

# BULLETIN

volume 86, issue 5 *May 2012*

## **Inside this issue**

Contact Information .....	2
Editor's Corner .....	2
Lockwood Family Nights .....	3
May Guest Speaker .....	3
Mt Wilson 60-inch Telescope Nights .....	4
<b>The Virgo Cluster</b> .....	<b>5-8</b>
M95 Supernova .....	9
LAAS On NightSky Network .....	10-11
Loaner Telescope Program .....	11
Public Star Party Procedures .....	12
Garvey Ranch Park Map .....	13
Outreach program .....	13
LAAS Email Lists .....	14
Website Information .....	14
Events Calendar .....	15
<b><u>Sky &amp; Telescope</u> &amp; <u>Astronomy</u> subscriptions</b> .....	<b>16</b>
Membership Dues and Phone Lists .....	16

**85 YEARS OF ASTRONOMY IN  
LOS ANGELES**

**Los Angeles Astronomical Society**  
Griffith Observatory  
2800 East Observatory Ave.  
Los Angeles, CA 90027

**Change of Address, Membership:**  
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*Editor's Corner*

**7**his month (May) we've got a partial solar eclipse (annular in some parts of the western US) on May 20th. Then there's the last Venus transit of the Sun until next century on June 5th. Griffith is hosting public star parties for both.

Then we have Mars past opposition and making a good show in the evening sky, with Saturn at opposition in the east. Then there's a supernova in Leo, an image of which appears on page 9.

So there's a lot of excitement in the skies this month !

Articles, short news or story items, and photographs are always welcome. They should be focused on things of interest to our members. Please keep articles to 1,500 words or less. Please submit only a few images at a time, with a caption for each. Include such information as camera and equipment used, and exposure times. The deadline for submitting bulletin material is the 10th of each month. If possible, please submit through email to:

dinakamoto@hotmail.com

Material may also be sent to the LAAS address listed at the top of the column at left. ✧

*David Nakamoto*

# Family Nights Return to Lockwood Valley

Family Nights in Lockwood Valley at our dark sky site are back!

Please mark the following dates on your calendar:

June 9, 2012

July 14, 2012

September 8, 2012

August 11, 2012

All LAAS members are invited to come up to the dark sky property and enjoy an evening of stargazing with friends and family. Bring your telescopes, tents and sleeping bags and camp out under the stars. Please RSVP and bring food for the pot luck dinner that we'll all share together. Registered members of Night Sky Network, will receive an event message in your email with an RSVP option. Everyone else should send their RSVP to the following email: [Coordinator@laas.org](mailto:Coordinator@laas.org).

Stay tuned for further information or check one of the dates on our calendar of events in the near future to learn more about Family Nights. ✧

*Andee Sherwood*

## *May General Meeting Speaker*

David Bunds is the guest speaker for the May Meeting.

He was born in SoCal and became interested in astronomy at age 12 and immediately wanted a telescope. His dad eventually purchased a 10" Cave Astrola right before Cave Telescopes went out of business. He is currently working for Nelson-Miller Inc as an IT Manager.

His talk is titled "Measuring the Universe: Henrietta Leavitt and her Standard Candle". He will be discussing measuring astronomical distances in general and concentrating on the discovery of the Cepheid variables by Leavitt and how that is associated with the Shapley-Curtis Debate (aka the Great Debate) concerning the true nature of the spiral nebulae. ✧

# Mt Wilson 60" Nights



LAAS has arranged for two half-nights and one full-night at the Mount Wilson 60-inch telescope this year. All three are New Moon nights. Half-nights are until 1:00 am.

June 22nd, Fri (half night)  
Aug 18th, Sat (full night)  
Oct 12th, Fri (half night)

Only LAAS members are allowed to sign up. If there is still room two (2) weeks prior to the date, paying guests will be permitted. Everyone who shows up, whether family member, friend, or guest, will have to pay in order to be allowed in the 60-inch telescope observatory. The cost is \$85 per person for the full night (no half night reservations on a full-night outing), and \$45 per person for the half night. We are allowed to accommodate only a limited number of participants at each session, and your reservations are being accepted on a first come, first serve, basis.

