

BULLETIN

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OUR 82nd YEAR OF
ASTRONOMY IN LOS ANGELES
Los Angeles Astronomical Society
 Griffith Observatory
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 Los Angeles, CA 90027

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Editor's Corner



November is nomination night for officers and board members for the LAAS board. Please consider volunteering your time and be a board member or officer to help steer The Good Ship LAAS.

Also at the November meeting, we'll have David Jurasevich to talk about what happened at Mt Wilson during the devastating Station Fire. Considering the length of the fire and that it was the first time in at least a long time that Mt. Wilson was so threatened, it should be interesting to hear what happened up there.

Hank Lin is our new Youth Activities Liaison. Let's help him to make reaching out to our youth members easier and more fun !

If you're interested in learning how to move and setup the Society's 26-inch telescope currently stored at Griffith, please attend the Griffith public star party events. We normally bring the telescope out around one hour before sunset so we have enough light to do so. We'd like as many members to be trained and comfortable handling the telescope.

Next year's RTMC dates have still not been finalized yet. We'll try and keep everyone informed.

Information on the 2010 annual banquet to be held at the Monterey

(Continued on page 3)

Hill Restaurant in the San Gabriel valley, Monterey Park, on January 24th Sunday is on page 10.

Articles, short news or story items, and photographs and images are welcome as long as they're focused on LAAS interests. Articles need to be 1,500 words or less. Please submit only a few images at one time, and please supply a caption for each. Include such information as camera type, telescope or other equipment used, and exposure times. The deadline for submitting bulletin material is the 10th of each month. If possible, please submit electronically to: BulletinEditor@laas.org

Material may be sent to the LAAS address listed at the top of the column at left, but timely reception and publication cannot be guaranteed. ✧

David Nakamoto

Outreach Program

School's now back in session, and that means outreach opportunities. In fact, 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 !

Outreach@laas.org (818) 891-3087 ✧

(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 either join the LAAS Yahoo group or access the LAAS website. To join the LAAS Yahoo group, see page 16)

Don DeGregori



This wonderful sunset image was taken by David Pinsky with a Canon Powershot with a 1/40 sec @ f2.8 during one of the Griffith public star parties.

The Hubble Deep Fields

By Timothy Thompson

Back in the February 2006 bulletin I wrote about “Going Deep” and featured the Hubble Ultra Deep Field (HUDF). The deep field images are probably the iconic achievement of the venerable Hubble Space Telescope (HST). I remember the excitement in the amateur astronomy community when the original Hubble Deep Field (HDF) was made public in January 1996. So let us go back to the exciting days of yesteryear for this article and remember one of astronomy’s signature successes.

