



The Year In Review...

By Doug Brown, President FPOA

It has been quite a busy year for us, with a number of changes and positive developments.

Programs

We delivered 22 night and 6 solar public programs this year. Their popularity resulted in huge turnouts on many nights, causing us to deliver an estimated average of 1.6 presentations per program. In addition, we put on over half a dozen special programs for various community organizations. Monterey Peninsula College, Hartnell College, and the International School of Monterey all used FPOA as part of their science curriculum.

The Hartnell Internship Program completed a successful second year with a solid team of six interns. See their team report elsewhere in this issue. Also see the article describing the imaging system that we will soon have at the Peak, thanks to a program grant.

Our Star-B-Que had huge attendance, partly due to the large public turnout for the Perseids later that night. Raja Guhthakurta (UC Santa Cruz) presented "Journey to the Big Bang", and Joe Hennawi (UC Berkeley) gave an update of his previous presentation, and we all had lots of fun.

FPOA helped organize AANC's ASTRO-CON 2007, held this year at the College of San Mateo's new planetarium.

Facilities and Instrumentation

Aside from programs, the biggest single 2007 investment of time and energy on the part of a number of members has been in planning and installing the new east ramp, as described in a related article in this issue.

Both primary and secondary mirrors on the Challenger were removed, driven to LA, and given enhanced aluminum coatings. We've also upgraded to a new computer in observing room.

Financial

We continue to be solvent, with stable reserves to cover anticipated needs. Most of our reserves are held in CDs which, over the past 20 years, have steadily lost value in real terms. To protect our investment for the future, the Board has approved a plan to put the reserves into a conservative combination of bonds and broad-based, no load, index funds.

Governance

At the beginning of 2007 Pat Donnelly, our president of the past 6 years, relinquished his post due to a work assignment on the east coast but remains active on the board, both chairing our investments committee and ensuring we maintain an appropriate

FPOA Programs: 2008

Note: Please check http://www.fpoa.net/schedule-2008.html after mid-January for the new 2008 schedule

Saturday Evening Programs

Closed for the remainder of 2007

degree of levity. Dave Samuels was elected Vice President. In March our Secretary, Steve Loos, had to resign due to time commitments of his growing appraisal business; Ed Huston took his seat on the board, and Mark Levine stepped into the role of Secretary. Ron Dammann continues as Director of Instrumentation and Programs Coordinator, Rick Morales as Treasurer and sharing responsibility for Facilities with Loren Dynneson, and Donn Mukensnoble as a member of the Board. This is a very dedicated and capable group, deserving a lot of credit and recognition for the work they do on our behalf.

The Board invested considerable time early this year reexamining and revising our mission. This resulted in a complete rewrite of Article 1 (Objectives and Purposes) of our bylaws, which was ratified by a vote of the membership at our annual meeting in August.

Membership

With your support, FPOA membership continues at about 160 strong.

www.fpoa.net
Check out our web site improvements. Among others, we've added a number of hyperlinks to the public page, and there's a new Who's Who page in the members-only section that we hope to expand over time. Send your photos, bios, and other suggestions to webmaster@fpoa.net.

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A Day and a Night of Astronomy

By Ed Huston

I recently had the great privilege of hosting Girl Scout Troop 353 from Cupertino at FPO and at Manresa campgrounds. We began the day at the Peak with lessons on the moon, constellations and the 30" Challenger telescope. We wrapped up the day, after a yummy dinner (cooked only the way Girl Scouts can do it!), with some lessons on the planets and some viewing of constellations, through the feisty coastal fog, and the moon, through a small telescope. Let the following comments tell the girls' story of their thrill of learning astronomy. (Space limits me to just a small sampling of many other great comments.)