***To secure your reservation, send in your request AND A CHECK payable to LAAS to our Treasurer at:***

P.O. Box 56084  
Sherman Oaks, CA 91413

Any LAAS member who has not been to a 60-inch night at Mount Wilson should consider it as an opportunity to visit astronomy history. To see the location and equipment used by giants such as Shapley and Hubble will add to your appreciation of their contributions.

The scope will belong to LAAS for the time indicated. We mutually agree upon which objects to view. Often, a member is the operator, so it is a very comfortable environment. (Do bring a coat, however). The viewing is without a doubt the best you are likely to see in your lifetime.

If you need any further information about attending these nights on Mount Wilson, contact our Treasurer at [treasurer@laas.org](mailto:treasurer@laas.org) or by mail at P.O. Box 56084, Sherman Oaks, CA 91413. ✧

# *The Virgo Cluster*

*by Timothy Thompson*

After recording the 91<sup>st</sup> entry in his list of things that are not comets, on 18 March 1781, Charles Messier made the following comment (in French, of course):

*The constellation Virgo and especially the northern wing is one of the constellations which encloses the most nebulae. This catalog contains 13 which have been determined, viz. Nos. 49, 58, 59, 60, 61, 84, 85, 86, 87, 88, 89, 90 and 91. All of these nebulae appear to be without stars and can be seen only in a good sky and near meridian passage. Most of these nebulae have been pointed out to me by M. Mechain.*

Together, Messier & Mechain had discovered the Virgo cluster of galaxies. This is the first written documentation of that discovery. Messier went on to add objects 98, 99 and 100 to his catalog, to total 16 objects from the Messier catalog in the Virgo cluster. Messier had written down the wrong coordinates for M91, and it was William C. Williams, an amateur astronomer from Texas, who figured out which galaxy in the cluster was actually M91, documented in a letter to the editor of *Sky and Telescope* in the December 1969 issue. So from 1781 until 1969, M91 was a “missing object” on the Messier list.

The Virgo cluster covers an area roughly enclosed between +13 and +20 degrees declination, and 12 to 13 hours right ascension. My *Sky Atlas 2000.0* (Tirion & Sinnott, field version, 2<sup>nd</sup> edition) shows the Virgo cluster on page 14, and in the appendix at the end of the atlas on page B1. The cluster sits astride the boundary between Virgo and Coma Berenices, so it is also sometimes called the Coma-Virgo cluster.

The Virgo Cluster Catalog (VCC) was published in 1985, but remains the standard catalog still used today (*Studies of the Virgo Cluster II. A Catalog of 2096 Galaxies in the Virgo Cluster Area*; Binggeli, Sandage & Tammann, *The Astronomical Journal* 90(9): 1681-1758, September 1985). The catalog lists 1277 certain cluster members and an additional 574 possible cluster members (1851 altogether), along with 245 background galaxies that are all in the Zwicky catalog. They found no foreground galaxies. A paper from 2010 shows 2156 galaxies in the VCC+ catalog, of which 1175 are dwarfs and 414 are irregular or peculiar, but does not distinguish between certain and probable cluster members. Dwarf galaxies typically outnumber larger galaxies by about a factor of 10, so these numbers are reasonable. Our own small Local Group, with about

*(Continued on page 6)*

60 galaxies, has only 2 large spirals (Milky Way & M31), one small spiral (M33) and everything else is a dwarf galaxy.

The total mass of the Virgo Cluster is somewhere between  $10^{14}$  and  $10^{15}$  solar masses, depending on who is doing the reporting; the most recent determination I have seen, based on observations of 1792 galaxies falling into the cluster, can only give the range  $2.7\text{-}8.9 \times 10^{14}$  solar masses. In any case, these are reasonable numbers for a large galaxy cluster; our own Local Group weighs in at a few times  $10^{12}$  solar masses, including dark matter, making the Virgo cluster at least 100 to 300 times as massive as our Local Group.

