



THE PINE MOUNTAIN OBSERVER

Volume 23, No. 2 Celebrating 39 Years of Observing Summer 2006

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MEETING NOTICE

Summer Meeting
 Saturday, August 12th
 2006
12:00 PM

Pine Mountain Observatory
MAP ON BACK

details on page 6

for more information:
 Mary Hill
 visions@pacifier.com

A Note From President Mary

AT THE SPRING MEETING I ANNOUNCED THAT I WOULD BE RETIRING FROM THE office of President of PMO as of the end of the Winter meeting. I have been president for so long that I've earned the nick name of "Queen Mary." My reign must come to an end. Anyone interested in becoming president, please let me know. We really do need someone. Here's hoping everyone comes to the Summer and Winter meetings so we can visit and say "good bye." The Winter meeting will be one big party. The Summer meeting will be at Pine Mountain at noon on Aug. 12th. Please come on up and enjoy both the meeting and the evening tours. It'll be great. This is your big chance to hear my lecture while the night is young. I like to be informative, entertaining, and enthusiastic. You know what a "shy" person I am. It is very hard for me not to get carried away when it comes to the cosmos. Love those Deep Sky Objects!!

Hope to see everyone at Pine Mountain on Saturday, August 12th. Have a great star gazing summer. We had four clear nights in a row here. Now we're back to fog and partly cloudy. Life at the beach. ❖

Mary Hill
 Prez. PMO

Proposed PMO Education Center Status

LAST ISSUE WE (THE ED CENTER PLANNING COMMITTEE) REPORTED THAT WE'D held a series of meetings to develop the allocation of specific spaces within the Ed Center to accomplish the functions called for by our "market/product" driven goals:

1. Sky tours for variety of groups of clients.
2. Workshops for teachers and students.

We are in the process of taking these specifications to a professional architect who we'll ask to develop a working construction plan including costs.

Meanwhile we are closely working with the U of O College of Arts and Sciences Development Officer, Ms. Jane Gary, and her staff, to spread word to communities around the Pacific Northwest of the merits and needs of our project in anticipation of actual fundraising in the very near future.

We want to link public awareness of the science/technology/math (STEM) literacy issue, echoing recent calls for major improvement made by leading business

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Major Electrical Storm Damages, Destroys Instrumentation at the Observatory

by Greg Bothun

IN LATE MAY A VERY VIOLENT AND ELECTRICALLY charged thunderstorm made a rapid descent onto the summit. Local witnesses (e.g. Alan and Mark) thought this was the most severe storm they had ever seen and visually saw 6-7 actual lightning strikes on the observatory grounds. The rapidity which the storm occurred precluded any effective means of disconnecting anything that was powered in a timely manner. As a result, there was significant damage to the following:

1. The research camera, nicknamed CowCam, was damaged initially and over the last month began to de-grade until the point where it no longer returned decipherable data. The camera will be shipped back to the vendor for repair. Most likely, its one of the internal PC boards in the camera itself (I suspect the signal chain board) that is corrupt and is no longer properly recording the readout of the actual CCD. It is possible that the CCD itself is damaged, which would be a major loss, but this seems unlikely. Until the camera is repaired, scientific operations at the observatory are suspended. This is unfortunate as one of the science missions of the observatory is to provide some ground

base support for various aspects of the Spitzer Space Telescope studies.

2. One of the weather stations had most of its sensors destroyed and correspondingly is no longer operational.

3. At least 2 or possibly 3 of the observatory's web cams were also destroyed, in case you're wondering about why you can't see them anymore.

4. One of the internet hubs was also partially damaged. There still is internet connectivity to the site, but the number of nodes on the PMO LAN is now restricted to the few good working ports on our main hub.

Recovering from this disaster will likely be frustratingly slow. PMO and its associated equipment is insured for acts of God, but that machinery will likely grind slowly. The most optimistic view is that CowCam merely requires a new interface board and that repair can be done quickly at low cost and we will be back to imaging the sky as soon as possible. ❖

Visitors' Season Ongoing at PMO We'd Like More Visitors & Need More Tour Guides

by Rick Kang

THE FIRST MONTH OF THE 2006 VISITORS' SEASON is history.

Mostly a history of lots of rain and clouds, but the weather does seem to be on the mend. You are encouraged to come up to PMO, particularly on non-Full Moon weekends; we have lots of interesting star clusters and nebulas to show you along the summertime Milky Way, and later on, by midnight, the Fall Galaxies adorn the dark sky. Jupiter with its ever changing Moons and new Red Spot Jr. is always intriguing to observe, and Uranus and Neptune rise earlier and earlier each night.

Nighttime temperatures have been fairly balmy. We haven't been below freezing for awhile, although you should come prepared for cold weather.

