

# The Refractor

*The Bulletin of the Eastbay Astronomical Society*  
 Founded in 1924 at Chabot Observatory, Oakland, California

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 June(2) 2007

## June (again!) 2007 talk:

### *Compact Reconnaissance Infrared Spectrometer for Mars (CRISM)*

Saturday, June 30, 2007, 7:30 pm

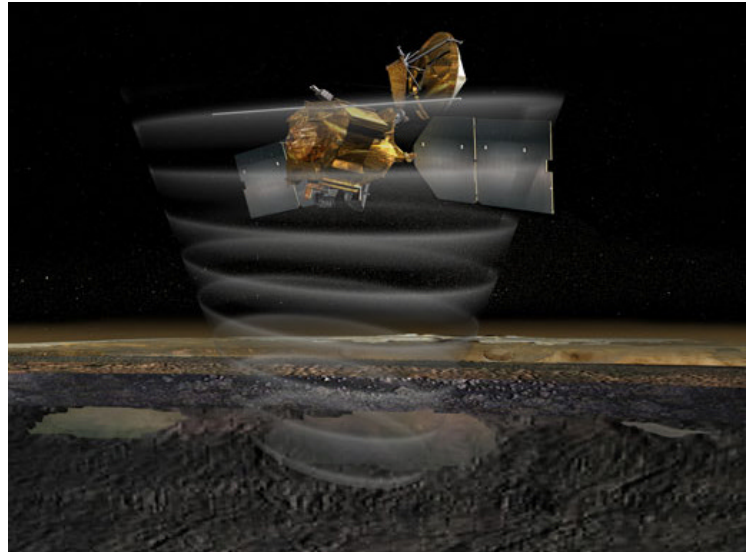
Speaker: Dr. Adrian Brown of SETI

Chabot Space & Science Center  
 Physics Lab, 2nd Floor, Spees Building

The *Compact Reconnaissance Infrared Spectrometer for Mars* (CRISM) is a NASA sponsored instrument currently onboard the Mars Reconnaissance Orbiter (MRO) which is in orbit around Mars, and has begun taking images as of September 2006. It's an infrared spectrometer that measures light from 0.4 microns to 4 microns. This region of the electromagnetic spectrum extends from what we can see with our eyes (the visible) to what is commonly termed the mid infra-red. Just like infrared sensors here on Earth, CRISM can reveal patterns our eyes are not sensitive to, because molecules and minerals react differently to infrared light.

CRISM does not, however, extend its greatest sensitivity to the "thermal infrared" region where it may be able to sense heat. This region has been covered at Mars by the Thermal Emission Spectrometer (TES). TES was sensitive to heat, and in particular, how heat was emitted from Martian materials, however because Mars is so cold, it is very challenging to interpret the information from TES. CRISM, by looking at reflected light from the Sun, at over 500 wavelengths (for many so called "hyperspectral" observations) will reveal at very fine spatial scale (down to about 18m per pixel) between minerals on the surface.

Dr. Adrian Brown has a background in computer science and electrical engineering - his first degree was in Electrical Engineering from the Australian Defence Force Academy in Canberra, Australia. After receiving his Electrical Engineering degree, Adrian served with the Royal Australian Navy as a Weapons Engineer and Fire Control Officer on Her Majesty's Australian Ships CANBERRA and ARUNTA, in addition to numerous shore postings around Australia. As a certified Java programmer, Adrian has worked as a Software Engineer for a variety of commercial pro-



*This artist's concept of the Mars Reconnaissance Orbiter highlights the spacecraft's radar capability. The Shallow Radar (SHARAD) instrument is the long pole-like feature that extends horizontally from the spacecraft.*

jects for IBM, Zurich and Bunnings. He has a Masters in Computer Science from the University of New England in Armidale, New South Wales. At Australia's Macquarie University, Adrian studied with Prof. Malcolm Walter, the head of the Australian Centre for Astrobiology, and was recently granted his PhD in Planetary Science. His topic was "Hyperspectral Mapping of Ancient Hydrothermal Systems". He was also supervised by Dr. Thomas Cudahy of CSIRO Exploration and Mining in Perth, Western Australia.

