

Mount Diablo Astronomical Society

Diablo Moon Watch

April 2014

GENERAL MEETING

Tuesday April 22, 2014

Acetylene fermentation!

By Dr. Ronald Oremland

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

Relevance to primordial biogeochemistry and the search for life in the outer solar system.

Acetylene is a highly reactive component of planet(oid)s with anoxic, methane-rich atmospheres, such as Jupiter, Saturn, Titan, and perhaps the primordial Earth. Included in this group is Enceladus, although it is not clear if the acetylene detected within its jets by Cassini was formed by photolysis of methane or from thermo-catalysis of organic matter in the orb's interior. Acetylene



yet a number of anaerobes can use it as a carbon and energy source to support growth. The

inhibits many microbial processes (e.g., methanogenesis, methane oxidation, hydrogen metabolism, denitrification)

best studied is *Pelobacter acetylenicus*, which carries out a two-step reaction involving the enzymes acetylene hydratase and acetaldehyde dismutase. The former, a low potential W-containing enzyme, forms acetaldehyde while the latter produces ethanol and acetate. Metabolism of acetylene by mixed microbial communities (sediments and/or enrichment cultures) produces these intermediates, and when coupled with sulfate-reduction or methanogenesis respectively

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Your 15 Minutes of 'Frame' - from NASA's Cassini

Arguably the most photogenic planet in the solar system, Saturn is the sixth planet from the sun and the second largest planet after Jupiter.

With its luminous striped surface and stunning ring system, the planet is a wonder to view, especial-

ly from orbit, as NASA's Cassini spacecraft has demonstrated since arriving at the Saturn system in 2004.

Over the years, the Cassini mission website has been sharing raw, unprocessed versions of images sent to Earth by the spacecraft. On June 30 (July 1 EDT), Cassini will celebrate 10 years exploring Saturn, its rings and moons. To help mark 10 years in orbit, NASA's Jet Propulsion Laboratory in Pasadena, Calif., has created a special gallery on the Saturn website where members of the public can experience "15 minutes of frame" by submitting their own amateur images made up from image data brought back by Cassini.

With more than a half-dozen images and GIFs already live on the page, users are

(Continued on page 6)

WHAT'S UP

Tycho and Kepler—Then and Now

by Chuck Waitman

Tycho Brahe was the last and greatest naked eye astronomer, improving observational accuracy by a factor of 60. From these observations,

(Continued on page 8)

PRESIDENT'S CORNER **This Month's Club News and Commentary**

by Jim Head

Mount Diablo State Park Birthday Bash!

The 150th anniversary of the California State Park system and the 40th anniversary of the MDIA are being celebrated in Mt. Diablo State Park April 26th and 27th.

The park plans activities at Mitchell Canyon, Rock City, Juniper Campground, and the Summit (Lower Summit Parking Lot). They are in need for volunteers to assist parking and to help with MDIA fundraising at Mitchell Canyon. We also will need help staffing our area with activities and solar observation both days and a public night Saturday. The shifts are 10-1, 1-4 both days, and for our public night. This is a great way to build your VIP hours, or just to have fun with our group and the curious public.

It should be mentioned that you must become a docent before setting up a telescope with any of events inside Mt. Diablo Park; the process is easy, the next Docent training class is April 13, email Richard Ozer (rozer@pacbell.net) if you wish to attend.

Fernandez Ranch Astronomy

On May 3, with May 17th as a backup, we are scheduled to setup telescopes and activities for the public at Fernandez Ranch.



This property is a recent addition of the Muir Heritage Land Trust, it's a beautiful site across a bridge shielded from nearby city light, in the hills between Rodeo and Martinez. This might be the last we see of Jupiter for the season, Saturn will be visible in the East, if the hills don't block the view.

