

Mount Diablo Astronomical Society

Diablo Moon Watch

January 2014

GENERAL MEETING

Tuesday January 28, 2014

Kepler's Laws: What makes the worlds go'round?

By Jeff Adkins

Doors open at 6:45 p.m.
Lindsay Wildlife Museum
1931 First Avenue,
Walnut Creek, CA 94597

Please park East of the
museum, follow the
instructions on the last page

You hear a lot about Kepler's Laws. Calculating orbits can be an intimidating task. Orbital elements are used to establish the position of the planets in three-dimensional space.



stration of how Kepler's Second Law actually works, and find the time it takes to send a space probe to another planet. The importance of Kepler's Laws (and Newton's version

But, surprisingly, the basics are pretty easy. In this interactive presentation, you will be invited to draw an ellipse, find its eccentricity, determine the perihelion and aphelion distances of a planet from the sun, see a demon-

of Kepler's Third Law in particular) to the discovery of new planets and determining the masses of planets will also be explained. Enjoy this conceptual astronomy activity with just enough math to get the ball rolling.

Jeff Adkins is the author of Conceptual Astronomy 1 and 2, a pair of high school astronomy activity books for students taking earth science or astronomy. He is a long time member of MDAS and serves as a NASA Education Ambassador for Sonoma State University's Education and Public Outreach program. He teaches astronomy and physics at Deer Valley High School in Antioch and Los Medanos College in Pittsburg. 2013

2013-Joe Disch Award

The Joe Disch award was announced in a special ceremony by Moon last Fall, right before John Read was to leave for reassignment in North Carolina, Moon said:

"The recipient of the 2013 Joe Disch award is John Read!" His plaque reads: "The Grounded Astronaut". John stood out to me from the moment he joined our club. His engaging qualities and genuine passion for astronomy were infectious. Always at the ready; to explore, expand and help his fellow club members. I found his imagery and knowledge exciting!

Although his time with us was too short, I'm confident in knowing he will spread his "astronomy wings" back East and continue to inspire those around him through his vision of the cosmos.

WHAT'S UP

A Tour of Mauna Kea

Inside the Gemini and CFT observatories presented by Chris Ford.



PRESIDENT'S CORNER

A look back at 2013, and to what's coming up in 2014.

by Jim Head

2013 was another exciting year for Astronomy, many discoveries and programs contributed to the understanding of our Universe. I'm sure you've read many Top Ten lists; this list includes a few events missing from others.

On everyone's list was the Chelyabinsk meteor. The 20m wide, 10,000 ton chondrite rock slammed into our atmosphere at 67,000 km/h, bursting apart as it descended from 45 to 30 kilometers above Chelyabinsk, sending punishing shockwaves to many below. There were over 1500 injuries, most were cuts from flying glass, some were severe burns caused by the UV radiation; over 3500 buildings were damaged. Scientists say the meteor pro-



Chelyabinsk smoke trail

duced the force of 20 Hiroshima-sized bombs. The trajectory closely matches another two-kilometer wide asteroid, 86039 (1999 NC43); perhaps the Chelyabinsk meteoroid split from this larger rock in the recent past.

The same day, as luck would have it, a larger asteroid about 30m in diameter, 2012 DA14, passed by safely at 17,100 miles above Earth. Safe, yes, but that was close – inside the orbit of our geostationary satellites.

Originally, it was thought we would see large impactors every 100 years or so, now it's every few decades. Most of the large asteroids capable of widespread ecological disaster are well known and not considered a threat; on the other hand, asteroids that can take out a city remain largely undiscovered. NASA and other efforts such as Pan-STARRS, B612, Chabot's Nellie, and amateur asteroid hunters everywhere are trying to monitor the threat.

Adding to the challenge, whenever one object is near the gravity of another, trajectories can change and loose rocks can split into multiple objects.

Explore animations of known objects in our solar system at the Minor Planet Center:

<http://www.minorplanetcenter.net/iau/Animations/Animations.html>

Last year, scientists reached consensus that Voyager 1 went

beyond the influence of our Sun's plasma and is now traveling through the interstellar medium, about 17 light hours away.

The spacecraft continues to detect the Sun's magnetic field and it will be another 300 years before it reaches the Oort cloud. In 40,000 years Voyager 1 will drift within 1.5 light years of the star AC+79 3888 in the Camelopardalis constellation.