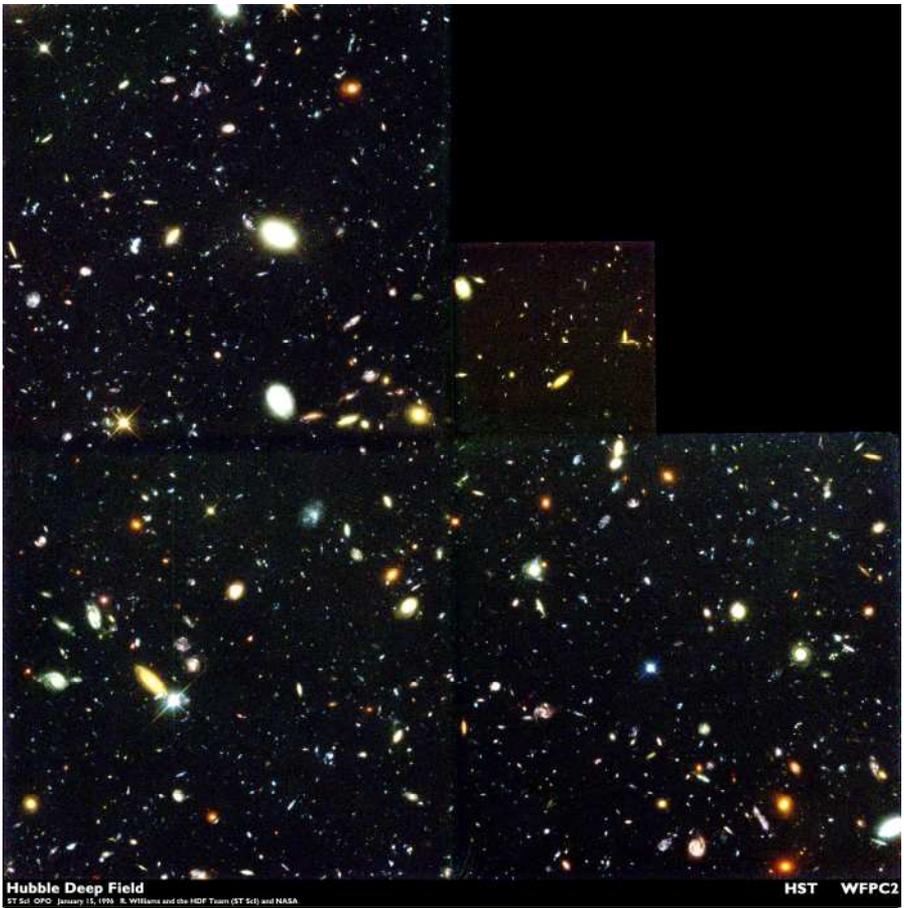
Of course, there was nothing new about the idea of making deep exposures. It was already well known that this was the only way to see the era of galaxy formation, which remains to this day a sort of Holy Grail for observational astronomers. Once the additional optics were installed on the HST to compensate for the slightly flawed primary mirror, it became evident that HST could resolve structure in moderate to high red-shift galaxies, enough so to make morphological classification possible. Despite its relatively small aperture of about 96 inches, HST could clearly do something impossible from the ground-based observatories. So at the discretion of Robert Williams, then the director of the Space Telescope Institute, the quest was on for an appropriate field of view somewhere in the vast sky, to make this deepest of all exposures (with unpredictable results).

The chosen field had to be in the Continuous Viewing Zone (CVZ) for maximum efficiency, which quickly limits the field to around 60 degrees declination. Going deep of course requires minimum optical extinction (less than 0.01 magnitudes), which in turn requires a low column density of neutral hydrogen, and a minimum of emission from the infrared cirrus that permeates the galaxy (this was done by looking at the old IRAS 100 micron sky maps). They finally settled on a field just pole-ward of where the handle meets the cup of the Big Dipper.

The chosen field was observed between 18 to 28 December 1995. 342 exposures, about 15-40 minutes each, with the Wide Field Planetary Camera 2 (WFPC2) were put together to make the original HDF image, released to the world on 15 January 1996. About 2.4 x 2.4 arc-minutes square, the image is the same size as a dime seen from 75 feet, and still features about 5000 galaxies, but less than 20 field stars. It reached down to nearly 29th magnitude and was at the time the deepest image ever made in visible light.

The HDF image was such a success that it didn’t take long to realize that a

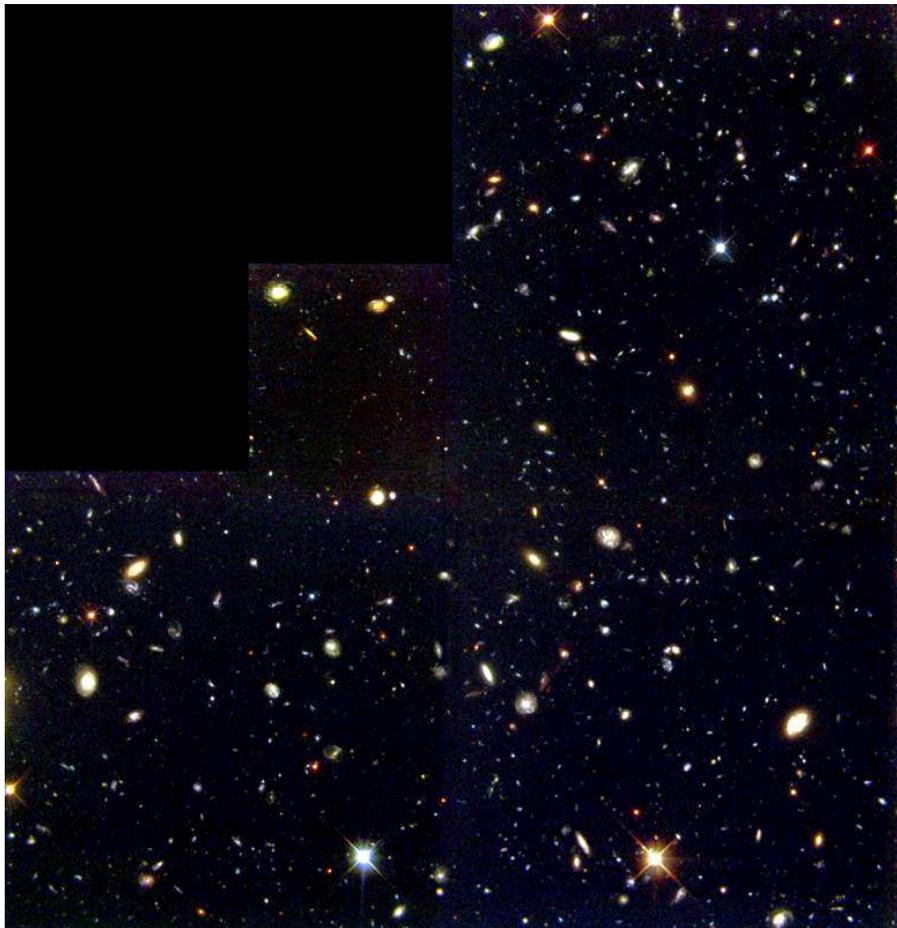
(Continued on page 6)



