M A R C H 2 0 1 8

Mount Diablo Astronomical Society

Diablo MoonWatch

MESSIER MARATHON MARCH 17TH
CLICK HERE FOR DETAILS!

GENERAL MEETING PROGRAM

TUESDAY, MARCH 27, 2018 7:15 PM
DOORS OPEN 6:45 PM

On Becoming a Spacefaring Society

Speaker: Ejner Fulsang, NASA & SETI

Lindsay Wildlife Experience
1931 First Avenue
Walnut Creek CA
Follow Parking Instructions on Last Page

Chapter One: Propulsion



If we ever hope to become a true spacefaring society, we must wean ourselves away from chemical rockets. This premise will be proven through an examination of Tsiolkovsky's Rocket Equation, where it will become apparent that adding fuel achieves diminishing returns, but increasing exhaust gas velocity offers rapid transits to Mars, the outer planets, and eventually the nearby stars. There is an upper limit to the exhaust gas velocity of chemical rockets. To improve on this we must revisit nuclear thermal rockets, and eventually fusion rockets, and finally antimatter rockets. Each of these technologies is feasible although considerable engineering and infrastructure development remains to be done. This technological evolution is presented in Fulsang's series of hard SciFi novels, The Galactican Series. **Fulsang will be offering for sale signed copies of each of his two SciFi novels, SpaceCorp (pictured) and CisLuna.**



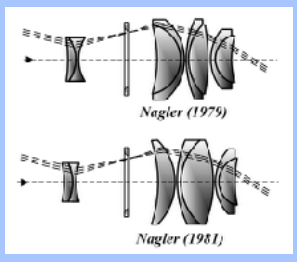
Ejner Fulsang has been a tech writer for NASA and SETI for the last ten years. His specialty is helping scientists write proposals for space missions. It's been quite an education, covering topics like spacecraft, instruments, mission design, launch vehicles, and hazards of space. He is particularly intrigued by the possibility of life on other planets and moons, especially the notion of a second genesis where life comes from chemical, not biological origins.

WHAT'S UP? MEMBER TALK

What's Up?
Eyepiece Optics

By Alan Agrawal

A review of the history of some important eyepiece designs, and discussion of eyepiece performance, coatings, and testing.



Optical layout of the Nagler Eyepiece

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PRESIDENT'S CORNER

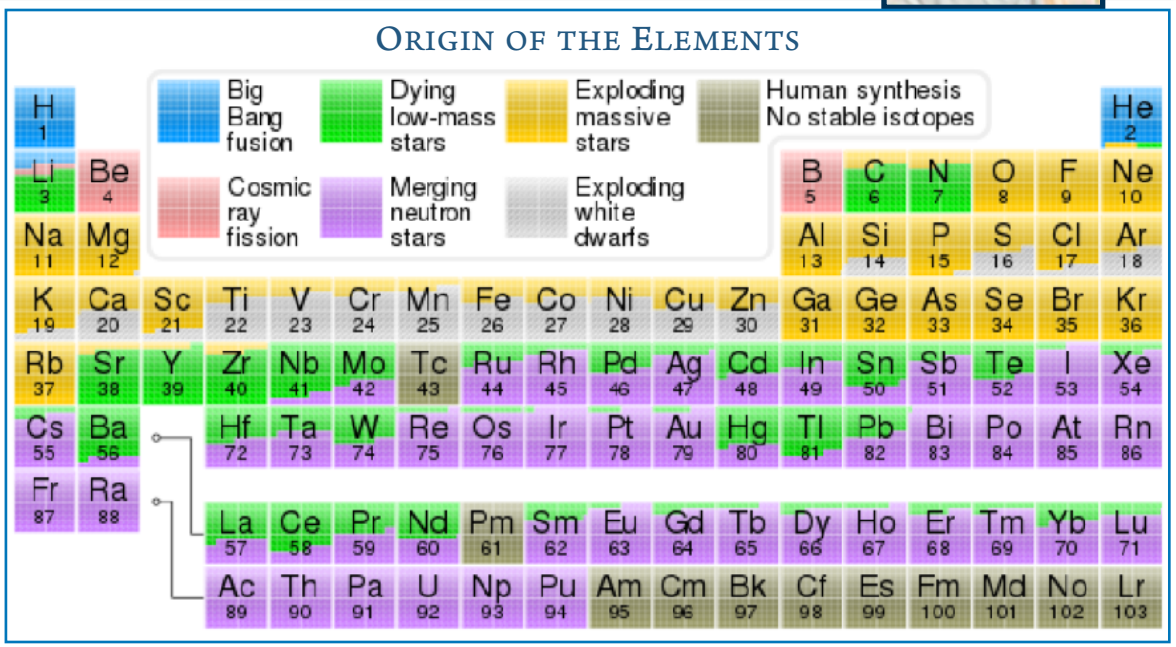
Nucleosynthesis Revisited (Part 2)