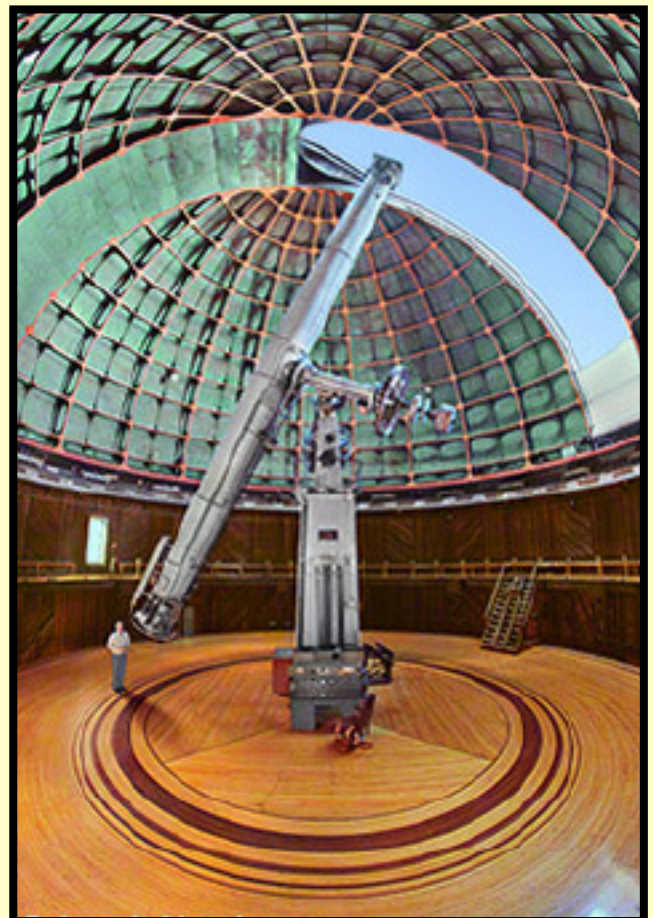
Save Lick Observatory!

It's hard to imagine Lick without support from the UC system. Please watch Dr. Alex Filippenko's recent lecture explaining the ongoing research that is responsible for a wide spectrum of discovery and invention. Please refer to the writeup elsewhere in this newsletter for information on how to learn more about Lick, and to listen to another amazing performance by Alex. Last summer I had the

wonderful experience of observing through the 36" refractor with its huge movable floor, then walking the beautiful hall to the other end to work with the 40" Nickel, I highly recommend visiting the historic working observatory during one of their Summer Visiting Programs or the Music of the Spheres.

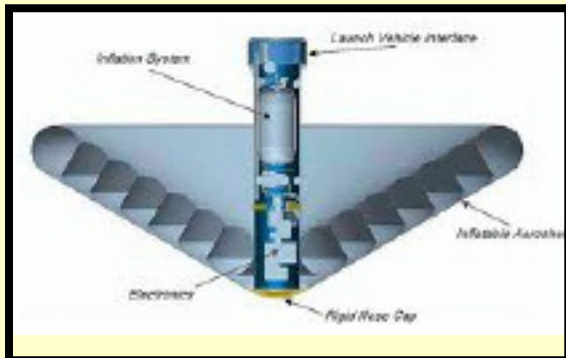
NASA's new Z2 Spacesuit Design

There are a few days left to vote on NASA Spacesuit design, April 15th is the deadline, vote for your choice at <http://jscfeatures.jsc.nasa.gov/z2/>



(Continued on page 3)

This Month's Club News and Commentary *(Continued from the previous page)*



HIAD

Hypersonic Inflatable Aerodynamic Decelerator (HIAD) - This revolutionary concept improves the way spacecraft enter an atmosphere at high velocity.

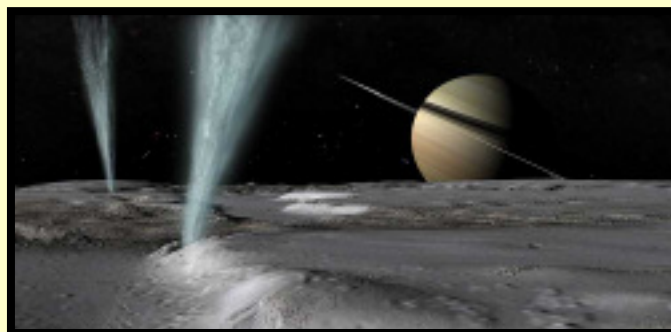
See more at:
<http://www.nasa.gov/directorates/spacetechnology/game-changing-development/HIAD/index.html>

We hope you enjoy this month's newsletter!