Anywhere from 60% to 90% of the normal (*baryonic*, not dark matter) mass of a galaxy cluster is found in the intracluster medium (ICM) rather than in the galaxies themselves. The ICM is mostly tenuous and very hot gas. However, the galaxies in a cluster often make close passages by one another, or even collide. The result is that a lot of stars are stripped away from the galaxies and become wandering stars between the galaxies. These stars create a diffuse glowing light, called the *intracluster light*, between the galaxies within the cluster. There is a well studied intracluster light in the Virgo cluster and it is not strictly limited to normal stars; a large number of intracluster planetary nebulae have been observed as well. The intracluster light near M87 is particularly bright, indicating stars stripped away from the outer regions of the galaxy by the combined gravity of the rest of the cluster.

In 1926, Harlow Shapley and Adelaide Ames published a paper estimating the distance to the Virgo cluster as about 10,000,000 light years (ly), and they also speculated that the spiral nebulae in the cluster were stellar systems not unlike our own Milky Way galaxy. In research papers from the last year, the given distance to the cluster ranges from 15 to 20 megaparsecs (Mpc) or 48,900,000 to 65,200,000 ly. Since the cluster is an extended object, the near side being considerably closer to us than the far side, choosing a single distance is obviously as much of an art than a science. The depth of the cluster from our vantage point is anywhere from 2 to 6 Mpc (6,500,000 to 19,600,000 ly). There is a small group of 5 galaxies on the far side, about 23 Mpc (75,000,000 ly) that may be cluster members. M87 is the most massive galaxy in the cluster, roughly corresponds to the cluster center of mass, and lies at a distance about 16.1 Mpc (52,490,000 ly). The lenticular galaxies M84 & M86 are conspicuous at the fat end of the Markarian Chain of galaxies. M84 lies at a distance of about 18.4 Mpc (60,000,000 ly), while M86 lies at the somewhat closer distance of about 15.9 Mpc (51,800,000 ly). The giant elliptical galaxy M87 is the most massive galaxy in the cluster, roughly corresponds to its center of mass, and lies at a distance about 16.4 Mpc (53,460,000 ly). The large spiral galaxy M100 lies at a distance about 16.1 Mpc (52,490,000 ly).

(Continued on page 7)

Cosmologists make use of the cosmological redshift – distance relationship to derive the distance to very distant galaxies. But the measured redshift is actually a combination of a redshift induced by the cosmological expansion plus a redshift, or blueshift, caused by the motion of the galaxy relative to its own local environment (this local motion is typically called *peculiar* motion). In most cases the peculiar motion is so small compared to the cosmological expansion that it can be ignored, but this is not the case for the Virgo cluster. At least 6 bright members of the cluster (M86, M90, M98, NGC 4318, NGC 4419 and IC 3258) show blueshifted spectra, but there are at least 60 cluster members known to show blueshifts. The record blueshift is IC 3258, heading this way at 517 km/sec. Likewise, some of the Virgo cluster galaxies exhibit extreme redshifts for galaxies so cosmologically nearby; i.e., M99, NGC 4168, NGC 4354, NGC 4388, NGC 4607 and IC 3453, all of which show redshifts in excess of 2300 km/sec, which if entirely cosmological would imply a distance in excess of about 110 million light years. These blueshifts, and excess redshifts, are due to the fact that the Virgo cluster is still in the process of forming. New galaxies are still falling into the cluster, so galaxies falling in from the opposite side naturally appear blueshifted, and galaxies falling in from the near side naturally appear excessively redshifted. Our Local Group is “falling” towards the Virgo cluster at about 240 km/sec, but the Virgo cluster is “falling” away from us at about 1200 km/sec, so both the Local Group and the Virgo cluster are “falling” towards a greater mass that lies on the far side of the cluster.