Dr. Brown is a postdoctoral researcher at the NASA Ames Research Center and SETI Institute in Mountain View, CA, and is a fully qualified Private pilot. He has used this skill to enhance his knowledge of remote sensing by flying over study regions in Western Australia. ★

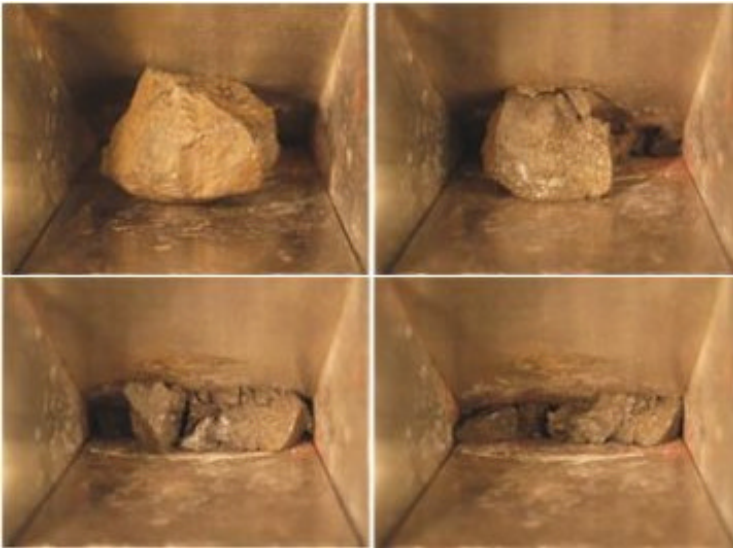
#### DINNER WITH THE SPEAKER

5:30 pm  
 Saturday, June 30  
**HUNAN YUAN**  
 4100 Redwood Rd., #11  
 (next to Safeway)  
 Oakland  
 (510) 531-1415  
 No need to confirm—just show up!

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Looking down on the jaws of the Mars Rock Crusher, we see a magnetite rock get crushed into smaller and smaller particles.

## Chew on This

**T**he Mars robotic rovers, Spirit and Opportunity, are equipped with RATs, or Rock Abrasion Tools. Their purpose is to abrade the surface patina off the Mars rocks so that the alpha x-ray spectrometer can analyze the minerals inside the rocks, rather than just on the surface.

But future robotic missions to Mars will be asked to go even further below the surface. Scrapers and corers will gather rock samples of substantial size, that, in order to be analyzed by a spectrometer, will need to be crushed into a fine powder.

Crushing rocks on Mars? Now there's a problem that brings to mind a multitude of possible approaches: Whack them with a large hammer? Squeeze them until they explode? How about just chewing them up? It was with this latter metaphor that the planetary instrument engineers struck pay dirt—so to speak.

Thanks to NASA's Planetary Instrument Definition and Development Program, a small group of NASA engineers came up with the Mars Rock Crusher. Only six inches tall, it can chew the hardest rocks into a powder.

The Mars Rock Crusher has two metal plates that work sort of like our jaws. One plate stays still, while the other plate moves. Rocks are dropped into the jaw between the two plates. As one plate moves in and out (like a lower jaw), rocks are crushed between the two plates. The jaw opening is larger toward the top and smaller towards the bottom. So when larger rocks are crushed near the top, the pieces fall down into the narrower part of the jaw, where they are crushed again. This process repeats until the rock particles are small enough to fall through a slit where the two plates are closest.

Engineers have tested the Mars Rock Crusher with Earth rocks similar to those expected to be found on Mars. One kind of rock is hematite. The rusted iron in hematite and other rocks help give Mars its nickname "The Red Planet." Another kind of rock is magnetite, so-called because it is magnetic. Rocks made by volcanoes are called basalts. Some of the volcanoes on Mars may have produced basalts with a lot of a mineral called olivine. We call those olivine basalts, and the Rock Crusher chews them up nicely too. ★

Visit [www.jpl.nasa.gov/technology](http://www.jpl.nasa.gov/technology) to read the latest about other NASA technologies for exploring other planets and improving life on this one.

*This article was written by Diane K. Fisher and provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*

## Sky & Telescope: Policy changes for renewals

One of the benefits of being an EAS member is that you get reduced subscription rates for Sky & Telescope magazine (as well as Astronomy magazine). The folks at Sky & Telescope recently notified us that they have changed their policy for renewing member subscriptions.

Under the new policy, if you already have an established discounted member subscription to Sky & Telescope, you will renew your subscription directly with S&T. They will send you a renewal notice, showing the discounted members' rate, and ask you to respond with payment directly to them. They will ask EAS to verify your membership (so you get the discount), but EAS will no longer submit subscription renewals.

So next fall, when it's time to renew your EAS membership, you will not need to include payment for your Sky & Telescope subscription renewal. If you do not have an S&T subscription, and you want to start a subscription with the EAS discount, you will have to send that first payment with your EAS membership renewal. Likewise, new members will have to submit the subscription payment with their initial membership application.

