DIABLO MOUNTAIN ASTRONOMICAL SOCIETY

Slamming Rockets into the Moon: NASA's LCROSS Mission

March 27 2007 — **Doors open at 6:45 p.m.**

Concord Police Association Facility 5060 Avila Road, Concord

We know that Mother Nature is constantly bombarding the Moon with rocks from space, creating small and sometimes large craters. But in just a couple short years, humans will attempt the same thing, only not with rocks, but rockets.

Join us on March 27th as Dr. Jennifer Heldmann of the NASA Ames Research Center talks about NASA's upcoming Lunar Crater Observation and Sensing Satellite (LCROSS).

At our last meeting, Ken Coates gave us an overview of NASA's Vision for Space Exploration (VSE) to return to human exploration of worlds of the Solar System. The mission objectives of LCROSS advance the VSE by confirming the presence or absence of water ice in a permanently shadowed crater at Moon's South Pole. The identification of water is very important to the future of human activities on the Moon. LCROSS will blast the permanently dark floor of one of the Moon's polar craters with two heavy impactors early in 2009 to test the theory that ancient ice lies buried there. The impact will

cause an explosion of material from the crater's surface to create a plume that specialized instruments will be able to analyze for the presence of water (ice and vapor), hydrocarbons and hydrated materials.

Dr. Heldmann is a Principal Investigator working on the LCROSS Science Team at NASA Ames Research Center in the Space Sciences Division. She also works at the SETI Institute in the Center for the Study of Life in the Universe.

She often spends time in places like the Arctic, the Outback in Australia, and Death Valley. Why? To study places on Earth that are Mars-like and learn how to live and work in hostile environments. Hence the spacesuit-in-the-desert photograph.

Don't miss Dr. Jennifer Heldmann and her presentation on the LCROSS mission. She may even share her desert adventures with us.

Upcoming Programs:

April 24: Dr. Charles H. Townes, Nobel Prize winner in Physics (1964) for research leading to the development of the laser.

May 22: Dr. Bruce Margon, UC Santa Cruz: Latest from the Hubble Space Telescope

MDAS Astronomy Workshop, March 15th, 7:00 p.m.

Reserve your spot for an evening of Exploring the Solar System!

Last year, our club held a series of astronomy workshops attended by several of our members to discuss and experience new ways to share the night sky and the wonders of astronomy with the public. Due to popular demand, we're doing it again this year.

Mark your calendars now for the first workshop, which will be held the evening of Thursday, March 15, 2007, 7:00 p.m.

We will have a sneak preview of the next ToolKit to be released to the Night Sky Network, "Exploring the Solar System". NASA wants to hear our opinions about the

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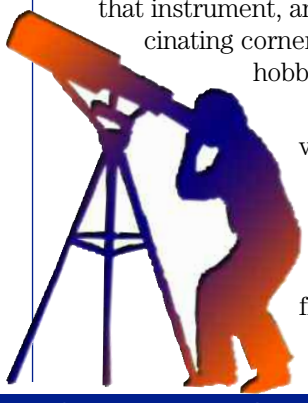
What's Up

Visual Observation of Variable Stars.

By -Jerry Hudson



Everyone who has a telescope or even a pair of binoculars can do some serious science with that instrument, and discover a new and fascinating corner of their astronomical hobby.

Any stellar object that varies in brightness qualifies as a "variable star." That covers some of the most unusual objects in the universe, ranging from galactic nuclei and exploding stars down to red

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President's Corner
Spring

By Nicholas Tsakoyias

March is here and with it Spring.