MDAS President: Steve Jacobs



In last month's episode, Part 1 of Nucleosynthesis Revisited, I listed the six processes of nucleosynthesis:

1. Big Bang
2. Stellar
3. Explosive (e.g. supernovae)
4. Cosmic ray spallation
5. Man-made
6. Neutron star merger



In the table above, Dying low-mass Stars, Exploding massive stars and Exploding white dwarfs are all included in "Explosive" processes, one of the six listed processes of nucleosynthesis.
From https://upload.wikimedia.org/wikipedia/commons/thumb/3/31/Nucleosynthesis_periodic_table.svg/1200px-Nucleosynthesis_periodic_table.svg.png

In Part 1 (see Feb 2018 newsletter), I described in more detail the first three processes: Big Bang, Stellar and Explosive.

This month's episode, Part 2, describes the other three processes: Cosmic ray spallation, Man-made and Neutron star merger.

"Explosive" processes (Dying low-mass Stars, Exploding massive stars and Exploding white dwarfs referred to in the table above) produce elements heavier than iron but the process happens quickly, in minutes, after the core collapse.

Scientists felt another process was needed to produce heavier elements in the amounts measured in the universe. The process proposed was the merger of neutron stars. Neutron stars are the remnants of stars over 8 times the mass of our Sun which have run out of fuel and gone supernova. Gravity combines the atoms of the remaining core into a mass of neutrons. The problem was no one had ever witnessed the merger of two neutron stars. That is until August 17, 2017, when a host of telescopes and the LIGO and Virgo gravity detectors viewed the merger of two neutron stars. Heavy elements were detected in the aftermath of the event, thus confirming scientists' hypothesis.

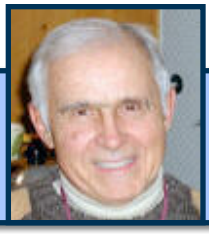
In my What's Up presentation of a few years ago, I had a slide with the periodic table of elements showing the origin of the elements. The table above is updated to include neutron star mergers.

Cosmic ray fission is the same as cosmic ray spallation which produces B – boron and Be –beryllium and some Li – lithium by stripping away protons from heavier elements or by adding protons to lighter elements (natures high-energy laboratory). Man-made ("Human synthesis" in the table above) are elements created in high-energy laboratories which have no stable isotopes so that they decay rapidly and do not exist in nature. ~