**M87**, a giant elliptical galaxy, is the most massive galaxy in the cluster and roughly coincides with the cluster center of mass. Everything about M87 qualifies as *big*. The main body of the galaxy is about 120,000 ly across, compared to a diameter of about 100,000 ly for the Milky Way disc. While the stellar halo of the Milky Way might extend out as far as 300,000 ly, the stellar halo of M87 extends out about 490,000 ly. The main body of M87 weighs in with about  $2.5 \times 10^{12}$  solar masses, roughly equal to the combined mass of M31 and the Milky Way, and therefore most of the mass of our entire local group. The total mass of M87 is anywhere from  $5 \times 10^{12}$  to  $10^{13}$  solar masses. While our Milky Way sports 158 globular clusters in the 2003 William Harris catalog, M87 is known host at least 14,000 globular clusters. Even our supermassive black hole does not measure up. The central black hole in the Milky Way carries about 4 million solar masses, while the central black hole for M87 is no smaller than 3 *billion* solar masses. That’s roughly the same as the total mass of local group spiral galaxy M33.

In 1918, from Lick Observatory, Heber Curtis discovered “a curious straight ray” in the heart of M87. In 1954, Baade and Minkowski identified M87 as the optical counterpart of radio source Virgo A. We now know that the straight ray discovered by Curtis is a jet, extending perhaps 5000 ly, from the supermassive

*(Continued on page 8)*

central black hole, and that's where most of the radio emission comes from. Jets of the type found in M87 are ubiquitous.

Since M87 is the closest giant elliptical galaxy to us, its jet can be studied in more detail than any other, so it becomes the surrogate study object for large-scale jets everywhere. M87 is one of the most intensely studied galaxies in the sky.

**M100** is a face-on spiral galaxy with two conspicuous major arms looping around it, which defines the form typically called *grand design*. Grand design spirals are actually somewhat rare, more so than one might think after seeing them in every collection of galaxy images. M100 is about 3,600,000 ly from M87 and both are about the same distance from us. The stellar disk of M100 is about 113,000 ly in diameter, only slightly larger than the roughly 100,000 ly diameter Milky Way disk. I cannot find any determination of the mass of M100, but considering its size, it must be comparable to that of the Milky Way, about  $10^{12}$  solar masses including dark matter.

The chief claim to fame for M100 is that it played a key role in the Hubble Key Project, using Cepheid variable stars to determine the true distance to distant galaxies. After determining Cepheid distances to the closer galaxies M81 and M101, the HST Key Project turned its attention to the Virgo cluster and M100. The distance they determined remains the most reliable, 16.1 +/- 1.3 Mpc, or 52,490,000 +/- 4,240,000 ly.

The Virgo cluster is prime hunting ground for amateur astronomers looking for galaxies. It is also prime hunting ground for professional astronomers who want to study galaxies, and the effect of the cluster environment on galaxy evolution; being the nearest galaxy cluster, its member galaxies can be observed with high resolution and are relatively bright. It is prominent in spring, and spring has sprung, so all you galaxy observers have something to keep you busy. ✧