It's a time when the weather starts to warm up, flowers start to bloom, and birds can be heard singing, a time of awakening from a long winter. It's also a time for many people to do their spring cleaning, and get ready for outdoor activities that go along with the warmer weather. The same can be said with MDAS. March is the month in which we have our Messier marathon on Mt. Diablo, this year it's on our society night March 17th. If you've never done a Messier marathon it's something that I highly suggest. It's an all night affair where you observe with either binoculars or with a telescope 109 celestial objects. These are some of the most beautiful and impressive deep space objects in the sky. They are called Messier objects because of Charles Messier, a successful French comet hunter who lived in the 18th century, who was hunting comets but instead kept running into these annoying little fuzzy objects that didn't move. So he made a list of these objects so that others that were hunting comets also could ignore them for they weren't comets. Little did he know that these objects were some of the finest galaxies, nebulas, globular and open clusters that are in the night sky. Don't worry if you've never done a Messier marathon before we'll have a list in the order to observe them, plus they'll be plenty of members there to help you out.

March is also the month that MDAS kicks off their Public Astronomy Events on Mt Diablo State Park. It's a monthly affair that is open to the public and MDAS puts it on for free!

First Public Event

It will be on March 24th, so if you are a docent for the Mt. Diablo parks system, bring your scope and participate in showing the cosmos to the public. If you are a docent but have no scope you can still help out by helping set up for the Public Event. If you are not a docent, but would like to be one, you can ask and we'll let you know when the next docent training is to be done. Also don't forget about our Public Outreach programs, we're always in need of scopes for theses events. If you can help out with these events please do, I know our Public Outreach chairperson Jim Head would be most grateful.

So what are you waiting for!

While you're doing your spring cleaning dust off those scopes and those eyepieces, get out those star atlas' and star charts out and come up to Mt Diablo for either a Society night or again if you are a docent come to our Public Astronomy events, and don't forget our Outreach programs event, either way it's time to start observing!

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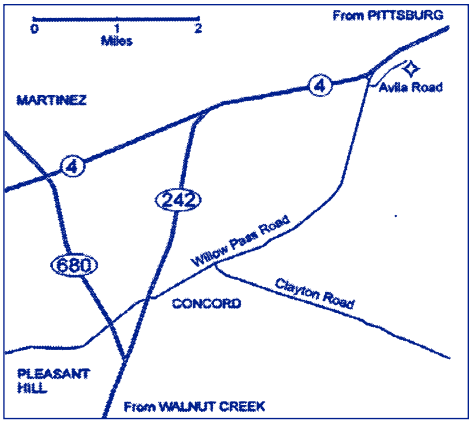


MDAS meetings are held on the fourth Tuesday every month, except on the third Tuesday in November and December. Refreshments and conversation are at 6:45 p.m. What's Up? at 7:15 p.m. Speaker at 8:00 p.m. The Concord Police Association Facility at 5060 Avila Road is at the top of the hill east of Willow Pass Road, just south of Highway 4. Everyone is invited.

Please consider receiving *the Diablo Moonwatch* by email instead of the Postal Service. Saving in printing and postage is more than $5.00 per member. You will receive your issue sooner, view it in color, and if you wish can be printed as well on your own printer. Please send a request by email to inquiries@mdas.net.

Membership Demographic Adjustment Section.

To all members: If you have any questions or comments regarding your membership status, badges, addresses, and/or magazine subscriptions, please contact Tom Harris through www.mdas.net and/or email: memberinfo@mdas.net. *Thank you!*

Postcards from the Universe

San Francisco Amateur Astronomers

Wed. March 21. Randall Museum 7:30 pm

Take a tour with R.Jay GaBany, one of the Bay Area's finest astrophotographers.

Imaging from New Mexico and Australia,

GaBany reveals stunning vistas described with a poet's sensibility.

You will see the deep sky in a new and exciting way.

Stirred By a Stellar Breeze.

For some folks, the Universe beckons later in life but, for me, I felt it's gentle nudges at age 13, just before Neil Armstrong set foot on the moon. I will briefly discuss the roots of my enthusiasm, my observational experiences and how these created a map for my journey into taking pictures of the dark places between the stars.