MARVELOUS MOON

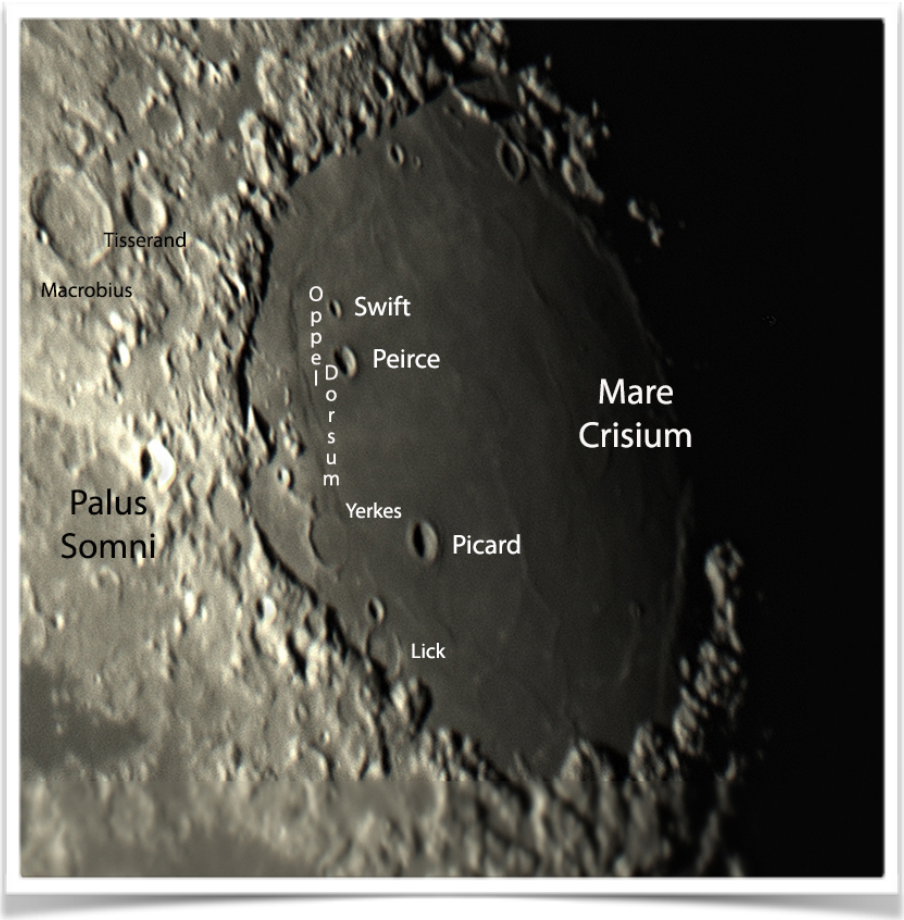
Mare Crisium (Sea of Crises)

by Jim Scala, MDAS member jscala2@comcast.net



A Bridge on the Moon?

I like to observe Mare Crisium with a small telescope shortly after full moon and imagine myself an early astronomer. I try and interpret what I see, trying to cast away what I currently know about the moon. I have concluded the early selenographers (mappers of the Moon) who reported they saw a bridge located almost on a line going from west of the crater Peirce toward the sunken crater Yerkes. This "bridge" is labeled *Oppel Dorsum* ("Oppel's ridge") on the image.



Though this (b)ridge never gained the recognition that Martian canals did, it created some controversy and encouraged speculation about our Moon being inhabited. As telescopes improved it became clear there was no bridge, but rather a ridge, and the reports disappeared in the sands of time.

I encourage you to observe the western edge of Mare Crisium under at least 100 times magnification with a small telescope, or a large one stopped down to three or four inches. Then as you observe, forget what you know (it's not easy), and try to interpret what you see for a lay person who will soon take the eyepiece. You might find yourself saying, "It looks like a bridge."

Of course, there's no bridge, but in examining my image you can understand how someone might explain it that way. Aside from a bridge, the sea of crises makes for good observing at almost any time. In addition, at Full Moon its many rills are visible.

An enthusiast can't help but ask, "Why did Yerkes and Lick, the financiers of two great observatories, get such inconspicuous, flooded craters, named after them?" After all, great strides in science were made by astronomers at those observatories…hmm.

As you observe Mare Crisium, notice the area I've labeled *Palus Somni* or the Marsh of Sleep. Its name harkens back to early selenography when observers interpreted what they saw in the concepts of the day. There are only three "marshes" on the Moon.

To get a feeling for the distances we're looking at, Mare Crisium, about 350 miles across and 68,000 square miles - a little larger than Iowa. In contrast Peirce is almost 11.5 miles in length and Swift is six.

I hope this brief discussion of Mare Crisium will encourage you to observe shortly after full moon or during its growth to first quarter. ~

MDAS ASTROIMAGING

Markarian's Chain (Zoom in to see detail)

Submitted by Dan Vanderzanden of the MDAS Imaging Special Interest Group

A small area of sky

Markarian's chain (right) is a group of galaxies in the Virgo Galaxy cluster. How many galaxies do you see?

Hold two fingers out at arm's length against the sky and close one eye. The area of sky covered by your fingers is about the dimensions of this image, 2.7 degrees x 2 degrees.

The tool PixInsight was used **to identify all the galaxies with the result shown in the image below.**

When one considers the number of stars in each galaxy and possible planets around those stars, it's truly astounding to contemplate what could be out there.