The small oblong area is Voyager 1, imaged by the Very Long Baseline Array February 21, 2013, the radio signal shown is just 1 millarcsecond across! Voyager 1 is about 127 AU's from the Earth. Credit: Alexandra Angelich, NRAO/AUI/NSF.

Kepler, the planet hunter, lost another gyro. The solar wind might be used to help balance it. The latest analysis suggests there could be up to 20 billion worlds within the habitable zones around stars in our galaxy. Scientists working with Hubble and other observatories are refining imaging processes to examine exoplanet properties. With an abundance of water and nearly all the building blocks necessary to support life widely strewn throughout the

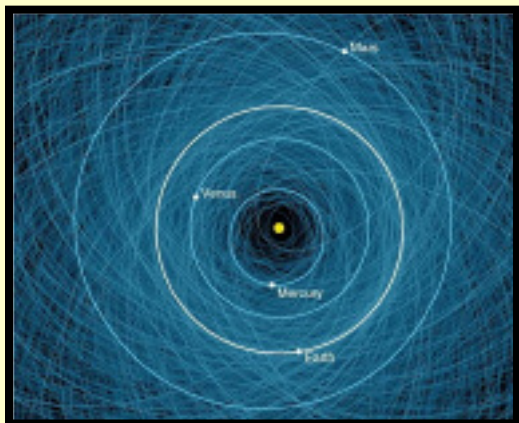
A look back at 2013, and to what's coming up in 2014. *(Continued from the previous page)*

galaxy, it would be a huge surprise if life wasn't found on a few million planets with habitable environments. In other developments, Mars Curiosity discovered an ancient lake bed that once had all the ingredients to support life billions of years ago.

A new space race? Or race to the Moon?

China landed on the moon and successfully deployed a rover last month, the first soft-landing on the moon in 37 years. India and China plan to place humans on the moon in 6 to 10 years. The Moon, rich in useful compounds and minerals, was possibly wetter long ago. Last year they discovered small amounts of hydroxyl in the Apollo moon rock samples, including the 4.5 billion year old Genesis rock. With recent data from India's orbiter and our LRO, it's evident the moon has adequate resources to live and work on its surface.

Imagine sitting in an observatory on the moon. There would be little atmosphere to obscure the view and just enough gravity to



Plot of 1400 known PHA's as of 2013. Credit NASA/JPL

keep you and the telescope balanced. One imaging session could continue uninterrupted for hundreds of hours.

In other news, a group of High School students developed a satellite and was launched with 28 other small satellites last Fall. <http://www.tjhsst.edu/tj3sat.html>. The experiment/demonstration converts text messages into voice and rebroadcasts it over Ham Radio frequencies.

Last but not least, fellow MDAS/EAS member Robert Minor and his wife Jeannie made history with others in the first flight of its kind, capturing the hybrid total eclipse from the air last Fall... Way to go, Congratulations!

<http://www.mdas.net/newsletter/documents/mdasnldecember2013.pdf>

MDAS activities went well in 2013

Our members enjoyed many Society Nights on Mt. Diablo, one of the best venues in the Bay Area for observing. Some enjoyed setting up at Glacier Point in Yosemite National Park, while many more honed their skills and enjoyed multiple dark nights illuminated by the Milky Way at the Golden State Starparty last summer. There was good weather on Mt. Wilson, Lick, and CalStar. All in all, it was a fantastic year for many.

MDAS Outreach Group mem-

bers were busy sharing the Universe with students and the general public in 2013. This is an exciting time to be on planet Earth, there's a constant stream of discovery in many areas. Given the rapid pace of development, it's no wonder schools and libraries have difficulty staying current, but it isn't that simple, many schools in our area do not teach science or astronomy! It's little wonder why over 40 MDAS members altogether traveled the distance of Earth's diameter, while



The shadow appeared during totality and moved rapidly to the horizon.

logging over 1200 hours, to show the Universe to visitors and students at schools, libraries and parks last year.

Highlighted upcoming MDAS events for 2014:

- February 6th Larkey Park, Walnut Creek (Fee)
- March 7th Old Ranch Park, San Ramon (Free)
- March 22, first 2014 Public Night
- April 26th, Mt. Diablo State Park Birthday and MDAS Public Night

The remaining schedule is on our calendar, soon it will be on our website.