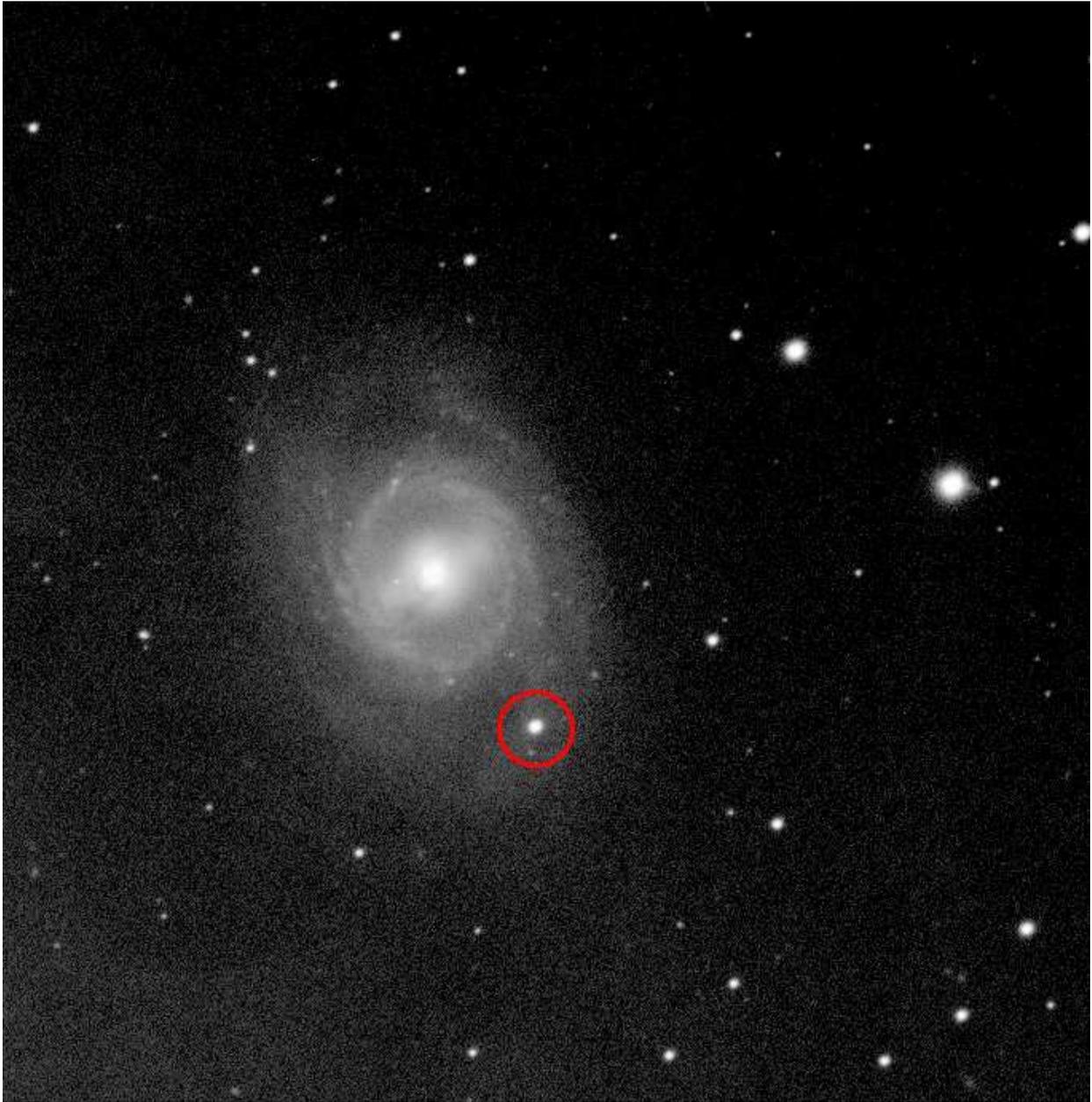
## **Soylent Co.**

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Proud to sponsor amateur Astronomical endeavors like the LAAS.

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Remember— *Soylent Green is people.*



This image of M95 showing the recent supernova was taken by Dr. Barry Megdal from his backyard in Northridge. It was made up of 10 exposures of 10 minutes each with an FLI PL16803 camera on an Astro-Physics 206 telescope. M95 is one of the best barred spirals visible to amateurs. The brightness of the supernova is apparent, rivaling the brightness of the core of M95. The supernova apparently was first detected on March 16th, and shows up bluish in images, contrasting with the reddish hue of the core. M95 is 38 million miles away beneath the belly of Leo the Lion. It has faded by now, but something might still be visible. By the way, Mars is also in Leo, with Saturn next door near Spica in the constellation Virgo, so a lot is going on in the evening sky !

# LAAS on Night Sky Network

LAAS has been on Night Sky Network since May, 2011. I'm happy to announce that we now have 94 members on the roster! Please register at: Los Angeles Astronomical Society - Night Sky Network

The NSN calendar is now available for all members to use on the laas.org web site or on Night Sky Network.

You can now find dates for club meetings, special social events, Family Nights at Lockwood, RTCM, PATS, Science Nights, the seasonal "Skies" classes taught by our very own Mary Brown, Dark Sky nights and even the very special 60 Inch Nights at Mount Wilson. Popular national and local events are also posted for your convenience. Instead of waiting to hear about future events, you can check the calendar up to December 31, 2012 to discover all of our club's activities in advance and plan ahead.