Jim Head

Acetylene fermentation *(Continued from page 1)*

forms CO₂ or an equal mixture of CO₂ plus CH₄. It is not inconceivable that such an anaerobic, microbial food chain could exist in the waters beneath the ice cap of Enceladus, Titan, or even in the mesothermal atmospheric regions of the gas giants. Detection of the identified intermediate products of acetylene fermentation, namely acetaldehyde, ethanol, acetate and formate in the atmospheres of these planet(oid)s



would constitute evidence for a microbial life signature. This evidence would be strongly reinforced if a stable carbon isotope fractionation was identified as

well, whereby the products of acetylene fermentation were enriched in ¹²C relative to ¹³C (i.e., had a lighter ‰¹³C signal) when compared to that of the starting acetylene. The most practical target to test this hypothesis would be Enceladus,

owing to the relative ease of sample collection and analysis either in future flybys or lander/collector missions.

Joe Disch Award



Hi Jim!

Just received the plaque and the NASA goodies and I thought I'd send along a photo of Isaac and I holding the award (attached).

Please give my kind regards to all the wonderful folks at MDAS and the outreach team.

John

Introducing New ASP Executive Director, Dr. Linda Shore

The ASP is pleased to announce the appointment of Dr. Linda Shore to the position of Executive Director. Most recently, Shore served as Director of the Teacher Institute at San Francisco's renowned science museum, the Exploratorium. While there she led a staff of scientists and educators, and created nationally recognized teaching programs. She was also responsible for fund development, grants program, and expanding institutional reach by forging collaborations with national and international museums and science centers. Shore has co-authored Exploratorium science and education books, and written articles about popular science and science education for the public. A native San Franciscan who has spent most of her life in the Bay Area, she holds a PhD in science

education from Boston University, and a master's degree in physics and astronomy from San Francisco State University. Shore was also the recipient of a prestigious Smithsonian Pre-doctoral Fellowship to work at the Harvard-Smithsonian Center for Astrophysics where she developed curriculum and conducted research on astronomy learning for the National Science Foundation funded program, Project STAR (Science Teaching through its Astronomical Roots).

"I am deeply honored and excited to assume the role of Executive Director for the ASP, an organization whose mission so strongly resonates with my per-



sonal passion for increasing science literacy through the study of astronomy," said Dr. Shore. "I look forward to continuing the organization's 125-year history of supporting a large and diverse community of astronomy enthusiasts and helping the organization to become a leader in science education and outreach for the next century."

MDAS Public Address System Training

Mike Lewis is offering members hands-on training for the PA system at 6 PM before the next meeting on April 22nd.

Help operate the Public Address system we use for our General Meetings and larger outreach events. On April 22nd, before our general meeting, hands-on training will be offered to learn how to use the simple PA system. Signup at the Night Sky Network:

https://nightsky.jpl.nasa.gov/event-view.cfm?Event_ID=56690

Help Save Lick Observatory

Exploding Stars, New Planets, Black Holes and the Crisis at the Lick Observatory

Public Lecture on Exploding Stars, New Planets, Black Holes and the Work and Crisis at the Lick Observatory (by Professor Alex Filippenko) is Now on YouTube.

On Feb. 26, 2014, Dr. Alex Filippenko (who was voted the "Best Professor" a record nine times at the University of California, Berkeley) gave a dynamic talk in the Silicon Valley Astronomy Lecture series on

"Exploding Stars, New Planets, Black Holes, and the Crisis at Lick Observatory". The video is now available on YouTube at:

<https://www.youtube.com/watch?v=JEY2pzxda1w>

Lick Observatory, the first mountain-top telescope facility in the world, was founded in 1888, but continues to be a vibrant research facility and an important site for student and public education. Dr. Filippenko discusses some of the most exciting research being pursued at Lick,

but also explains the funding crisis facing Lick, what is being done by local citizens, and how you can help.

For additional information about Lick and the issues, please see:
<http://www.ucolick.org/SaveLick/>

Andrew Fraknoi
Chair, Astronomy Department
Foothill College

Lunar Eclipse April 15 Early Morning!

The first eclipse of the year is well placed for observers throughout the Western Hemisphere. The eclipse occurs at the lunar orbit's ascending node in Virgo. The apparent diameter of the Moon is close to its average since the eclipse occurs nearly midway between apogee (April 08 at 14:53 UT) and perigee (April 23 at 00:28 UT). This is the first of four consecutive total lunar eclipses in 2014 and 2015 (see Lunar Eclipse Tetrads).