A look back at 2013, and to what's coming up in 2014. *(Continued from the previous page)*

- GSSP 2014 June 25-29.
- Yosemite tbd
- Oct 23rd, partial Solar Eclipse, multiple locations.

And, it's now only 3.7 years until the North American total solar eclipse in 2017!

Calendars and other Activities for 2014:

Here are a few sites where you can find interesting events and activities for next year:
<http://www.seasky.org/astronomy/astronomy-calendar-2014.html>

An expanded list of observing opportunities are in this list from the Robert Ferguson Observatory,
<http://rfo.org/jackscalendar.html>

Downloadable observing guides for the intermediate-advanced observer:
<http://faintfuzzies.com/DownloadableObservingGuides2.html>

If it's cloudy, or looking for other ways to contribute and learn in the process, check out the list of Citizen Science programs here:
<http://www.planetary.org/explore/space-topics/citizen-science/>

If you want to learn more about imaging, join the MDAS Imaging Group, signup for email notices of meetings and other events at
<http://groups.yahoo.com/neo/group>



[ups/mdasimaging/info](http://www.mdasimaging.com/ups/mdasimaging/info)

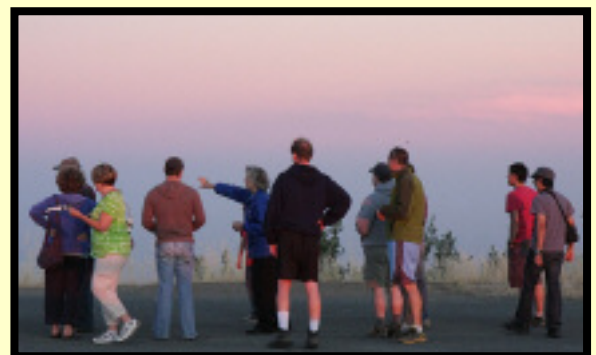
A few last words for this first edition of 2014:

Our club is for the benefit of its members and to serve the public. If you have suggestions or comments please contact one of the board members for their area, or email outreachinfo@mdas.net. If you want to check out our board meetings, they're held monthly at the Sports Basement in Walnut Creek.

As the new president of MDAS I would like to thank all of you for your support, and Mike Harms for being VP, and a special thank you goes to Chris Ford and Rick Linden for their excellent service -- we hope to hear of their adventures and accomplishments throughout the year.

Thanks also to all the wonderful volunteers, none of this would be possible without their help: Vianney Serriere for the monthly newsletter, Marni Berendsen for the Public Night Programs and managing members, Wil Roberge for managing our records, finances, and legal affairs, Steve Jacobs for doing a great job with publicity, Moon for taking good notes, Dick Flask for securing great speakers for our general meetings, Richard

Ozer for helping with the Park and Public Nights, Jon Steel for keeping our website up to date, Stuart Forman and Doug Grebe for helping to manage our imaging group, MDOA/MDAS members Jon Wilson, Richard Ozer, and Robert Minor for operating and maintaining the observatory, our "What's Up" coordinator Kent Richardson has done a great job recruiting members for their night under the lights, Chris Ford, for his many contributions to the newsletter and imaging group, and the refreshments have been wonderful during our General Meetings, thank you Ron and Laura Daniel, Moon and Linda Jacobs, among others, who helped keep our visitors safe on Public Nights. And thank you to the entire MDAS Outreach Group, your volunteer efforts are appreciated by thousands.



I wish everyone a healthy and prosperous year, may all of your learning pursuits go well.

Jim Head

Planet Labs

by Leilani Marie Labong.

Planet Labs, SoMa's very own spacecraft design studio, is counting down to this month's launch of 28 satellites, each between the size of a toaster and a mini fridge, into the final frontier. For those of us not well-versed in space technology, this is an incredible feat.

Called doves, the miniature satellites produce high-resolution, science-grade imagery of the Earth that is light years ahead of what larger equipment has been able to document—until now.