There is a great deal of information available for each event. You will find the following info listed with each scheduled date by clicking on the event title:

- Time of sunset
- Star/sky chart
- Current moon phase
- Weather forecast
- Directions and map plus the latitude and longitude of each location
- The contact info
- Who organized the event
- Expected number of visitors plus the age group of such visitors
- Additional location and set up info for Outreach volunteers
- Speaker information for General meetings
- And MORE!

Our Outreach Program is using the NSN calendar with great success. Once a request for Outreach has been received, the date is scheduled on the calendar within a few hours and the information is available for you. If you're thinking about going to some of our Outreach activities, you can now plan ahead to see what schools or groups are in your area by checking the calendar. You can even RSVP directly to Heaven, our Outreach Coordinator if you are a registered member on NSN. It is easy to do and efficient!

Steve Dashiell, our club's Secretary has made some changes making the site

*(Continued on page 11)*

better for all of us. Our web site has a new addition which is from NASA's "Space Place" which consists of monthly science articles appropriate for both children and adults. In return, LAAS receives wonderful items from JPL/NASA to hand out to visitors at our star parties and Outreach program events. Steve has some wonderful ideas which you may see soon on laas.org.

Why should you register on Night Sky Network? If you want to get involved with the Outreach Program and stay informed of all of our events, you'll receive event messages directly in your email once you register your email. Here's a video that will explain the benefits of being a member on NSN.

Night Sky Network: Benefits to your Astronomy Club - YouTube

New and fun events are brewing away! Stay tuned for more information to come. ✧

*Andee Sherwood*

*Night Sky Network Coordinator*

## Loaner Telescope Program

Due to the relative in-activity in the loaner program, the Loaner Corner has been dormant for the last several months. Due to the recent activity this has been awakened. The spring and summer star seasons are just around the corner and now is the time to consider borrowing a telescope from the LAAS. The following instruments are currently available.

- LAAS-1: Celestron 4.5" f/8 reflector on a genuine Polaris equatorial mount.
- LAAS-2: Upgraded Tasco 4.5" f/8 reflector on an Edmund equatorial mount with an internal clock drive.
- LAAS-4: Telescopes 6" f/5 reflector on a Dobsonian mount.
- LAAS-6: Discovery Instruments 10" f/4.5 reflector on a Dobsonian mount. This is a large instrument especially good for deep sky observation. It is rather large. Therefore anyone considering this instrument should have access to a small truck, van, or SUV.
- LAAS-7: Meade 80mm f/15 refractor on an Orion Sky-View Deluxe equatorial.
- LAAS-9: 80mm refractor on a Celestron heavy duty camera tripod. This is a good Rich Field Telescope.
- LAAS-10: Meade 70mm f/10 refractor on a light equatorial mount. This instrument is currently under development and will include 3 eyepieces and a star diagonal.

For more information call David Sovereign at (626) 794-0646. ✧

# *Griffith Observatory*

## *Public Star Party Procedure*

Before 6:00pm, show your LAAS badge or card to the traffic control person at the fork at the top of Vermont road just before you reach the tunnel. You'll be allowed to drive up East Observatory Ave. After 6:00pm, no one is allowed to drive up East Observatory Ave, and you'll need to drive through the tunnel, up West Observatory Ave., and through the public parking lot to the traffic control person at the end of the lot. Show the person there your badge and they should let you through. Once at the U curve in front of the Observatory, temporarily park your car on the side nearest to the observatory and unload your equipment. A cart will be available to facilitate moving your equipment. Unload your equipment at the spot where you wish to set up. Mary will oversee your equipment while you park along East Observatory Rd. Then set up your equipment.

Volunteers without equipment are also needed. We especially need help with crowd control with the LAAS 26-inch telescope.

Those who volunteer should remember that the main focus is to be of service to the patrons at Griffith Observatory and show them the nighttime sky. New Members are not expected to adhere to this policy.

Please check the LAAS website and Yahoo group messages for changes and updates to any LAAS event.