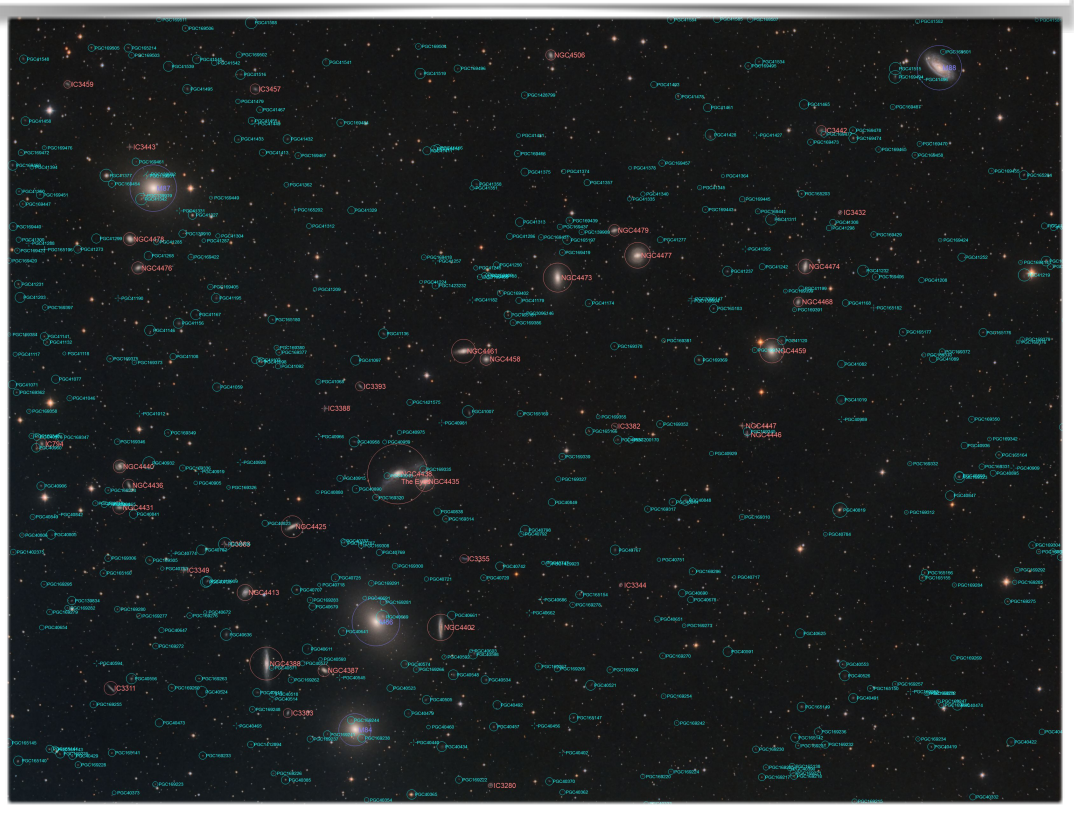


Image Details:
3 hours each of RGB data, taken with Stellarvue SV80S with 0.8 Focal reducer. Processed in Pixinsight.
Credit: Dan Vanderzanden

Zoom in to see the detail!

How to join the Astro Imaging Group

Click on https://groups.io/g/mdasimaging, scroll to "Apply For Membership In This Group". For any questions, please email Stuart Forman at s24man@gmail.com

MDAS COMMUNITY OUTREACH

Out Under the Sky with Our Community!

To join the Outreach Team, contact Paul Reid and Ken DeSilva at outreachinfo@mdas.net



Cloudy Skies and Clear, Mount Diablo Astronomical Society members share their time, expertise and telescopes with the wider community.

MDAS member Mike Warren opens the universe to mother and daughter at Loma Vista Elementary School.

Check the MDAS Calendar for outreach opportunities: https://nightsky.jpl.nasa.gov/club/event-list.cfm?Club_ID=51

HOW TO sign up to make a difference at school and community outreach events (events in RED on the calendar):

- *Log into the Night Sky Network.*
- *Select: My Profile > My RSVPs*
- *Upcoming outreach events will be listed.*
- *Select Update next to events where you can help.*

Ken DeSilva delivers our solar system to a Daisy and Brownie troop in Brentwood.



To join the Outreach Team, contact Paul Reid and Ken DeSilva at outreachinfo@mdas.net

WEAR YOUR CLUB COLORS

Last Chance to Order a Personalized MDAS Jacket!

ANNUAL ORDER

We place our MDAS jacket order once a year, so NOW is your chance to reserve your very own personalized MDAS jacket.



The order will be placed on March 15th, so reserve yours right away.