“We’ll have so many satellites in orbit that we’ll be able to update a map of the entire world at a greater frequency than is currently available”—making even Google Maps look a little sluggish—explains Chris Boshuizen. The former NASA physicist cofounded Planet Labs in 2010 with two other former NASA brainiacs, Will Marshall and Robbie Schingler. “If you can refresh the images more frequently, perhaps you can also inspire global action,” he adds. The satellites could, for instance, detect



Founders Chris Boshuizen, Robbie Schingler, and Will Marshall. Photo by Joe Fletcher.

senseless acts of deforestation or monitor rising ocean levels and melting ice caps, arming humanity with cutting-edge evidence to incite everything from congressional campaigns to grassroots movements. Worried about wildfires creeping up near your summer cabin? On the Planet Labs website, you could view the blaze before it's too late. Suspicious that your chainsaw-wielding neighbor has sinister plans for a nearby thousand-year-old redwood tree? You might build a case against him using data from these satellites.

Come mid-December, the 28 doves will take flight aboard repurposed US and Russian rockets to reach their orbit about 400 kilometers above Earth. “You have to buy a ticket for each dove to ride into space,” explains Boshuizen, who likes the thought of old rockets now making strides for humanity. The cost is, well, astronomical and depends on the size of the load, but Boshuizen claims that the value for mankind is priceless. “I guess you could file our project under Space Exploration,” says Boshuizen. “But it's really all about [protecting] the Earth and its people.”

It's Membership Renewal Time for April members!

Renew your MDAS membership and your magazines online!



ANNUAL MEMBERSHIP DUES OF \$25 ARE DUE MARCH 31, 2014.

For members on the April membership cycle only. Some of our members renew in October, but they will be notified separately.

You should have already received an email if your membership needs renewing. To renew your club membership, you may either:

- Renew online using Paypal or your credit card at http://mdas.net/mdas_store.html , select Membership Renewal. On the same web page, please consider making an additional MDAS Donation or MDOA Donation (for our Observatory on Mount Diablo)
- Or if you do not have internet access or prefer not to make online payments, you may mail a check for \$25 (or more!) made payable the M.D.A.S. to this address:

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

MAGAZINE SUBSCRIPTION RENEWALS

All Sky & Telescope and Astronomy magazine subscriptions renewals are handled online, at the club discount rate.

The Astronomical Society of the Pacific has made arrangements with these magazines to allow members of the NASA Night Sky Network to renew at the club discount rate. All you need is a login for the Night Sky Network (NSN) through our club.

You can log into Night Sky Network and go to the Magazine Subscriptions and Links page to find the "New and Renewal Subscriptions" link. Here's the direct link: <http://www.astrosociety.org/magazine/>

If you don't have access to a computer, please renew by mail directly with the magazine using your renewal notification.

Any questions?

Please email memberinfo@mdas.net or call Marni Berendsen at 925-930-7431.



Scopes Are Needed!

Upcoming Mount Diablo Astronomical Society Events:

Many events are scheduled, we'll see what the weather brings, check your calendars and sign up where you can, Thanks!

Thursday, January 30, 2014—6:00 p.m.- 8:00 p.m.

PHE Science Night, Pleasant Hill Elementary School, Pleasant Hill, CA Setup 5:00 p.m.

Tuesday, February 4, 2014—6:00 p.m.- 8:00 p.m.

Westwood Elementary Science Night, Westwood Elementary School, Concord, CA Setup 5:00 p.m.

Thursday, February 6, 2014—6:30 p.m.- 8:30 p.m.

Stargazing at Larkey Park with the Lindsay Wildlife Museum, Walnut Creek, CA Setup 5:30 p.m.

Friday, February 7, 2014—7:00 p.m.- 8:30 p.m.

Gregory Gardens Elementary Stargazing, Gregory Gardens Elementary, Pleasant Hill, CA Setup 6:00 p.m.

Tuesday, February 11, 2014—7:00 p.m.- 9:00 p.m.

Hercules Library Star Party, Hercules Public Library, Hercules, CA Setup 5:30 p.m.

Thursday, February 13, 2014—6:00 p.m.- 8:00 p.m.

Hidden Valley Elem. Science Fair, Hidden Valley Elementary School, Martinez, CA Setup 5:00 p.m.

Saturday, March 1, 2014—9:00 a.m.- 11:00 a.m.

MDUS District Science Fair, Willow Creek Center, Concord, CA Setup 8:30 a.m.

Tuesday, March 4, 2014—7:00 p.m.- 8:30 p.m.

Cambridge Elementary Stargazing, Cambridge Elementary School, Concord, CA Setup 6:00 p.m.

Wednesday, March 5, 2014—7:00 p.m.- 8:30 p.m.