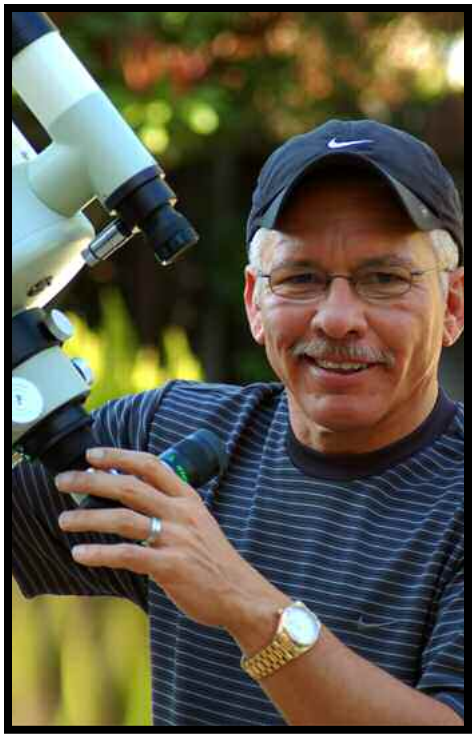
Cruising the Universe Without Moving

Having spent years as a visual astronomer, I will discuss the pros and cons of astroimaging today. Many of the top astrophotographers are using remote robotic imaging.

How is this shaping the future of amateur astronomy? Enthusiastic amateurs are also becoming a valuable resource for professionals. We will consider in what ways.

Mementos From the Brink of Eternity

We live in a time of stunning photos taken by amateurs. Some of these inspired me to try to produce images of the highest quality. Teaching myself and being willing to devote many hours to acquiring and processing images has led to surprising new discoveries that I will share with you.



2007 Public Program

Month	Date	Month	Date
March	24	July	21
April	14	August	18
May	19	September	15
June	9	October	13

2007 Society Nights

Month	Date	Moon Phase
March	17	
April	21	
May	12	
June	16	
July	14	New
August	11	
September	8	
October		
November	3	
November	10	New
December	1	
December	8	

MDAS Astronomy Workshop, *(continued on page 1)*

ToolKit before it is released, so we will review the resources and plan on a schedule to try them out at upcoming MDAS events.

The location is Jim Head's home: 2114 Whyte Park Avenue in Walnut Creek. Space is limited, so if you would like to reserve a place at the workshop and/or be notified of future astronomy workshop meetings, email or call Jim Head, our outreach coordinator, and he'll send you more details: jamesnhead@comcast.net or 925-202-5345. As with our club's other Special Interest Groups, these workshops are offered free of charge for any MDAS member. New members through seasoned veterans have attended and YOU are invited to participate. No prior knowledge or experience is required.

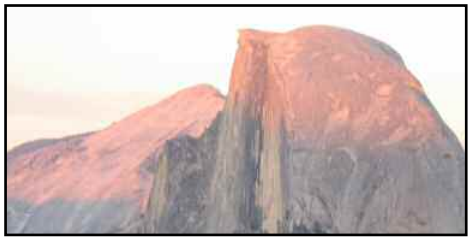
First Public Night of 2007: March 24th

Our first public astronomy night on Mount Diablo is Saturday, March 24. For details and the full schedule: http://www.mdas.net/html/publiccalendar.html

M D A S

YOSEMITE STAR PARTY

JULY 20—21 2007



FOR MORE INFORMATION: PLEASE EMAIL INQUIRIES@MDAS.NET

IMPORTANT REMINDER Just a reminder to all MDAS members, when driving up or down Mt. Diablo State park for a Public Astronomy Event or a Society Night please obey the speed limit on the mountain which is 25 MPH. Not only will you get a speeding ticket if caught by the rangers it is also unsafe to exceed that limit, being that the mountain has a very winding road and exceeding that speed may cause a serious accident to yourself and others including wildlife. Thank you, Nicholas Tsakoyias, MDAS President

Solar System Notebook

Returning to the Moon

Venus and Jupiter at Stellar Extremes with Saturn at Opposition

By Jim Scala

Ken Coates called my attention to Michael Huang's article discussing Stephen Webb's book identifying 50 solutions to Fermi's Paradox.