We have not yet heard of a similar change by Astronomy magazine, so, if you subscribe to Astronomy, you'll still need to submit your subscription renewal payment with your EAS membership renewal.

If you have any questions about the Sky & Telescope subscription changes, please contact your EAS treasurer, Gerald McKeegan, by email at [geraldspace@earthlink.net](mailto:geraldspace@earthlink.net), or by phone at (925) 926-0853. ★



## Editor's News 'n Views

Howdy astro fans! Condolences to all us astronomy-freaky-dark-skytypes for the absolute worst time of the year: Summer Solstice (this year, June 21, 10:07am PDST). The days are long, the nights are short, and there's *nothing* we can do

about it (aieeeee!). To add insult to injury, the PTB (Powers That Be) have also inflicted Darkness Squandering Time on us. So it's popular; so it saves about 1% in energy consumption; so it decreases traffic accident death by 1% - what about the stars? What about the night? What if an incoming earth-crossing asteroid was missed, because an amateur astronomer had to go to bed an hour earlier, and the world perished in a planetary holocaust that might have otherwise been avoided, all because of DST? Not much "saving," there, eh what? Try and convince anybody of that, though <phphhh!>

Despite the odds against us, we still managed to have *some* fun doing a MOVN (Members Only View Night). When I say "we," I mean the telescope operators (myself, and two newly trained operators, **Paul Terrill**, and **Tom Lehnert**). We only had two CSSC members show up, and one other couple who appeared at the gate by happenstance. What the heck - we let 'em in. (We think that because it was also Father's Day that attendance was even lighter than usual.) I don't know, though - I'm amazed we don't have higher attendance for these events from EAS members. What other club on the whole planet has access to THREE large-format telescopes at their beck and call? You know, there are observatories out there that charge the public big bucks for the privilege of using *their* telescopes, once. We charge \$24 per year (for membership), and have observing opportunities practically every month. This last MOVN, we looked at the slowly waning crescent Venus, a beautiful thin crescent Moon, Saturn, Jupiter, M13, M57, M56, NGC 6543 (the Cat's Eye Nebula), and showed the non-member couple how to use their Meade telescope. All that, and snacks and drinks, too. Really! You should come up and help us share all this fun - I am burdened with a great sense of guilt, keeping it all to myself. ;-) <== (That, by the way, is an *emoticon*, or *smiley*. If you don't know what that means, ask someone who uses email.)

I guess you could call this a "blue...EAS meeting...month," in that we are having TWO general club meetings in the same month, this month. (This is in reference to what's called a "blue moon": a somewhat rare event when two full moons happen in the same month - but I'll bet you already knew that, didn't you.) It's because we're switching our meeting date from the early part of the month, to the later part, from now until the end of the year. We felt that it would be too long a wait to have 8 weeks between meetings (May 5 and June 30), so we had one in early June to kind of split the

difference. And I suppose that means that that's why we're getting two newsletters in the same month. Hey! I wanna vacation!

It was fun, but that was pretty much it for the nice views of Saturn, this year. It goes out with a nice send-off, though - on the June 30, it has a *very* close conjunction with Venus, a little more than one moon-width away. I think, for our club meeting that evening, we should take some time out to look at this. It ought to be just beautiful. I'll betcha 10,000 quatl-oo a picture of this conjunction will show up on the web at APOD (Astronomy Picture Of the Day).

Lastly, Chabot put in a presence at the 2nd annual *Maker Fair*, held at the San Mateo Fairgrounds. They sent **Conrad Jung** and his award winning collection of astrophotos to promote CSSC, and we did quite well. We also got to see all the other "makers" who made everything from cute little finger puppets to giant 15' high Tesla coils. If you get a chance next year, you should go—or better yet: help Conrad there, and get in for free! ★



### FUTURE CONJUNCTIONS—2007

NOTE: Please note there are TWO meetings in June. We are switching from having our General Meetings from the early to the later part of the month, and it was thought that it would be too much time between the June 3 and July 28 meetings.