The Moon's orbital trajectory takes it through the southern half of Earth's umbral shadow. Although the eclipse is not central, the total phase still lasts 78 minutes. The Moon's path through Earth's shadows as well as a map illustrating worldwide visibility of the event are shown in Figure 1. The times of the major eclipse phases are listed below.

<http://eclipse.gsfc.nasa.gov/OH/OH2014.html>

<http://www.timeanddate.com/eclipse/lunar/2014-april-15>

Also, Mars is reaching opposition early next week:

http://in-the-sky.org/news.php?id=20140408_13_100

IMAGING MEETING
Every Third Thursday of every month.
Walnut Acres Elementary School, room B7

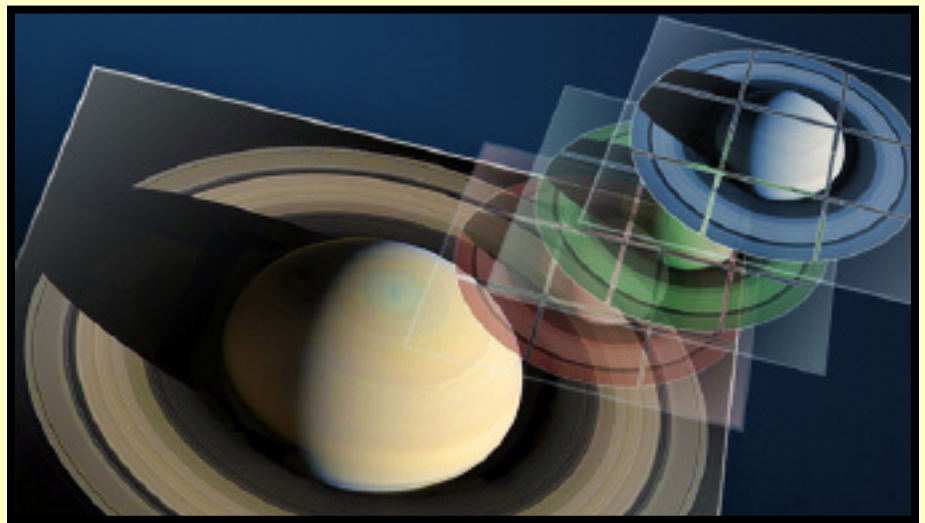
Your 15 Minutes of 'Frame' - from NASA's Cassini *(Continued from page 1)*

invited to visit Cassini's raw image database, dig through the treasure trove and create their own digital masterpiece and suggested caption. The submission process is as simple as filling out a form and uploading the image. Guidelines and further information can be found on the Cassini website.

Now that Cassini has completed its first decade of observations, mission planners are looking forward to the next phase, when the spacecraft's instruments will return additional data and images. The mission will probe the densest part of the geysers spewing from Enceladus, and dive between Saturn and its innermost ring.

As part of the 10-year anniversary celebration, the Cassini team is releasing a video preview of the next four years of the mission:

<http://youtu.be/fAQM9rfZq7w>



The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL, a division of the California Institute of Technology in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter and its two onboard cameras were designed, developed

and assembled at JPL. The imaging operations center is based at the Space Science Institute in Boulder, Colo.

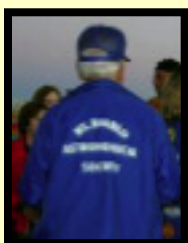
For more information about Cassini amateur images, visit:

<http://saturn.jpl.nasa.gov/photos/amateurimages/>

How to order your own MDAS Jacket

Now is the time to place an order for your very own personalized MDAS jacket!

Jackets are embroidered on the back with our club name, include an MDAS patch sewn on the front, and your first name is embroidered on the front. The cost of the jacket is \$55.00. Orders are placed only once a year. So NOW is the time.



This year's jacket order will be placed on May 14th: reserve yours now! Order online here:

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

You may also reserve your personalized jacket by sending an email to berendsen@aol.com or call Marni Berendsen at 925-930-7431. Be sure to tell us the size you want (S, M, L, XL, XXL) and the first name you want embroidered on the jacket. You can also mail a check for \$55 made payable M.D.A.S. to this address:

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

Wear your MDAS colors proudly to all our events!

Celebrate on the Mountain!

**150th Anniversary Commemoration of California State Parks
& Celebration of the 40th Anniversary of Mount Diablo Interpretive Association**

April 26 and 27, 10 a.m. to 4 p.m.*

For two days, April 26 and 27, 2014, from 10 a.m. to 4 p.m., Mount Diablo State Park and Mount Diablo Interpretive Association will be partnering to commemorate significant milestone anniversaries.