"I liked how the ceiling moved and the big telescope was so cool." – Jenna

"I also loved the star finder that we made and all the different constellations you can see in the different months." – Arushi

"I really enjoyed the "bouncing" sun. I didn't know there were so many constellations." – Victoria

"What I thought was really cool was that the telescope was perfectly balanced." – Rebecca

"I especially loved star gazing. I also liked the sliding roof. It was awesome!" – Melissa

"Thank you for letting me see Pluto [on Starry Night] even though it is not a planet any more." – Emily

"I learned a lot about the planets." – Shelton

"It was really cool to see the constellations in the sky. Thank you for showing me Cassiopeia, Polaris, part of Pegasus and Andromeda, and part of Ursa Minor and Major." – Emily

"I have recommended my friends to learn about the stars because I had a lot of fun!" – Aditi

"The laser pointer was the best thing. I could see the constellations very clear." – Olivia

"It was interesting that there is a constellation called Draco." – [Harry Potter fan] Isabel

"I never knew Jupiter had a storm, that was called the red spot!" – Rei

"At the end we got to see the moon that had so much detail when I looked at it." – Mounika

"I have never seen the Big Dipper before either. I also didn't know earth moved so fast." – Sarah

"I told my friends about star gazing, and they thought it was so cool. I hope next time I can bring my other friends." – Kelsey

I am so impressed with how much the girls remembered, more than a week later. They provided me some great sketches of the

observatory and the skies, too. They were diligent note-takers; a teacher's dream. What a great time we had, and FPOA has some enthusiastic new fans.

New East Ramp Nearly Complete

Next time you are up at the Peak, please take a moment to admire our new east ramp. In a burst of construction activity not seen here since 1986--or at least since the roof blew off--a dedicated team of volunteers has been contributing its weekends to demolish the rickety old east walkway and stairs and replace them with a new, solid, ADA-compliant ramp, stairs, and walkway.

The project architect was member Greg Bossler, who briefed the board on the design process and numerous legal constraints, gathered input on design options, drafted and reviewed conceptual drawings with the board and then developed them into final drawings. Not only that, he even revised the "final" drawings when we changed our mind and asked him to add stairs that could be used to bypass the ramp.

Loren Dynneson, the project manager, and Rich Morales met with the State to get their approval of the design, turned Greg's drawings into construction plans and a materials list, and purchased it all. Ever conscious of cost, Loren calculated our lumber purchase to the nearest foot, with almost no room for error. Being a true craftsman, he always insisted we adhere--or at least get as close as we were able--to his high standards of construction quality.

Before construction could begin, the lumber needed to be prepared. Mark Levine and Loren made several trips to turn the lumber, which was stored in the ranger's back yard, and make sure it was fully dried before applying several layers of preservative.

Most of the construction was done in October and November by a core team of Loren Dynneson, Rick Morales, Mark Levine, Paul Bradshaw, Ron Damman Dave Samuels and Doug Brown, who were joined occasionally by Miguel Rodriguez, Al Quan and Pat Donnelly

Groundbreaking occurred at the October board meeting when we excavated and poured concrete for the ramp pad and footings. The team demolished the old ramp and started framing 11/10. We all began to appreciate Rick's truck, which literally is a rolling hardware store. It seemed that whenever we ran into a tough problem requiring a specialized tool, or discovered we were missing a particular fastener or material, Rick would climb in the back and emerge minutes later with exactly the right item.

On 11/17 the team continued framing, which was completed 11/24 along with the deck. Plans are to complete the stairs and railings by mid-December.

Many thanks to this dedicated group of volunteers for their hard work. The result looks very nice, and should last for years! You can visit www.fpoa.net for photos of the construction.

Hartnell College Internship Report

By Intern Team Marco Barbosa, Joe Fair, Ricky Fernandez, Angelica Meza, Eduardo Navarro, Miguel Rodriguez . Fremont Peak Observatory Research Advisors: Ron Dammann and Doug Brown

Our team's goal was to develop project management skills and give us experience in in area of project management. Through our partnership with the Fremont Peak Observatory Association (FPOA) our purpose was to make astronomy available to the general public by assisting the FPOA in giving presentations, answering visitor questions, and helping visitors use the telescopes.