To refresh your memory, Enrico Fermi was a Noble Lauriat in Physics. In 1950, during a lunch discussion with colleagues about extra terrestrials, he asked, "Where are they?" Fermi asked his question because he was aware of the abundant time and number of stars and that most of his colleagues had reasoned that planets in our galaxy were teaming with life. He reasoned that if they were correct, there would be many alien civilizations and certainly one should have made their presence known by 1950. In 1951, Physics Today published his insightful question as Fermi's Paradox. Over 50 years have passed and the deafening silence in SETI's earphones is somewhat troubling.

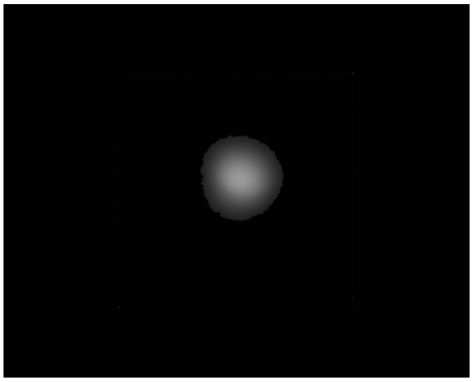
Of the 50 reasons for SETI's silence that Webb reviewed, his last, we are alone, is his first choice and his conclusion. His position was undoubtedly shaped by Ward and Brownlee's book, Rare Earth, which explains why Earth is probably very rare if not unique among planets in our galaxy.

After reading Webb's analysis for the second time I wondered, "Could we really be alone in this galaxy?" I'm an optimist and keep hoping SETI's earphones will receive a signal. We can't prove the negative that Web proposes and since it can only be disproved if SETI receives a transmission (they could just land and not signal), we're left with a dilemma in addition to a paradox. In view of this, I propose that the most important thing we can do is to become a space-faring species. More, that we begin our journey by building a permanent and self-sustaining habitat on the Moon. Indeed, some say we are in the early beginnings of creating silicon-based life (robots). Without carbon-based life's (humans) severe limits, we can easily and very efficiently explore and colonize our entire galaxy. However, I propose that human life, with its unbelievable potential, should be spread throughout the galaxy. So, I echo the song, "Let it begin with us."

I understand and can even empathize with the ranks of scientists who claim we should set human space faring aside because very efficient robotic exploration is cheaper and safer. I say there's something more important at stake. We will be shaping a message in our time and sending it to a time and distances we cannot see as our distant progeny take their place among the stars. I propose we put the debate behind us and get on with the quest.

Have you noticed that bright star at sunset?

The 2007 Venus season begins. As the sun drops below the horizon, a dazzlingly bright Venus graces the western sky. Earth travels around its orbit at about 67,000 MPH while Venus zips along at 78, 000 MPH; hence, Venus will flash by us at 12,000 MPH on August 18th. It follows that Venus just came out from behind the Sun and when it's in our western sky, we're looking back while it gains on us. Image two shows its featureless disk about 90 percent illuminated and only about 10 arc seconds in diameter. At inferior conjunction (August 18th), it will appear as a dazzling slender crescent about 57 arc seconds tip to tip; larger than any other planet can ever become in our sky. Start observing Venus regularly as it grows in size and evolves into



Venus on February 15th when about 90 percent illuminated and 10 inches in size.