- Jun 30 **General Meeting, Chabot, Physics Lab, 7:30pm**
- Jul 12 Board Meeting, Chabot, Soda Board Rm, 7:30pm
- 22 MOVN @ Chabot, Wightman Plaza\*
- 28 General Meeting, Chabot Physics Lab, 7:30pm
- Aug 9 Board Meeting, Chabot, Soda Board Rm, 7:30pm
- 25 General Meeting, Chabot, Physics Lab, 7:30pm
- 19 MOVN @ Chabot, Wightman Plaza\*
- Sep 4-15 Approx dates for Barcroft High-Altitude Star Party
- 13 Board Meeting, Chabot, Soda Board Rm, 7:30pm
- 22 General Meeting, Chabot, Physics Lab, 7:30pm
- 30 MOVN @ Chabot, Wightman Plaza\*
- Oct 11 Board Meeting, Chabot, Soda Board Rm, 7:30pm
- 27 General Meeting, Chabot, Physics Lab, 7:30pm
- 14 MOVN @ Chabot, Wightman Plaza\*
- Nov 15 Board Meeting, Chabot, Soda Board Rm, 7:30pm
- 24 General Meeting, Chabot, Physics Lab, 7:30pm
- (tba) MOVN @ Chabot, Wightman Plaza\*

\*Members Only View Night:

Always call 510 482-2913 after 5pm to confirm

NOTE: Dates and times may change. We will provide as much advance warning as possible.

# RTMC 2007

(Riverside Telescope Makers Conference)

From an interview with Paul Hoy and Bill Drelling

**F**ounded in 1969, the Riverside Telescope Makers Conference was begun by Clifford W. Holmes to bring amateur telescope makers together so they could compare notes, share techniques, and have fun with the hobby. This was Paul's fifth time attending, and Bill's first.

They camped with the *Peninsula Astronomy Society* group, including Ken Lum and William Phelps. William brought his 7" Astrophysics refractor on an AP1200 mount, and shared amazing bino-eyepiece views of Hadley Rille on the moon, and a shadow transit on Jupiter. During the day, he put an H-Alpha filter on a home made telescope whose tracking motor was powered with, appropriately enough, solar cells. Paul brought his short tube Williams Optics 80mm with Polaris mount, and his Coronado 40mm PST H-Alpha solar scope. Bill brought his Takahashi FSQ 106 and mount. This was only the 2nd time Bill had assembled his relatively new gear, and was able to learn a few tricks and tips from Phelps, who had a similar setup. They looked at Venus during the day by  
(TECHNIQUE ALERT):

1. Leveling the tripod;
2. Mounting the scope, and leveling its counterweight shaft;
3. Pointing the mount's axis north using a compass;
4. Setting the mount to the current latitude (for RTMC, that's N 34° 13' 50");
5. Get the planet's current RA & Dec from a computer program, such as *Starry Night*, or, on PDAs, *Pocket Stars*;
6. Use coordinates to get close to the object (in this case, Venus), and then zero in.

John Wright of Pasadena had two solar scopes mounted side-by-side: a .4 angstrom narrow band 60mm Coronado that showed a lot of detail on the sun's surface, and a 60mm white light scope. At night, they looked at Saturn, and later Jupiter, the Trifid Nebula, and many other objects, but the quarter moon was up, so it got most of the attention. One interesting thing about their local camping group—there wasn't a single reflector among them! They were all refractors. Just a bit odd.

Both Paul and Bill did a lot of astrophotography while they were there. Bill used film and tried out his new SBIG STV autoguider to take pictures of The Lagoon nebula and a few other objects with relatively short exposures. Paul put on his digital SLR on and took 8 five minute exposures of the North America nebula, with cool-off periods and dark frame exposures in between the actual photographic exposures. It turned out great (see photo on next page).

Paul had even more fun taking "portraits" by moonlight. It all started when Bill wanted a picture of himself with his gear, and Paul thought it would be good if it were taken using a semi-long exposure with moonlight. Checking the results, they noticed that they could see part of the Milky Way in the photo, and wouldn't it be cool to take a picture with the Clark refractor and the Milky Way in the background, so they did that. After showing the results to some of the other guys

around at the time, Dave Rodrigues came by, saw the pictures, and wanted a picture of himself with the Milky Way too. He liked it so much, he went out and brought others, and then *they* brought others! It seemed Paul spent half the night taking pictures of people with the Milky Way. (He used 20 sec and equivalent 800ASA exposures.) It's hard to keep perfectly still for 20 seconds, but they mostly turned out well, and he had a lot of fun produced interesting results (try it!)