We achieved these goals by developing a project plan to clarify our goals at Fremont Peak, establishing a communication structure and creating contingencies to deal with potential problems should they arise. We developed a simple hierarchy in our project plan, created a phone list and established a Google group as a file-hosting site and to link our email.

We each took the initiative to learn more about the night sky and the constellations. In the process of developing PowerPoint presentations, we each became an expert on a particular topic in Astronomy. The team thus applied project management principles to execute an educational public service, which introduced visitors to astronomical facts and concepts.

The overwhelming display of interest and willingness to learn from the audience indicated that the team succeeded in helping to capture their curiosity in astronomy and to make them more aware of the importance of science.

New Hartnell Imaging System for FPOA

By Doug Brown

Last summer we were invited to attend the Hartnell College Project Management Institute Research Symposium, which presented program results from intern teams who had worked with FPOA, the Naval Postgraduate School, the Center for Adaptive Optics, and the Monterey Bay Aquarium Research Institute. The papers were quite interesting, and some contained cutting-edge research findings. Afterwards I asked Andy Newton (Hartnell Planetarium Director) and Pimol Moth (Hartnell Astronomy and Physics Instructor) if they would like to add a research component of the FPOA program to better match the experience interns were gaining at other locations.

Pimol and Andy were enthusiastic about improving our program and offered to consider funding any supporting equipment we might require. In response, Dave Samuels and Ron Damman developed and submitted an FPOA grant proposal for a new CCD imaging system to support specific research projects. The grant has now been funded by Hartnell's NASA Curriculum Improvement Partnership Award II Project and the equipment ordered. While the internship program will have scheduling priority, this system will be available for qualified FPOA member use.



Eduardo Navarro is transferring to Cal Poly San Luis Obispo this Fall to study Computer Engineering. He attended North Salinas High School. Angelica Meza is transferring to Cal Poly Pomona this Fall to study Aerospace Engineering. She attended North Salinas High School. Miguel Rodriguez is continuing at Hamel! this Fall and plans to study Biology/PreMed. Miguel attended Salinas High School. Marco Barbosa has transferred to CSUMB this Fall to study Math and Spanish. He attended Palma High School. Joe Fair is transferring to Sacramento State this Fall to study Civil Engineering. Joe attended Salinas High School. Ricky Fernandez is continuing at Hartnell this year and plans to transfer to study engineering. Ricky attended Monterey High School.

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The CCD imaging system will initially allow student interns to participate in three significant astronomy projects that provide experience and knowledge in detecting, tracking, and determining characteristics of objects and contribute their data to ongoing formal research programs.

- Detect, image, and determine orbital elements of near earth objects (NASA NEO Program)
- Re-acquire lost objects and provide orbital element information (IAU Minor Planet Center)
- Detect and to measure the characteristics of variable stars (AAVSO)

Dave and Ron proposed and evaluated three alternative system configurations, and wrote an excellent [proposal](http://members.fpoa.net/CIPA_Grant_07.pdf) (link: http://members.fpoa.net/CIPA_Grant_07.pdf) in a very short time to meet the funding deadline. The selected configuration includes the following:

- SBIG ST10XME Class 2 Camera
- SBIG AO-8 Adaptive optics
- SBIG CFW9 filter wheel
- Astrodon 1.25" E series LRGB TRU-Balance filter set
- Astrodon 1.25" H Alpha 6nm filter
- Astrodon 1.25" E series EBVRI TRU-Balance filter set
- RoboFocus focuser

The board will be establishing usage policies for FPOA members wishing to use the equipment. If you believe you have the skill set to help develop and mentor intern imaging projects, or would like to become qualified to use the equipment yourself, please contact me.

Chapter 4: Shooting the Moon!