The original Hubble Deep Field (North) includes 342 exposures with WFPC2 showing 5000 galaxies but less than 20 foreground stars.
J2000 RA & DEC: 12h 36m 49s.40 +62° 12' 58.0"

another deep field image, in a much different part of the sky, was highly desirable. So eventually another field was chosen, this time in the southern CVZ. One of the key goals of the original HDF was to count galaxies as a function of magnitude, so known galaxy clusters and bright objects were avoided, so as not to bias the count. Since this was achieved by the HDF, it was no longer a real worry for the southern field. Besides, after HDF was made two new instruments were added too the HST: the Space Telescope Imaging Spectrometer (STIS) and the Near Infrared Camera and Multi-Object Spectrometer (NICMOS). So while the original HDF was made only with the WFPC2, the southern field had to make use of both STIS & NICMOS. So the field was chosen to include a "bright" (17th

(Continued on page 7)



The Hubble Deep Field (South) shows about 2500 galaxies.
J2000 RA & DEC: 22h 32m 56s.22 -60° 33' 2.69"

magnitude) quasar (QSO J2233-606) in the STIS field, in order to get a spectrum of the Lyman-alpha forest for the QSO, and see what lies between it and us.

The chosen field lies in the southern constellation Tucana, not far from the star alpha Tucanae. This time 995 exposures were made, but that includes all 3 instruments. The observations began 28 September and ran through 10 October 1998, and the final image was made public on 23 November 1998. Typical exposure times were the same, about 15-40 minutes, but the WFPC2 image was not quite as deep as the original HDF. This new field was designated Hubble Deep Field South (HDFS) and the original HDF became Hubble Deep Field North

(Continued on page 8)



The Hubble Ultra Deep Field includes 800 ACS exposures and catalogs about 10,000 galaxies in a 3x3 arcminute field. That translates into 165,012,000,000 galaxies all sky, if you had 504,360 years of observing time to do it.
J2000 RA & DEC: 3h 32m 39s.0 -270 47' 29.1"

(HDFN), although HDF is still understood to mean the original.

The HDFS was not quite as deep as the HDFN, but provided mutually consistent galaxy counts and considerable information about the environment of QSO J2233-606 (STIS appears to have detected and otherwise unseen galaxy cluster in front of the quasar). But of course the addition of yet another new instrument to the HST retinue, the Advanced Camera for Surveys (ACS) motivated the quest for yet another, even deeper field. But this time things would be a little different.

