<sup>nd</sup> home, horses, etc. ½ hr. south of Lake Isabella, 2½ hrs N. of LA. \$129,000. Pictures available. [Jay.Glowacki@aero.org](mailto:Jay.Glowacki@aero.org), eve 310-831-4199.

Nonprofit Organization  
 U.S. Postage  
**PAID**  
 Santa Ana, CA  
 Permit No. 1468

NEWSLETTER OF THE  
 ORANGE COUNTY ASTRONOMERS  
 P.O. BOX 1762  
 COSTA MESA, CA 92628

RETURN SERVICE REQUESTED

**DATED MATERIAL  
 DELIVER PROMPTLY**

**HANDY CONTACT LIST**

**CLUB OFFICERS**

President	Barbara Toy	<a href="mailto:btoy@cox.net">btoy@cox.net</a>	714-606-1825
Vice-President	David Radosevich	<a href="mailto:Dave.Radosevich@ngc.com">Dave.Radosevich@ngc.com</a>	310-813-9021
Treasurer	Charlie Oostdyk	<a href="mailto:charlie@ccd.edu">charlie@ccd.edu</a>	714-751-5381
Secretary	Bruce Crowe	<a href="mailto:bcrowe12@pacbell.net">bcrowe12@pacbell.net</a>	714-971-8427
Trustee	Bob Buchheim	<a href="mailto:rbuchheim@compuserve.com">rbuchheim@compuserve.com</a>	949-459-7622
Trustee	Craig Bobchin	<a href="mailto:ETX_Astro_Boy@sbcglobal.net">ETX_Astro_Boy@sbcglobal.net</a>	714-374-7054
Trustee	Stephen Eubanks	<a href="mailto:SSEubanks@earthlink.net">SSEubanks@earthlink.net</a>	714-776-6361
Trustee	Joel Harris	<a href="mailto:eclipse125@earthlink.net">eclipse125@earthlink.net</a>	818-575-9580
Trustee	Tom Kucharski	<a href="mailto:TomRigel@aol.com">TomRigel@aol.com</a>	949-348-0230
Trustee	Tony Obra	<a href="mailto:tonykathyodieseldr@comcast.net">tonykathyodieseldr@comcast.net</a>	714-952-8779
Trustee	Gary Schones	<a href="mailto:gary378@pacbell.net">gary378@pacbell.net</a>	714-556-8729

**COMMITTEES, SUBGROUPS, AND OTHER CLUB VOLUNTEERS**

Webmaster/Press Contact	Russell Sipe	<a href="mailto:sipe@sipe.com">sipe@sipe.com</a>	714-281-0651
Sirius Astronomer Editor	Steve Condrey	<a href="mailto:SiriusAstronomer@OCAstronomers.org">SiriusAstronomer@OCAstronomers.org</a>	714-373-5283
Observatory Custodian	John Hoot	<a href="mailto:jhoot@ssccorp.com">jhoot@ssccorp.com</a>	949-498-5784
Anza Site Maintenance	Don Lynn	<a href="mailto:donald.lynn@office.xerox.com">donald.lynn@office.xerox.com</a>	714-775-7238
Astrophysics SIG	Chris Buchen	<a href="mailto:buchen@cox.net">buchen@cox.net</a>	949-854-3089
Librarian	Karen Schnabel	<a href="mailto:karen@schnabel.net">karen@schnabel.net</a>	949-887-9517
Membership, Pad Coordinator	Charlie Oostdyk	<a href="mailto:charlie@ccd.edu">charlie@ccd.edu</a>	714-751-5381
Beginner's Astronomy Class	Antonio Miro	<a href="mailto:tycmiro@aol.com">tycmiro@aol.com</a>	714-898-9677
Astrolmagers SIG (co-chair)	Leon Aslan	<a href="mailto:laslan@earthlink.net">laslan@earthlink.net</a>	562-433-2922
	Bill Patterson	<a href="mailto:bill@laastro.com">bill@laastro.com</a>	714-578-2419
Explore the Stars Coordinator	Richard Cranston	<a href="mailto:rcransto@ix.netcom.com">rcransto@ix.netcom.com</a>	714-893-8659
Silverado Star Parties	Bob Buchheim	<a href="mailto:rbuchheim@compuserve.com">rbuchheim@compuserve.com</a>	949-459-7622
Star Member Training	Barbara Toy	<a href="mailto:btoy@cox.net">btoy@cox.net</a>	714-606-1825
OCA Outreach Coordinator	Jim Benet	<a href="mailto:jimbenet@pacbell.net">jimbenet@pacbell.net</a>	714-693-1639
Telescope Loaner Program	Bob Bell	<a href="mailto:liamcelt@earthlink.net">liamcelt@earthlink.net</a>	714-808-9233
EOA Liaison	Del Christiansen	<a href="mailto:DelmarChris@earthlink.net">DelmarChris@earthlink.net</a>	714-895-2215
Anza House Coordinator	Larry Carr	<a href="mailto:LarryCarr@sbcglobal.net">LarryCarr@sbcglobal.net</a>	714-306-6584
GoTo SIG (formerly ETX SIG)	Mike Bertin	<a href="mailto:MCB1@aol.com">MCB1@aol.com</a>	949-786-9450