Order online here:
http://www.mdas.net/mdas_store.html#MDAS_Jacket

- **We need a minimum order of four jackets.**
- **Orders are only placed once a year.**

Jackets will be available for pickup at the April (or May) general meeting.

Your jacket is embroidered on the back with our club name, includes an MDAS patch sewn on the front, and your first name embroidered on the front. The cost of the jacket is $55.00.

WHAT'S YOUR SIZE?

Be sure to tell us the **size** you want (S, M, L, XL, XXL) and the **first name** you want embroidered on the jacket.

NOTE: The sizes are in Men's and run a bit large, so order accordingly.

In these two photos, Marni is wearing a size Small.

Order online here:
http://www.mdas.net/mdas_store.html#MDAS_Jacket

OR

You can **mail a check for $55 made payable "Mount Diablo Astronomical Society"** to this address:

Mount Diablo
Astronomical Society
P.O. Box 4889
Walnut Creek, CA
94596



For questions, email mdasberendsen@gmail.com or call Marni Berendsen at 925-930-7431.

WEAR YOUR MDAS COLORS TO ALL OUR EVENTS!

WEAR YOUR CLUB NAME BADGE

Need an extra MDAS Name Badge?

If you'd like a second (or replacement) MDAS Name Badge - or name badges for family members in your same household, order them online here (Scroll down to "Additional Badge Request"):

http://www.mdas.net/mdas_store.html

Orders are placed monthly.

Each badge is $7.00. Badge orders placed by the last day of the month will be ready for pickup at the following month's meeting.

Questions? mdasberendsen@gmail.com

EVENT CALENDAR

MARCH 2018

Detailed Event Information: https://nightsky.jpl.nasa.gov/event-list.cfm?Club_ID=51

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
25 5:56 PM Sunset	26	27 7:15 PM GenMtg: Variable stars	28	01 6:00 PM Adams Middle Science	02	03
04 6:03 PM Sunset	05	06	07 6:30 PM Gregory Gardens Star Part	08	09	10 12:00 PM Docent Training Session 6:00 PM Observatory
11 6:10 PM Sunset	12 7:30 PM MDAS Board Meeting	13	14	15	16	17 5:00 PM Society: Messier Marathon!
18 7:16 PM Sunset	19 7:00 PM MDAS Imaging Meeting	20	21	22	23	24 5:30 PM Public Astronomy: Stars
25 7:23 PM Sunset	26	27 7:15 PM GenMtg:Spacefaring	28	29	30	31

OUTREACH EVENTS

NEXT COMMUNITY OUTREACH EVENT

Wednesday, March 7th, Gregory Gardens Star Party

HOW TO sign up to help at school and community outreach events (events in RED on the calendar):

- Log into the Night Sky Network.
- Select: My Profile > My RSVPs
- Upcoming outreach events will be listed.
- Select Update next to events where you can help.



EVENT CALENDAR

APRIL 2018

Detailed Event Information: https://nightsky.jpl.nasa.gov/event-list.cfm?Club_ID=51

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01 7:29 PM Sunset	02	03	04	05	06	07 5:00 PM Society Observing
08 7:36 PM Sunset	09 7:30 PM MDAS Board Meeting	10	11 7:40 PM Montevideo	12	13 8:00 PM San Ramon Astronomy	14 7:00 PM Public Astronomy: Alien
15 7:42 PM Sunset	16 7:00 PM MDAS Imaging Meeting	17	18 8:00 PM Joaquin Moraga Astronomy	19	20 9:00 AM Delta Vista Science Week	21 6:00 PM Girl Scout Star Party 6:00 PM Observatory
22 7:48 PM Sunset	23	24 7:15 PM GenMtg: LIGO	25	26	27	28
29 7:55 PM Sunset	30	01	02	03	04	05

UPCOMING SKY EVENTS

For more upcoming sky events,
http:/www.seasky.org/astronomy/astronomy-calendar-current.html

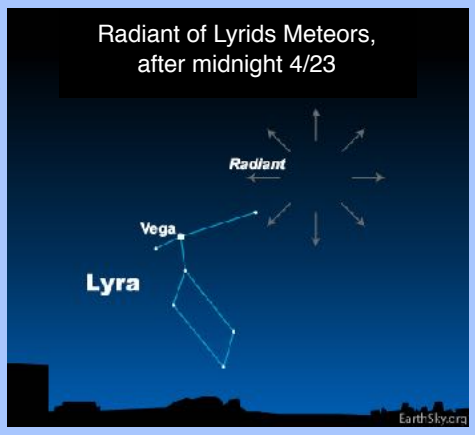
March 17: MESSIER MARATHON! Click here for details & observing guide.