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You might think that being in space would alleviate the problem of finding a dark sky for observing, but in this case you would be wrong! The CVZ inconveniently requires the HST to point near the limb of Earth. If it's the night side limb, that's called "dark time" for HST, but if it's the sunlit limb of Earth, it's called "bright time". In bright time, only the ultraviolet filter on WFPC2 is optimal, the other filters being contaminated by scattered Earthlight. But the ACS has no channel that is not affected by bright time, so for the ACS deep field it was decided to avoid the CVZ and go for a dark sky. Another requirement was to place the new deep field in a region already being observed by other deep surveys, so there could be correlation with other projects. And a desire to maximize availability of the field to other ground-based observatories limited the declination range to between +35° (above which the large South American observatories cannot see) and -40° (below which the large Mauna Kea observatories cannot see). The result was a field in the much larger Chandra Deep Field South, already heavily observed by both the Chandra & XMM X-ray observatories, and already studied as part of the Great Observatories Origins Deep Survey (GOODS).

The Hubble Ultra Deep Field (HUDF), a spot between Fornax & Eridanus, was observed from 24 September 2003 through 16 January 2004, and the first images made public on 9 March 2004. There were 800 ACS exposures over 400 orbits of HST. The slightly larger 3x3 arcminute field of view cataloged 10,000 galaxies. It was then, and remains now, the deepest visible light image ever made. The HUDF revealed for the first time the small building block galaxies, 1000 to 10,000 times smaller than the Milky Way. The current thinking on galaxy formation centers on the hierarchical model, which holds that the large galaxies we see in the present universe (like M31 and the Milky Way) are built up by the merging of the smaller galaxies. The HUDF presents evidence consistent with this view, showing small irregular galaxies were ubiquitous at high redshift, and showing small galaxies in the act of merging.

The HDFN, HDFs & HUDF images are together the deepest set of visible light images extant, or likely to be extant for the near future. They have contributed significantly to our understanding of the evolution of galaxies, and so the evolution of the universe. They have also provided rallying points for numerous deep field studies at many wavelengths, from radio through X-rays. The HDFN appears to have detected old white dwarf stars in the Galactic halo that will alter our ideas about the baryonic fraction of dark matter surrounding the Milky Way. The HUDF comes tantalizingly close to revealing the era for formation of the first galaxies in the universe. So we now have high hopes that the 6-meter primary mirror of the James Webb Space Telescope (JWST) will see all the way to the first galaxies (and maybe even to the first stars if we are lucky). To image the entire sky with the current HST, at the depth of the HUDF, would take

(Continued on page 10)

504,360 years of exposure time (not counting overhead for data communication, maintenance & etc.). So don't look for an all sky HUDF, and don't count on yet another HUDF, since it is unlikely that the HUDF can be surpassed by anything short of the JWST. But deep times lay ahead, I think, and surely somebody hanging around the JWST project has already thought about the JWST Hyper Deep Field. ✧

Table 1:

HDFN & HDFS WFPC2 Exposure time (hours) form each filter. Filter number shows the central wavelength in nanometers, where human eyes are sensitive to roughly the range 400 to 700 nanometers.

FILTER	F300W	F450W	F606W	F814W
HDFN	48.93	36.52	34.94	34.86
HDFS	36.83	28.28	27.00	31.17

Table 2:

HDFN & HDFS WFPC2 limiting magnitudes for each filter.

FILTER	F300W	F450W	F606W	F814W
HDFN	27.60	28.12	28.71	28.02
HDFS	26.8	27.7	28.3	27.7

Table 3:

HUDF ACS Exposure time (FT) and limiting magnitude (LM) for each filter.

FILTER	F435W	F606W	F775W	F850LP
ET	37.47	37.58	96.42	96.28
LM	28.7	29.0	29.0	28.4

2010 Annual Banquet

Here are the current details for the 2010 annual banquet. Please check future bulletins for any updates and changes.

Date : Sunday, Jan 24th

Time : 5:00pm for the bar
6:00pm for dinner

Location : Monterey Hill Restaurant
3700 Ramona Blvd., Monterey Park
<http://www.montereyhillrestaurant.com/>

Cost : \$45 per person
\$20 for children under 13

Mail reservations and checks to LAAS Treasurer at
P.O. Box 56084
Sherman Oaks, CA 91413

Make checks out to Los Angeles Astronomical Society. On the note line, write "2010 banquet reservation".

See ya there !

David Nakamoto



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Griffith Observatory Public Star Party Procedure

Signups are no longer required.