A continuing series on a novice's experience with CCD imaging, by Frank Dibbell

After a couple of "false" starts (due to clouds coming in early in the evening), I had a clear, if not chilly night, and set up all my equipment for my very first astrophotographic attempt. Target – the Moon. It is a relatively easy target, as it is essentially sunlit rock against a black background. This means that I can capture an image of the moon with a really short exposure and a single exposed frame.

Centering the CCD camera on an object is a challenge. You see, you don't have a viewfinder to look through to see if the subject is centered. Yes, you do center the subject in the eyepiece prior to removing the eyepiece and inserting the camera, but here is an interesting fact I learned about "field of view": while looking at an object through the scope with a low power eyepiece, the subject, in this case the moon, fits nicely in the center with a lot of sky around it. In fact, my low power eyepiece can see an area of sky that is roughly 1 degree of arc (the moon's width in the sky is about ½ degree, or 30 minutes of arc).

Now the camera, in this case my Orion Star Shoot Color CCD Imaging camera, only has a field of view that is about 1/4th of a degree, or 15 minutes, across, which is not only less than what my eyepiece sees, it is less than the size of the Moon. What this means, simply, is that there is no guarantee that what was centered in the eyepiece is centered in the camera's field of view. Not only that, the camera has a different focal length than the eyepiece, so not only is the object not centered, it is out of focus!

Fortunately the camera software has a feature called "focus", wherein it takes single frame shots at a "shutter speed" you specify, continuously. (It's really nice that you can control the camera from the software installed on the computer!) To center the object, I wait to see where it appears on the computer after a snapshot is downloaded, then tweak the telescope control to move the scope ever so slightly. The next downloaded frame will reflect the results of that tweak. In about a minute or two I will have a centered object.

Once centered, I can use the same process to focus the image. I turn the focus knob on the scope slightly, and view the effect it has on the subsequent downloaded image. Within another minute or two I have a focused image.

I am ready finally to take my first shot! This involves changing the camera setting from "focus" to "single" on the control panel displayed on my computer, then clicking on "expose". The result is a raw image of the moon displayed in a window in my computer.

At this point I find out there is a whole new vocabulary, and skill set, that I need to learn: screen stretching, squaring pixels, color balancing, unsharp masking, etc. That shall be saved for a future installment of this continuing series.

One of my very first CCD images I ever took. I feel like a proud Dad showing off his first born! This is a 0.001 second exposure taken at prime focus on my Takahashi FC-100 refractor.



The September 1 Aurigids from Fremont Peak

By Dr. Peter Jenniskens, SETI Institute

On September 1, 2007, Fremont Peak Observatory was host to a research expedition hunting for an elusive meteor shower, the Aurigids, some bits and pieces of which might provide the first direct evidence for a comet's pristine crust. The shower was only seen three times before and each meteor was a memory of events that occurred long ago, in Roman times.

The return of the Aurigids was highly anticipated. In most other years, this shower is hard to pick out from the sporadic background, but in the 2007 Earth was about the cross the 1-revolution dust trail of its parent comet, comet C/1911 N1 Kiess. The dust was ejected at around 4 AD and had traveled only one orbit around the Sun. The comet had already returned in 1911, when it was discovered by then post doc Carl Kiess at Lick Observatory. The dust particles were delayed, because they were pushed by the light of the Sun in slightly wider orbits, and have been coming back ever since in a continuous stream of dust. Normally, that stream passes just inside or outside of Earth's orbit, but in 2007 we calculated that the planets would move the trail in the Earth's path right at the time when Earth was there. This had happened before in 1935, when the shower was discovered and in 1986 and 1994. Each time, very few people watched the event. In fact, there were only three people still alive that had ever seen this shower. So, if you or I caught one with a video or digital camera, it would be the very first time.

The shower was especially interesting, because these were bits and pieces from a comet that was still moving in a long orbit, returning only once very 2000 years or so. Such long-period comets may still have some of the crust that was formed by cosmic ray exposure when the comet was in the Oort cloud in the past 4.5 billion years. An observing campaign was mounted to study the unusual shower, including both ground-based and air-borne observations.