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Solar System Notebook

(continued from page 4)

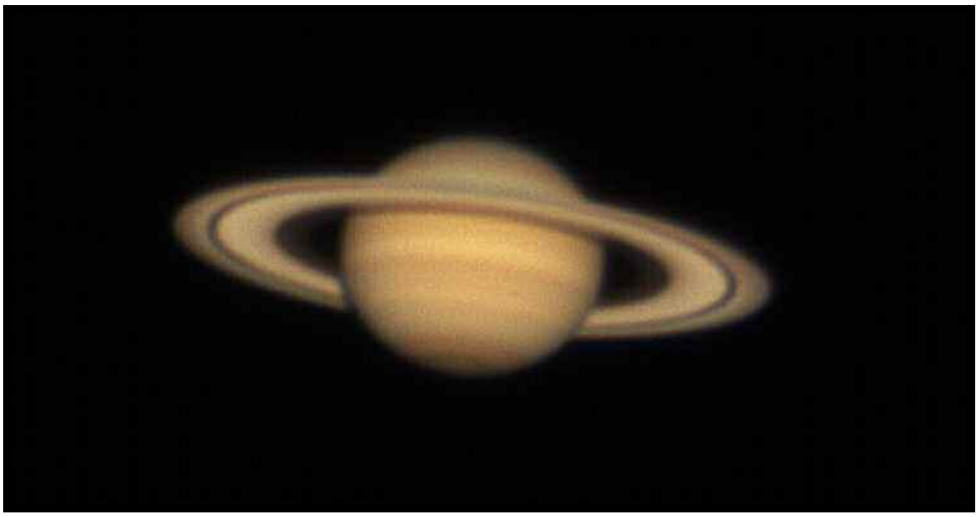
a slender crescent; then passes in front of the Sun.

Jupiter crowns the morning sky, but will be a challenge in 2007.

Jupiter moves ponderously through space at 28,000 MPH. Hence, Earth

Jupiter on the morning of February 20th. Jupiter's low -21° declination means it must be observed and imaged when near the meridian.

passes it at 39,000MPH. So, we're now catching up and will pass Jupiter on June 6th when it's at opposition. Jupiter will be at low declination for several years, so observers must take advantage of clear nights and experiment with stopping down their telescope to combat the unsteadiness that comes with a high air mass. However, Bay Area skies sometimes become very steady and good views of low, bright objects can be achieved.



Saturn on February 19th, eight days past opposition. Notice that the shadow of the planet on the rings is almost symmetrical. The rings are tilted 12°.

Saturn moves into the evening sky and becomes an easy, spectacular object.

Saturn has moved into the evening sky and transits by 10:30 PM on March 10th which is excellent for the clear spring skies we often get. Image four shows that the planet barely casts a shadow on the ring, indicating that it was just past opposition when the image was taken. Saturn will make excellent observing this spring and summer as its rings open to about 15° by June and then decline to about 6° in the fall. As the rings close to our line of sight, shadow transits of Saturn's moons will become possible. But shadow transits of Saturn's moons are a subject for 2008.

Outreach

Jim Head

Shucks, we were rained out of our February starparties, breaking our run of many months without a cancellation. We are trying to reschedule them, but in the meantime we have many events coming up - here are some of our upcoming events:

March 11

Girl scout training. Session # 1 of 2. We are teaching a few older Girl Scouts to lead activities for the event on May 5th in Pleasant Hill.

March 15.

Outreach Meeting/Workshop: Learn about the newest Toolkit from the NightSky Network and other outreach opportunities.

March 19

Concord - El Monte Elementary School: http://www.mdusd.k12.ca.us/elmonte/ 1400 Dina Drive Concord, Ca 94518, (925) 685 - 3113.

March 22, 23, 24

Intel-Affiliated Contra Costa County 2007 Science and Engineering Fair needs Astronomy or Physics judges. Signup at: http://cceconptnr.org/ScienceFair/ (North Concord)

March 24

Public night at Mt. Diablo -- We will be hosting 3 other small groups an hour before the public activity. We need 2 or 3 others to help lead activities. Marni is off to Australian skies!