In 2014, California State Parks is recognizing the 150th Anniversary of the founding of the State Park System, and Mount Diablo Interpretive Association is celebrating 40 years of service to Mount Diablo State Park.

We are celebrating with a special weekend dedicated to hikes, demonstrations, and all things Mount Diablo, featuring over 50 booths from local organizations and agencies. Some of the organizations participating are the Mount Diablo Astronomical Society, Save Mount Diablo, Sierra Club, East Bay Trail Dogs, the city of Walnut Creek, Wild Birds Unlimited, John Marsh Historic Trust, and many more.

Booths will be set up at five main locations throughout the park:

- The Summit ▪ Lower Summit Picnic Area ▪ Diablo Valley Overlook ▪ Juniper Campground ▪
- Laurel Nook Picnic Area ▪ Rock City ▪ Mitchell Canyon Visitor Center ▪ North Gate Entrance Station ▪

Please join us for a ceremony and anniversary cake at the Summit on Saturday at 3 p.m.

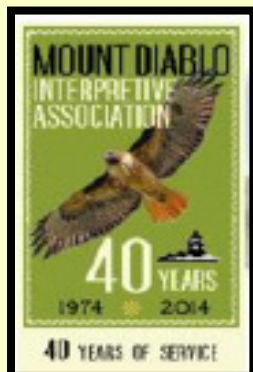
If you wish to volunteer with the celebration, please email info@mdia.org.

The announcements page of the MDIA website, MDIA.org, has a link to the anniversary page with a preliminary schedule of events, times, and locations. Please check back for updates to the schedule.

We anticipate a very exciting and interesting weekend at Mount Diablo State Park.

See you on the Mountain!

** Mount Diablo Astronomical Society
will have an evening of Public Star Gazing until midnight.*



Mount Diablo Astronomical Society Event Calendar—April 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31	1	2	Timber Point Stargazing (CANCELLED) (Private) 3	4	Society Observing (Private) 5 Sunset: 7:37 PM
6	Board Meeting (Private) 7 	Ron Nunn Astronomy (Private) 8	Riverview Solar Observing (Private) 9	10	11	12 Sunset: 7:43 PM
MDSP Docent Training (Private) 13	14	Astronomy Night (Private) 15 	16	MDAS Imaging Meeting (Private) Northgate HS Astronomy Ni (Private) 17	18	Observatory Maintenance (Private) 19 Sunset: 7:48 PM
20	21	7:15 PM GenMtg: Enceladus PA System Training (Private) 22 	23	24	25	7:30 PM Public Astronomy: Galaxies 10:00 AM MDSP Solar Observing 26 Sunset: 7:57 PM
10:00 AM MDSP Solar Observing 27	28	29 	30	1	2	3

What's Up Continued from page 1

he sought proof of his Tychonian theory of planetary motion. Late in life, and running out of time, he reluctantly hired Johannes Kepler.

Kepler was a skilled mathematician (who believed in Copernican theory). Using Tycho's observations of Mars and mathematics pre-

dating logarithms and calculus Kepler developed his first two laws of planetary motion.

Times have changed, but we have more in common with Tycho and Kepler than you might think.

Mount Diablo Astronomical Society Event Calendar—May 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27	28	29	30	1	2	3 Society Observing (Private) 8:30 PM Fernandez Ranch Starparty Sunset: 8:03 PM
4	5	6 Joaquin Moraga Stargazing (Private)	7 8:00 PM Cambridge Astronomy Night 	8	9	10 Sunset: 8:09 PM
11 Board Meeting (Private)	12	13	14 	15 MDAS Imaging Meeting (Private)	16	17 Observatory Maintenance (Private) 8:30 PM F. Ranch Starparty Backup Sunset: 8:16 PM
18 3:30 PM San Pablo Library Solar	19	20	21 	22	23	24 Society Observing (Private) Sunset: 8:21 PM
25 Memorial Day	26	27 7:15 PM Gen Mtg: LUX & Dark Matter	28 	29	30	31 7:30 PM Public Astronomy: Planets Sunset: 8:26 PM

Share your news with other members through the Diablo Moonwatch

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!

Jim and Vianney



Board Members & Address

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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.