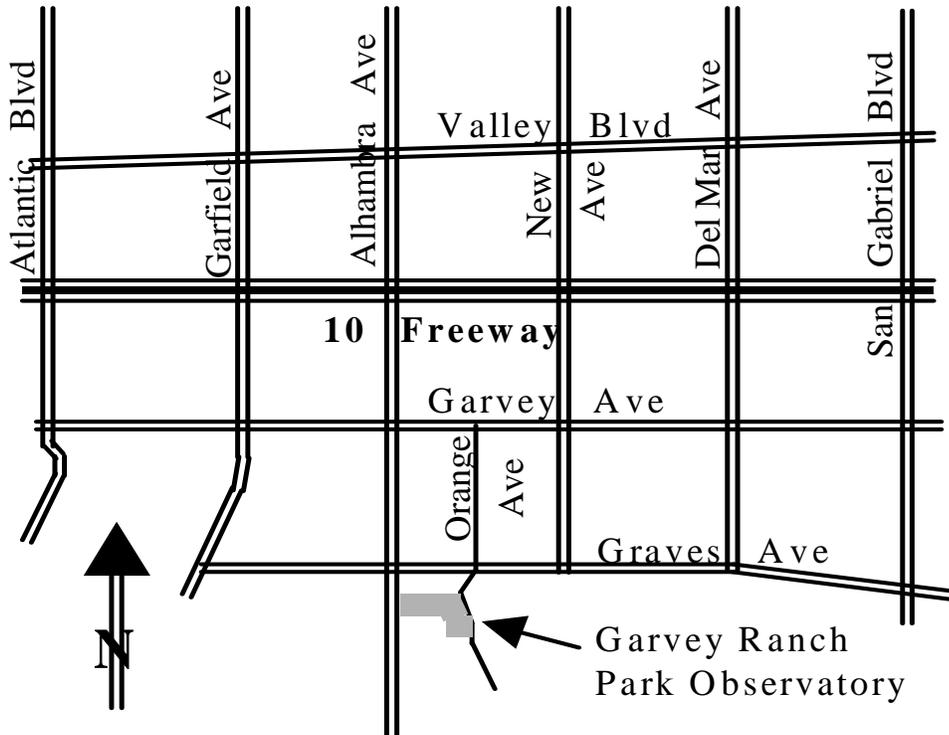
To be trained in moving, setting up, and preparing the 26-inch, please attend one of the Griffith public star party events. We normally start setting it up around one hour before sunset, weather permitting. We'd like as many members to be trained and comfortable handling the telescope.

Have fun and enjoy! ✧

*PJ Goldfinger & David Nakamoto*

# Map to Monterey Park Observatory

(The place to build your telescope)



## *Outreach Program*

We've got a large number of requests despite the Recession and the cutback in school funding.

We especially need people living in the San Gabriel Valley to go to outreach events there. Nearly all of the regular volunteers live in the San Fernando Valley, so the need in the "other" valley is great.

Come on out to the school and show all the enthusiastic kids, parents, and teachers the night sky. They always appreciate it. And if you get WOW's when they look through you scope, you'll feel good. If no scope, come out anyway and help up set up or answer questions from the kids. So, Outreach volunteers, let's pitch in. I'm sure the kids and adults will appreciate our effort. Thanks !

heven\_729@yahoo.com (213) 673 - 7355 ✧

(Editors Note: Be aware that often these requests come with very little advanced notice. Therefore, we won't post any events in the bulletin. The best way to get news of these events is to use the Internet and join the LAAS Yahoo group. To join the LAAS Yahoo group, see below.) ✧

*Heven Renteria*

# LAAS Email Lists

The LAAS maintains two E-mail lists, *for LAAS members only*, a general list and an announcements list. Instructions for joining either list can be found in the LAAS web pages under Resources → Newsgroups

Or look at the bottom of this article for instructions.

The announcements list is intended for announcements of events such as upcoming speakers, special star parties, or other functions planned by the LAAS board. General members are not expected to respond on this list, just to receive announcements. It is a very low traffic list. *Every member should join this group.*

The general list is intended for use by all LAAS members to communicate with each other; ask questions about events, ask questions about astronomy or the LAAS, plan your own events, ask for help with a telescope, or just talk about something relating to astronomy. Traffic will vary greatly depending on member interest & current events.