Meteor showers are particularly nice from the air, because the lack of dust and air offers an unimpeded view over a very large surface area near the horizon. The shower was truly spectacular. NASA Ames Research Center and the founders of Google made it possible for 24 researchers to watch the shower from two Gulfstream V business jets for stereoscopic viewing. Dave Holman of Oakland counted 174 Aurigids while watching the video of one of the intensified cameras mounted behind the windows, using a video headset display. The average counts by four observers, translated into Zenith Hourly Rates, were posted in near-real time on our mission website (<http://aurigid.seti.org>). One of our participants, Ron Dantowitz, has written an account in the December issue of *Sky & Telescope*. Ron was one of several researchers who, combined, captured several dozen Aurigid spectra for finding clues about the possible presence of a comet crust.

From the ground, not quite as many Aurigids were expected to be seen, but it would be easier to make accurate triangulation of the meteors if the weather cooperated. Fortunately, it did. The sky was clear and transparent during the night of the peak. Some people in the Bay Area reported seeing the shower from their bedroom window and even from a jacuzzi. The meteors were

impressively bright. The shower was seen in all western states of the USA and Canada, including Hawaii and Alaska. Many recollections of the shower are posted at our mission website.

A research team from Armagh Observatory found an ideal observing site at Fremont Peak Observatory, where Ph.D. student Prakash Atreya and systems support officer Martin Murphy settled to measure the meteor's trajectories. They were particularly interested in finding out how deep the meteoroids penetrated into the Earth's atmosphere. If these were once part of a comet's pristine crust, they could well penetrate a little deeper than other meteoroids of similar size and speed. The Fremont Peak observers were joined by a group of amateur meteor astronomers led by Daniel Fischer of the German Meteor Working Group (AKM). Also present was Juergen Wolf of SOFIA/DLR at NASA Ames, a regular at Fremont Peak.

Here is how Prakash described the shower: "The weather was fortunately clear at both sites despite an earlier concern about fog out of the SF bay area. We set up and waited. At around 03:30am local time the first Aurigids began to appear indicating that the prediction was to be borne out. The rate picked up over the next hour or so peaking at around 04:15am, interestingly a quarter of an hour earlier than the predicted maximum, and at a level of about 100/hr, similar to that of the Perseids albeit for only 10-15 min. Visually, the meteors were yellowish in color leaving short-lived trains with two or three occurring simultaneously. Despite the bright moon several tens of Aurigids were captured by the cameras, some of them significantly brighter than the brightest stars in the sky."

An animation of Aurigid detections at Fremont Peak Observatory is shown here: <http://star.arm.ac.uk/aurigid/>. Daniel Fischer describes his observations at: <http://www.astro.uni-bonn.de/~dfischer/skyreports/2007/>

70 km further north, at Lick Observatory, Prakash's thesis advisor Dr. Apostolos (Tolis) Christou deployed similar intensified and low-light level cameras. Tolis was supported by local amateur astronomer Bryan Murahashi. As it happened, the observations by Dr Christou were carried out at the same Observatory from which Carl Clarence Kiess discovered the parent comet of the Aurigids that now bears his name.

At least 24 meteors were captured from two sites simultaneously. These observations are joined by some twenty other observers in the area who captured some meteors on video or on digital still images. The list is posted here: <http://spreadsheets.google.com/ccc?key=pCRvZPYQQM3x4aHjuBuF2Ng&inv=aac@arm.ac.uk&t=7457276393894023100&guest>

It is still too early to tell what the data will reveal. The observations are now being analyzed. It is clear, however, that Fremont Peak was a great spot for this work and the combination with observations from Lick Observatory was very fruitful. Hence, we are very grateful to the Fremont Peak Observatory Association and to Fremont Peak State Park officials who made these observations possible.

(Photos appear on the next page...)

