

# The Refractor

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

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Number 6

April 2009



ESA - C. Carreau

## April 2009 talk: *“Exo-planets, Not Just in Star Trek Anymore”*

**When:**

Saturday, April 4th, 7:30pm

**Speaker:**

*Dr. Sloane Wiktorowicz*

**Where:**

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

**T**hough we have not yet succeeded in traveling to planets around other suns, we have made huge progress towards the next best thing: studying planets from afar. With about 340 exo-planets known, and a new one being announced every week, we are beginning to transition from planet detection to planet characterization. From Spitzer Space Telescope observations to exo-planet temperature to Hubble Space Telescope observations of a possible disk of material around Fomalhaut b, I will discuss the novel techniques that are giving us unprecedented views of individual planets. Finally, I will show a promising technique that has the potential to see the atmospheres of exo-planets in a new light.

*Dr. Sloane Wiktorowicz is a postdoc at UC Berkeley who fell in love with the stars the first time he saw them, preferring astronomy books to Dr. Seuss. A San Jose native, Sloane was a member of the San Jose Astronomical Association while in high school. He received the Astronomical League's National Young Astronomer Award, 4th place, for volunteer work at Lick Observatory and for logs with his 4.5" Newtonian. Sloane and his wife Sharon live in Daly City, where the term "clear skies" has never been heard.*



Inside this issue:

- |                           |        |
|---------------------------|--------|
| __ EAS Exo-planet Group   | page 2 |
| __ On The Web & Who's Who | page 3 |
| __ Future conjunctions    | page 3 |

## EAS EXO-PLANET GROUP

Exo-planets need little introduction. Of late, they seem to see a good deal of 'air time' in both science and layman news media. With each new discovery researchers move closer to finding a truly earth-like planet orbiting what would be considered a hospitable star. At the center of the search for Exo-planets is Geoff Marcy of the University of California, Berkeley and Debra Fischer of San Francisco State University. Geoff Marcy's group has to date discovered the lion's share of new Exo-planets, and continue to refine data with observations made with telescopes at Lick Observatory, Mt. Hamilton; the Keck reflectors on Mauna Kea, and, among others, the 20 inch refractor at Chabot Space and Science Center. That's right; our very own Rachel.

Dr. Terry Galloway leads a team of EAS members in studying these distant worlds. The very demanding, precise work is done with either a photo-electric photometer (an ultra sensitive light measuring device) or a state of the art, large format CCD camera, supported by sophisticated computer hardware and software. Either instrument is mounted at the focus of the 20 inch refractor. Exo-planet team members include Dr. Steve Mathews, Dr. David Birnbaum, Bruce Skelley, Derek Lenzi, Bill Sheridan, Paul Hoy, Cmdr. Bill Drelling and Alan Fisher.

Unlike Geoff Marcy's discovery work which involves detecting the wobble of stars caused by one or more orbiting planets, or, more precisely, looking for back and forth Doppler shifts of stellar spectral lines over relatively long periods, the EAS team carefully measures the brightness of select stars looking for a miniscule decrease in brightness, typically just a few hundredths of a magnitude caused by a planet passing in front of the star's bright surface. Photometric measurements of the star and neighboring comparison stars for each Exo-planet system are plotted, then sent to Geoff Marcy's team where they're added to data from other observatories around the world to reveal the orbit, size and maybe atmosphere detail of these incredibly distant planets.

Early work at Chabot involved the use of a highly light sensitive Gallium-Arsenide photo-cathode photomultiplier tube. The photomultiplier tube, a cooling system and associated optics were contained in a very long, box housing that attached to the focuser of the 20 inch refractor. Star light striking the photo-cathode caused a cascade of electrons in the 11 stage pho-

tomultiplier tube, producing a current signal measuring 10 to 10,000 picoamperes which was measured by the team with a Keithley picoammeter. Not only the subject star, but several neighboring stars, used for comparison, needed to be individually measured. A night's work would consist of separately locating each star, centering the star in a small aperture, making measurements of each star, then repeating the process several, if not dozens of times. Very time consuming, very labor intensive.

Today, candidate stars and their comparison stars are imaged at the same time with a high resolution, large format Apogee CCD camera. The camera, mounted in



place of the photo-electric photometer at Rachel's focus, greatly simplifies the process of collecting data, while improving measurement accuracy. The CCD camera is also fitted with a computer controlled filter wheel containing UBVRI photo-

metric filters allowing the stellar measurements to be made in wavelengths ranging from ultraviolet to near-infrared. Stars being studied by the group range from 6<sup>th</sup> to 8<sup>th</sup> magnitude. The dimming caused by the transit of a planet is a mere 1.5% to 3%.

The EAS Exo-planet group is looking for more members, particularly high school students and undergraduate college students to participate in this ongoing project. However, you need not have an extensive technical background to participate, just a desire to do and learn. This is an incredible opportunity to get hands-on experience with a large refractor of professional scale, doing work that directly contributes to the better understanding of Exo-planet systems. Team members will learn how to operate Rachel, the ins and outs of photometry and CCD imaging, and data collection and reduction.

For more information on the Exo-planet group activities contact Dr. Terry Galloway at [terryg2@ix.netcom.com](mailto:terryg2@ix.netcom.com) or stop by and talk with him in Rachel's dome on any Sunday during the day.