When you arrive, 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 Rd. Once at the top of the road, temporarily park your car on the side nearest to the observatory and unload your equipment. Roger Keen should be available with a cart to facilitate moving your equipment if you need it. Once you've unloaded your equipment at the spot where you wish to set up, Roger will oversee your equipment while you park along East Observatory Rd. Then you can set up your equipment.

You can volunteer for the event **without equipment** to aid those with equipment so they can take breaks, help out with crowd control, et al. We especially need help with crowd control with the 26-inch telescope.

It should be understood by any LAAS member who volunteers their time towards the public star party that the main focus is to be of service to the patrons at Griffith Observatory and show them the delights of the nighttime sky. New Members are not expected to adhere to this policy.

Please check the LAAS website and Yahoo list for changes and updates in any LAAS event, as there are many communication mediums and some are missed.

Have fun and enjoy! ✧

PJ Goldfinger & David Nakamoto



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This image was taken by David Pinsky using his Canon Powershot and handheld on automatic mode.
This view will be soon a thing of the past, as the Shuttle is retired in a few years.

Map to Monterey Park Observatory

(The place to build your telescope)



LOANER CORNER



There have been some minor changes to the accessories for the instruments in the loaner program. All telescopes are equipped with three eyepieces. Reflectors come with a simple collimation tool and refractors come with a star diagonal.



LAAS-1: 4.5" f/8 Celestron reflector on a Polaris equatorial mount

LAAS-2; 4.5" f/8 upgraded Tasco reflector on a driven Edmund equatorial mount

LAAS-4: 6" f/5 Telescopic reflector on a short Dobsonian mount

LAAS-6: 10" f/4.5 Discovery reflector on a Dobsonian mount. This is the largest telescope in the collection.

LAAS-9: 80mm F/6.25 refractor which has been re-mounted on a heavy-duty Celestron camera tripod. This alt-azimuth style mount is good for this fine Rich Field Telescope.

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

David Sovereign

LAAS-4

LAAS-2



EVENTS CALENDAR

Date	Event	Location and Information
Nov 4th (Wed)	Board Meeting	Garvey Ranch Park Class Room. 8:00 pm to 10:00 pm
Nov 9th (Mon)	General Meeting	Griffith Observatory Leonard Nimoy Event Horizon Theater Speaker is Dave Jurasevich, site supervisor for Mt. Wilson Institute. Topic is the Station Fire and Mt. Wilson Observatory. Nominations night for the officers & board of directors election the following month. 7:45 pm to 9:45 pm
Nov 14th (Sat)	Dark Sky Night	Lockwood Valley
Nov 21st (Sat)	Public Star Party	Griffith Observatory 2:00 pm to 10:00 pm See pg 12 for details on how to attend.
Dec 9th (Wed)	Board Meeting	Garvey Ranch Park Class Room. 8:00 pm to 10:00 pm
Dec 12th (Sat)	Dark Sky Night	Lockwood Valley
Dec 14th (Mon)	General Meeting	Griffith Observatory Leonard Nimoy Event Horizon Theater Member show and tell, And election of officers and board members 7:45 pm to 9:45 pm
Dec 19th (Sat)	Public Star Party	Griffith Observatory 2:00 pm to 10:00 pm See pg 12 for details on how to attend.

LAAS Yahoo Group—how to join

The group is private, and therefore does not come up in a search. To join, send email to: LAAS-subscribe@yahoogroups.com. Include your full name so the moderator can verify your LAAS membership. Your full name is necessary so we can check our records to see if you really are a LAAS member. If approved, you will receive further instructions via email. ✧

Sky and Telescope Subscriptions

Sky and Telescope subscriptions renewals should be sent directly to Sky Publishing. To start a Sky and Telescope subscription, contact the LAAS Treasurer (see the contact information on page 2) directly to get the club rates, then thereafter send the renewal bills directly to Sky Publishing. ✧

Astronomy Magazine Subscriptions

For those that subscribe to Astronomy Magazine through the LAAS, the rate has gone up to \$34 a year, \$60 for two years. ✧



LAAS Home Page: <http://www.laas.org>
LAAS Bulletin Online: http://www.laas.org/Resources_Newsletter.htm

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
<i>Additional fees:</i>	
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.....unavailable for now
Lockwood Site (661) 245-2106
(not answered, arrange time with caller.
Outgoing calls – collect or calling card)
Mt. Wilson Institute..... (626) 793-3100