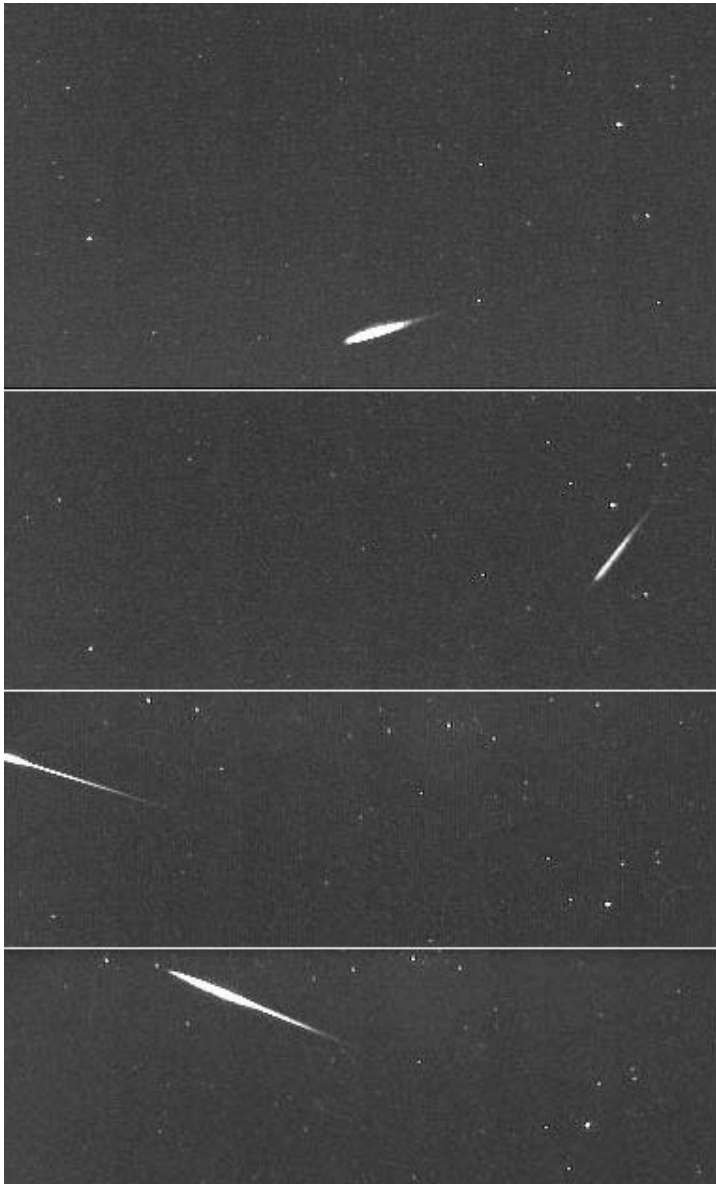


Figure 1: Aurigids captured by Daniel Fischer at Fremont Peak Observatory on September 1, 2007, at 11:16:32, 11:30:53, and 11:39:02, and 12:02:40 UT. Photo: Daniel Fischer.



Figure 2: Cameras set up at Fremont Peak Observatory. Photo: Prakash Atreya.

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The **Fremont Peak Observer** is published four times a year (Winter, Spring, Summer, and Fall). Articles from members are encouraged, and should be emailed to *fpoa@sbcglobal.net*. Articles should be either in plain text or MS Word format. Deadlines are Feb 1, May 1, Aug 1 and Nov 1 respectively. The Observatory's phone number is 831-623-2465.

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EMAIL DELIVERY OF THE OBSERVER

Dear FPOA Members,
 We have been delivering notification of the *Observer* via email for the past several issues. This obviously saves the Association postal expenses, and assures the quickest delivery to you. However, several of you no longer have valid email addresses, due to ISP changes, moves, etc. If you would like to continue to receive, or begin to receive, notification of the *Observer* via email, please send your current email address to fpoa@sbcglobal.net