Coming up next month:

April 19

Walnut Creek Intermediate school starparty

April 29

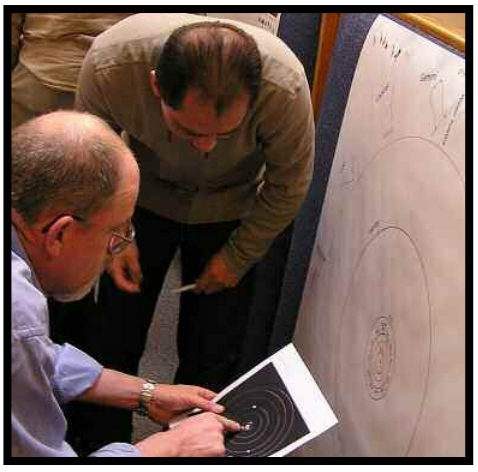
Girl Scout training workshop - Session #2 of 2. We are teaching a few older Girl Scouts to lead activities for the event on May 5th. Pleasant Hill

May 5

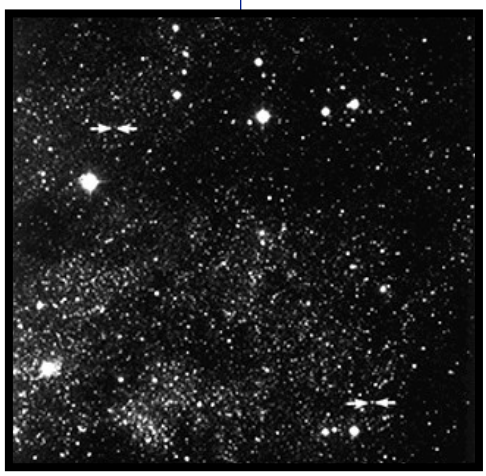
Mt. Diablo Girl Scout Astronomy program: 5:00 P.M. to 9: 00 P.M.

and more events to follow. . .

Send an email to: outreachinfo@mdas.net if you can help or attend any of these events. Thanks!



dwarfs that occasionally experience a flare. If the brightness variation is greater than, say, half a magnitude, then the object can be observed by simple visual methods. It turns out that many variable stars range over many magnitudes from maximum to minimum. Some do this with a regular, slow pulsation; others lure the observer into thinking that nothing's going to happen, then they brighten by 4 to 6 magnitudes.



Cepheid variable stars

If you have 'been around the sky' with your telescope, and are able to find objects of interest with it, then you already have some of the skills you need to be a successful variable star observer. The other skill you need to develop is being able to estimate the brightness of a star - photometry.

Visual photometry is always what is called "comparison photometry". That is, you simply compare the brightness of an unknown object with one or more comparison stars. The American Association of Variable Star Observers (AAVSO) publishes star charts with carefully measured comparison star magnitudes marked on them. Using the AAVSO chart, you try to find a comparision star that is slightly brighter than your variable, and one that is slightly fainter. Then, you apply a bit of imagination: consider the difference between the comparison stars to be exactly 10 steps. You try to place your unknown star on one of these 10 steps. Then work out the proportion for the actual magnitude difference to decide on a number for the unknown. Round it to the nearest 1/10th magnitude, which is about the limit of human perception.

Julian who?

Well, our conventional calendar isn't structured in a way that makes for straightforward time-keeping. How many days there are between July 4, 2007 and September 7, 2007. Hmm. Now that's a job for a calculator, or a fairly sophisticated computer program. But if you knew (from the AAVSO calendar, of course!) the Julian Date for July 4 is 2454286 and that for Sept. 7 is 2454351, then you have 351-286=65 days.

JD's are a more reasonable way to keep time for variable star work.

AAVSO provides a "freeware" computer program called PCObs that will let you make these date conversions from entering the calendar date and time, and more usefully, put out a report that you know will be acceptable at AAVSO.

A little contest.

You can estimate the brightness of a simulated variable star. The person who comes closest to the right number gets an AAVSO handbag containing a copy of the AAVSO Variable Star Atlas, the AAVSO Manual for Visual Observing of Variable Stars, and some other interesting literature.

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