Ron Nunn Elementary Stargazing, Ron Nunn Playground or Park, Brentwood, CA Setup 6:00 p.m.

Friday, March 7, 2014—7:00 p.m.- 9:00 p.m.

San Ramon Parks Astronomy Night, Old Ranch Park, San Ramon, CA Setup 6:00 p.m.

Saturday, March 22, 2014—7:00 p.m.- 11:00 p.m.

First Public Astronomy Program, Mount Diablo, Lower Summit Parking Lot, Clayton, CA Setup 5:30 p.m.

Mount Diablo Astronomical Society Event Calendar—January 2014

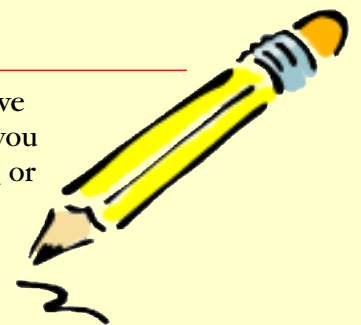
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	31	New Year's Day 1	2	2:00 AM Quadrantid Meteor Shower 3	Society Observing 4 (Private) Sunset: 5:04 PM
6:00 PM Jupiter at Opposition 5	6:00 PM Jupiter at Opposition 6	7	8	CCE Stargazing (Private) 9	10	11 Sunset: 5:10 PM
12	Board Meeting (Private) 13	6:00 PM Martinez Library Astro 14	15	16	17	Observatory Maintenance (Private) 18 Sunset: 5:18 PM
19	Martin Luther King, Jr. Day Globe at Night: January 20	21	7:00 PM Silicon Valley Lectures 22	23	24	Society Observing (Private) 25 Sunset: 5:26 PM
26	27	7:15 PM GenMtg: Kepler & Orbits 28	29	PHE Science Night (Private) 30	Chinese New Year 31	1

Always in Need of Articles

We are always looking for new articles, images or photos and content. If you have astronomical perspectives or experiences to share with your fellow members that you would us to consider, please feel free to contact me Jim (jamesnhead@comcast.net) or our newsletter editor Vianney. (veloroute@hotmail.com)

Clear skies!

Chris and Vianney



Mount Diablo Astronomical Society Event Calendar—February 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	31	Society Observing (Private) 1 Sunset: 5:34 PM
2	3	WE Science Night (Private) 4	5	6:30 PM Larkay Park Lindsey Wild 6	ASP 125th Anniversary 7:00 PM Gregory Gardens 7	Observatory Maintenance (Private) 8 Sunset: 5:42 PM
9	Board Meeting (Private) 10	7:00 PM Hercules Stargazing 11	12	8:00 PM Hidden Valley Elem. Scien 13	14	15 Sunset: 5:49 PM
16	Washington's Birthday 17	18	Globe at Night: February 19	Globe at Night: February 20	Globe at Night: February 21	Globe at Night: February 22 Society Observing (Private) Sunset: 5:57 PM
Globe at Night: February 23	Globe at Night: February 24	Globe at Night: February 7:15 PM GenMtg: James Webb ST 25	Globe at Night: February 26	Globe at Night: February 27	Globe at Night: February 28	1

Board Members & Address

President

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Webmaster

Jon Steel - jonlee0483@aol.com

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Moon - Moonglow6@hotmail.com

New Member Steward

Nick Tsakoyias - claytonjandl@aol.com

Mailing address:

MDAS

P.O. Box 4889

Walnut Creek, CA 94596-3754

General Meetings:

Fourth Tuesday every month,
except on the third Tuesday in
November and December.

Refreshments and conversations at 6:45 pm;

Meeting begins at 7:15

Where:

Lindsay Wildlife Museum

1931 1st Avenue

Walnut Creek, CA 94597

(925) 935-1978

wildlife-museum.org.

Directions to facility:

From the North: Take 680 South to Treat Blvd.
exit. Turn left at light onto North Main St. Turn
right on Geary Road. Turn left on Buena Vista.

Turn right on First Avenue. The museum is
halfway up the block on the left.

From the South: Take 680 North. Take the Treat
Blvd./Geary Road exit and turn left over free-
way. Go three more lights and turn left on
Buena Vista. Turn right on First Avenue. The
museum is halfway up the block on the left.

Parking:

The museum is located in a residential area.
There are no parking fees nor meters. Please
park only in the museum parking lots on the
east side of the museum, 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.