You can't have RTMC without vendors, and Meade was there showcasing their new *MaxMount* (it reminded Paul of a Transformer robot). With a 20" Cassegrain telescope on it, you can get it for only \$50,000. Or, you could put a downpayment on a house. The most unique product they saw, not on the market, yet, was the Ethos 13mm eyepiece created by Al Nagler. With a 100° wide apparent field of view, you had to move your eye around to find the eyepiece's edges. It felt like you were falling into the telescope, and the stars were tack sharp from edge to edge. One of the guys at Nagler's booth said the price would be "somewhere under \$1000," but don't know, yet, *how* far under \$1000. It's somewhat smaller than the 31mm Nagler (we use one of these for public viewing at Rachel, and refer to it as the "Holy Hand Grenade").

Of course, the highlight of the whole meet was the Awards Ceremony, where our club president, Carter Roberts, officially received his *G. Bruce Blair* award (see the April 2007 issue of *The Refractor*). It seemed odd to Paul that after receiving his award, Carter stayed on stage, while others received other awards. After a while, RTMC Exec Dir Steve Edberg gave the surprise announcement that Dave Rodrigues was this year's recipient of the *Clifford W. Holmes* award (!!!), given to those who significantly contribute to the popularization of astronomy, and named after the founder of RTMC. Normally, the award goes to a telescope maker, but Dave's work as the AstroWizard made his nomination very appropriate. Dave was totally caught off guard, and Carter tricked Dave into wearing his wizard outfit to the ceremony, asking him to do so because, "it would mean a lot to me if you wore it when I receive my award."

Overall, it seemed to Paul that Meade took over the exhibitor area, pushing out other vendors from the sheer amount of space they took. The group that usually brings up "The Yard Scope," a massive 36" dob, didn't have the room to set it up. Paul also noticed the event's attendance was lighter than previous years he's attended, down ~200 from the previous year (~<1,700). This was probably because the event date was during a waxing gibbous moon, and perhaps also because the focus was shifting away from telescope makers, to the more general field of astronomy. Be that as it may, RTMC still sounds like a lot of fun, and is an event every astro fan should attend for as many times as they possibly can. ★



# Spare Shots



▲ (Top 3 photos) Carter and Dave getting their just awards at this year's RTMC.

▼ Unusual shot: Bill Drelling and Paul Hoy w/stars visible above.

Very realistic recreations of Galileo's telescopes ▶

M31 and its two satellites, M110 and M32 ▼



The North American Nebula ▼

The Milky Way ▼




Carter's evil twin brother, Skippy, at the Maker Fair ▶ and above that, Dave Barosso mans the TMW booth at the Fair

Two giant Tesla coils have at it at the Maker Fair ▶

And that's it for now! ★





# Eastbay Astronomical Society

Post Office Box 18635 • Oakland, CA 94619-0635

**June (again) 2007**  
*RETURN SERVICE REQUESTED*

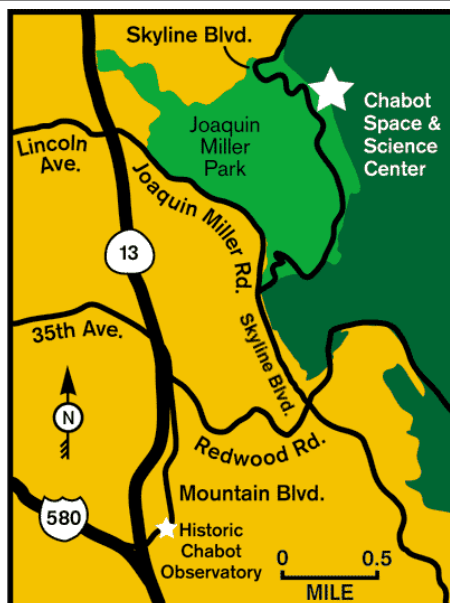
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Articles and photos for *The Refractor* are encouraged. Deadline for the July 2007 issue is July 7, 2007. Items may be submitted by mail to:  
 Editor - 3514 Randolph Avenue, Oakland, CA 94602-1228. Internet email address: donsaito@comcast.net Hm: (510) 482-2913.



### Join the Eastbay Astronomical Society

- Regular, \$24/year
- Family, \$36/year
- Contributing, \$40/year
- Student, \$15/year (digital news-letter, only)
- Sustaining, \$60/year or more

#### Discounted Magazine Subscriptions:

- Sky & Telescope \$32.95 (order between July & December)
- Astronomy \$34 (order between July & December)

*Note: Note: Each membership year begins November 1, and ends October 31. New memberships starting from July - October will be good through to the end of October of the next year*

Contact: EAS Treasurer  
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 Oakland, CA 94619-0635  
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**Sign up online at <http://www.eastbayastro.org/> (click on the Membership link for PayPal purchasing options)**