The LAAS does not automatically put anyone on an E-mail list; you have to choose to do it. E-mail is the most efficient way for the board of directors to communicate quickly with the members, and for the members to communicate with each other. We ask all members to join the announcements list, and ask all members to consider joining the general list.

The group is private, and therefore does not come up in a search. To join, send email to: LAAS-subscribe@yahoo.com. Include your full name so the moderator can verify your LAAS membership. If approved, you will receive further instructions via email. ✧



LAAS Home Page: <http://www.laas.org>  
LAAS Bulletin Online: [http://www.laas.org/joomlasite/index.php?option=com\\_content&view=article&id=102&Itemid=69](http://www.laas.org/joomlasite/index.php?option=com_content&view=article&id=102&Itemid=69)

# EVENTS CALENDAR

Date	Event	Location and Information
May 2nd (Wed)	Board Mtg	Garvey Ranch Park
May 7th (Mon)	General Meeting	Griffith Observatory Event Horizon Theater 8:00pm to 9:45pm. Speaker and topic on page 3.
May 19th (Sat)	Dark Sky Star Party	Lockwood Valley
<b>May 20th (Sun)</b>	<b>Partial Solar Eclipse</b>	<b>Griffith Observatory Public Sun and Star Party (times not known)</b>
May 26th (Sat)	Public Star Party	Griffith Observatory 2:00pm to 10:00pm See pg 12 for Procedures and Rules.
<b>June 5th (Tue)</b>	<b>Venus Transit of the Sun</b>	<b>Griffith Observatory Public Sun and Star Party Time approx. 12 noon to 10pm</b>
June 6th (Wed)	Board Mtg	Garvey Ranch Park
June 11th (Mon)	General Meeting	Griffith Observatory Event Horizon Theater 8:00pm to 9:45pm. Speaker and topic unknown.
June 16th (Sat)	Dark Sky Star Party	Lockwood Valley
June 23rd (Sat)	Public Star Party	Griffith Observatory 2:00pm to 10:00pm See pg 12 for Procedures and Rules.

# Sky and Telescope Subscriptions

Sky and Telescope subscriptions renewals should be sent directly to Sky Publishing. To start a Sky & Telescope subscription at club rates, send a check payable to "Sky & Telescope" in the amount of \$32.95 for a one year subscription to :

**LAAS treasurer**  
**P.O. Box 56084**  
**Sherman Oaks, CA 91413**

Be sure to include the exact name and mailing address for your subscription.

Then thereafter send the renewal bills directly to Sky Publishing. ✧

# Astronomy Magazine Subscriptions

For a club rate subscription to **Astronomy**, send a check payable to Kalmbach Publishing Co. in the amount of \$34 for one year or \$60 for two years to :

**LAAS treasurer**  
**LAAS**  
**P.O. Box 56084**  
**Sherman Oaks CA 91413**

Be sure to include the exact name and mailing address for your subscription. That magazine also requires later subscription renewals to be handled through the LAAS Treasurer. ✧

## Membership Annual Dues:

Youth	\$ 20.00
Regular (18-65)	\$ 45.00
Senior Citizen (65 and up)	\$ 30.00
Senior Family	\$ 40.00
Family	\$ 60.00
Life	\$ 500.00

### Additional fees:

Charter Star member	\$ 30.00
Star member, with pad	\$ 70.00
Star member, no pad	\$ 60.00
Printed Bulletin	\$ 15.00

**(Membership due date is indicated on the mailing label)**

## HANDY PHONE LIST



LAAS Answering Machine .....	(213) 673-7355
Griffith Observatory	
Program.....	(213) 473-0800
Sky Report.....	(213) 473-0880
Lockwood Site .....	(661) 245-2106
(not answered, arrange time with caller.)	
Outgoing calls – collect or calling card)	
Mt. Wilson Institute .....	(626) 793-3100