## ...ON THE WEB

### “Dorothea Kumpke Roberts, Pioneer Woman Astronomer”

By Donald Stone, EAS ddcstone@earthlink.net

An amazing biographical piece on one of the first to officially join the EAS, March 6<sup>th</sup> 1925. Dr Robert’s story involves observatories on two continents, conducting astronomical observations in a balloon, and a home called “Starfield.” A splendid read, and amazing piece of EAS history.

<http://www.aanc-astronomy.org/articles/dorothea.html>

Editor’s Note: Do you have an **astronomy** or **science** related personal web site or web posted article or review you’d like to share with fellow EAS members? Pass along the URL and a few words about the site to the editor at BakerSt@comcast.net

## ...WHO’S WHO \*

### *Don Saito, Newsletter Editor*

[by interim editor Jim Ferreira]

At the age of 3 Don Saito discovered photos of the Solar System in the family encyclopedia. Not long after that a telescope showed up on his Christmas list and soon he was the proud owner of department store Tasco 3 inch refractor, “complete with cardboard tube, shaky mount, and filters for the moon, and the sun (the kind that can crack and blind you)”. Early on, the Moon was his main attraction, but upon moving up to a 3.5 inch Tasco reflector telescope he began to view the bigger planets. Growing up and doing the gainful employment thing, astronomy was put on the back burner, so to speak....for a few decades! But, in 1997 Don discovered Chabot Observatory.....”Wait. An observatory in Oakland?” He was immediately “hooked,” ....well, after Conrad Jung con-



fided that observatory volunteers get to operate the telescopes. Don also discovered the Telescope Makers’ Workshop and promptly purchased a mirror blank and tool from Don Stone in the Starry Nights Gift Shop. Don became a TMW regular and began volunteering for EAS projects. Eventually he was recruited by Dave Barosso for the Rachel Restoration Project, then on to Leah, the Transit Telescope Mount and Rachel’s Rolling Viewing Platform project. Somewhere in there Don became an EAS board member and was recruited by Carter Roberts as editor of “The Refractor” newsletter. Don was trained to operate Rachel, Leah, and later, Nellie and has been volunteering regularly at Chabot as a telescope operator for public, private, and outreach events ever since. Oh, and did I mention the two out-of-country jaunts with Carter Roberts to see the 1999 and 2001 Leonid meteor storms? Didn’t think so. So, in a nutshell (which seems appropriate....) that is our Newsletter editor and chief, EAS board member, volunteer and Chabot aficionado; Don Saito.

Don’s thoughts on EAS / Chabot: “I wish more EAS members would get more involved with the volunteer opportunities of our club, because it not only makes us more valuable to Chabot, it's tons o' fun, and promotes our love of science and astronomy to the people - a win-win-win situation if ever there was one.”

And, as most of you know, Don is on hiatus from the Newsletter, at this very moment touring the US of A on his recumbent tricycle. To keep up on Don’s exploits, visit his **Cycle America** blog at <http://cycleamerica2009.blogspot.com/>

*\*Editor’s note: each month an EAS officer or active member will be presented here so you’ll know who’s who in EAS.*

#### FUTURE CONJUNCTIONS—2009

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|-----|----|--|
| Apr | 4  | EAS General Meeting, Chabot, Physics Lab, 7:30pm |
|     | 5  | EAS MOVN*, 7pm-10pm, Wightman Plaza, Chabot      |
|     | 9  | Board Meeting, Chabot, Soda Board Rm, 7:30pm     |
| May | 3  | EAS MOVN*, 7pm-10pm, Wightman Plaza, Chabot      |
|     | 9  | EAS General Meeting, Chabot, Physics Lab, 7:30pm |
|     | 14 | Board Meeting, Chabot, Soda Board Rm, 7:30pm     |
|     | 28 | EAS MOVN*, 7pm-10pm, Wightman Plaza, Chabot      |

\*Please call Gerald McKeegan at (925) 926-0853 after 5pm on the date of the MOVN to verify that it has not been cancelled due to weather or other considerations.



# Eastbay Astronomical Society

At Chabot Space & Science Center  
10000 Skyline Boulevard • Oakland, CA 94619

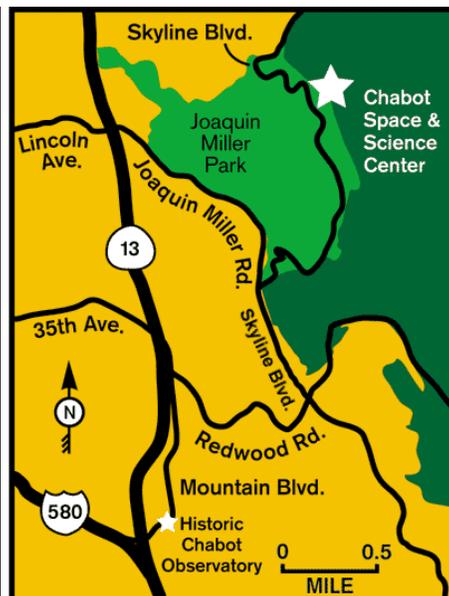
**March 2009**  
*RETURN SERVICE REQUESTED*

## Eastbay Astronomical Society

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Articles and photos for *The Refractor* are encouraged. Deadline for the May 2009 issue is April, 20 2009. Items may be submitted by mail or E-mail to: Interim Editor - Jim Ferreira, 753 Oriole Avenue, Livermore CA 94551 bakerst@comcast.net (925) 449-0107



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### 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

Contact: Gerald McKeegan, EAS Treasurer  
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**Sign up online at <http://www.eastbayastro.org/>**