March 20 - March Equinox. The March equinox occurs at 8:15 am PDT. The Sun will shine directly on the equator and there will be nearly equal amounts of day and night throughout the world.

March 1 and 31 - Full Moons, Blue Moon. Since the 31st has the second full moon in the same month, it is sometimes referred to as a blue moon. **This year is particularly unique in that January and March both contain two full moons while February has no full moon.**

April 22, 23 - Lyrids Meteor Shower. Moon setting around midnight means excellent viewing. Best is from a dark location after midnight the morning of the 23rd.

Radiant of Lyrids Meteors, after midnight 4/23



MDAS COMMUNITY OUTREACH

Summer Star Party Dates

By Richard Ozer, MDAS Observing Chair

Mark Your Calendars for California and Oregon Summer Star Parties

MDAS Yosemite Star Party: TBD



May 24 – 28 – RTMC Astronomy Expo, Big Bear, CA

http://rtmcastronomyexpo.org

July 11 – 15 – Golden State Star Party, Adin, CA near Mount Lassen

http://www.goldenstatestarparty.org

Aug 7 – 12 – Oregon Star Party, Ochoco National Forest, Oregon

http://oregonstarparty.org

Aug 5 – 11 – Eastbay Astronomical Society Barcroft Trip (EAS Membership Required)

http://eastbayastro.org/events



Credit: T. Saraiva

Sep 5 – 9 – Calstar, Lake San Antonio, CA (website has not yet announced these dates)

http://calstar.observers.org/

Nov 1 – 4 – Nightfall Star Party and Imaging Conference, Borrego Springs, CA

https://nightfallstarparty.com/

CLUB CONTACT INFORMATION

BOARD AND COMMITTEE MEMBERS

See who all these folks are: http://www.mdas.net/clubboard/clubboard.htm

President
Steve Jacobs -llasjacobs@gmail.com

Vice President
Leary Wong - kinglear3@aol.com

Secretary
Moon - moonglow611@gmail.com

Treasurer
Jamshed Gandi
gandijamshed@gmail.com

Board Member;
Whats Up Coordinator
Kent Richardson -
kayarind@sbcglobal.net

Board Member
Paul Reid -
p4real@comcast.net

Board Member;
AANC Rep; Observing Chair
Richard Ozer - rozer@pacbell.net

Outreach Coordinators
Paul Reid & Ken DeSilva
outreachinfo@mdas.net

New Member Steward
Nick Tsakoyias -
claytonjandl@aol.com

Astroimaging Group Co-Chairs
Stu Forman s24man@gmail.com
Chris Ford cford81@comcast.net

Meeting Programs
Dick Flasck - rflasck@aol.com

Meeting Refreshments
Ron & Laura Daniel -
daniel.laura945@gmail.com

Publicity
Mark Stafforini -
mstafforini@yahoo.com

Webmaster
June Stephens -
webmaster@mdas.net

Yosemite Coordinator
René Gandolfi -
rene.gandolfi@sbcglobal.net

Mt Diablo Observatory;
WAA President
Jon Wilson -
jwilson8721@sbcglobal.net

Newsletter Editor;
Membership Coordinator
Marni Berendsen -
mdasberendsen@gmail.com

Mailing address:
MDAS
P.O. Box 4889
Walnut Creek, CA 94596-3754

Website:
www.mdas.net

General Meetings:
Fourth Tuesday every month, except on the third Tuesday in November. *No Meeting in December.*
Refreshments and conversations at 6:45 pm; Meeting begins at 7:15

Where:
Lindsay Wildlife Experience
1931 First Avenue
Walnut Creek, CA 94597
http://lindsaywildlife.org/



Parking Instructions for Meeting

Lindsay Wildlife Experience is located in a residential area. There are no parking meters.
Please park only in the Lindsay parking lot on the east side of Lindsay, the Friends Church lot across the street (except Sunday mornings) or on Buena Vista Avenue. Please do not park on First Avenue in front of our neighbors' homes — you will get a parking ticket.