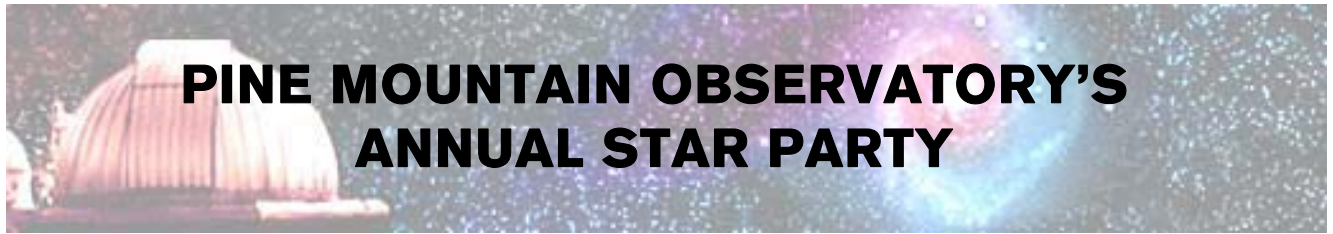
The program, every Friday and Saturday evening, starts at 9:00 PM and we often stay up observing until dawn.

Encourage your friends, associates, and colleagues to make the trip, a great opportunity for a family weekend outing that can also include camping (free primitive Forest Service Campground adjacent to PMO) and visits to other nearby points of interest such as High Desert

Museum, Lavalands, Newberry Crater, many other geological features to explore, plus the great restaurants in Bend. We do need more Tour Guides. Greg Hogue has been the Crew Chief almost every weekend, and sometimes has had no staffing assistance at all. Even with a relatively small crowd, we need at least three or preferably four Guides, to provide an adequate program. With Norma currently going to school and working in Portland, we also need someone to run the Gift Shop. This provides a major additional source of income for FOPMO as well as another point of interest to our visitors, and an important point of communication with them. The shop has been closed most of the weekends so far, due to lack of staff.

If you can help us out, please contact Greg, *hogue.greg@gmail.com*, 541-771-6987. Please point people to our website for information and directions for visiting PMO. The original webcam is still working for instant weather views, and we'll restore the other cameras and the weather station as soon as we can.

Hope to see you and your associates at PMO this summer! ❖



PINE MOUNTAIN OBSERVATORY'S ANNUAL STAR PARTY

Bringing the Stars to the Tower Theatre
THURSDAY AUGUST 10th – 6:30 P.M.

The Pine Mountain Observatory is one of only a handful of deep space research centers on the west coast open to the public. This summer, PMO and the University of Oregon are bringing the stars to downtown Bend. Join the Friends of Pine Mountain for this special event where Dr. Jim Brau, world leading physicist, will explore Einstein's Dream and mysteries of the universe. Along with this exploration and discussion, Dr. Brau and Friends of PMO will highlight the Observatory's role in the Bend community. Guests will also be treated to a display of images of the stars and galaxies the researchers have taken with CCD digital cameras.

For additional information about the observatory or Dr. Jim Brau visit <http://pmo-sun.uoregon.edu/~pmo/index.html> and <http://physics.uoregon.edu/~jimbrau/jimbrau.html>.

This event is free and open to the public; popcorn and soda will be served. Seating is on a first come, first served basis. Please call the Tower at 541-317-0700 to obtain your tickets.



COLLEGE OF ARTS AND SCIENCES

University of Oregon

Northwest Astronomy Conference Everett Community College

by Bob McGown & Dareth Murray

MAY 5, 2006 - STARTING AT 9 A.M., HELEN KIRK from University of Victoria, BC discussed star formation in the Perseus Molecular Cloud and measuring the structure of column density to determine where small scale structure forms. U.J. Sofia gave a brief presentation on "Insights into Dust Composition from Interstellar Gas Abundances." He assured the audience that the Interstellar dust "problem" is far from solved. This is a new astronomical problem for Sofia and the Spitzer space telescope. Next was Lucianne Walkowicz discussing habitable planets and the near UV environment around M dwarfs. M dwarfs have a very long main sequence lifetime and make up about 75% of all stars. Protoplanetary disks should form the same in M dwarfs as G dwarfs. The atmosphere of M dwarfs is more hospitable than previously thought. They will be looking at 107 nearby M dwarfs with the Hubble to try to find evidence of habitable planets.

Eric Hilton's presentation was on observations of the M dwarf flare star AD Leo. M dwarfs are smaller and cooler, fully convective and have much stronger magnetic fields. Flares are more common on M dwarf stars than the sun! Oliver Fraser talked about his investigation on the late stages of stellar evolution with long period variables from MACHO and 2MASS. A comparison of LMC and galactic LPVs (slowest variable stars) will lead to better understanding of the mechanisms involved.

Michael Schmieding discussed the extended calibration of photometric metallicities in SDSS (Sloan Digital Sky Survey.) The goal is to define a reliable method for estimating stellar metallicities. Tanya Harrison presented on recurrent novae: she suggested that RN are progenitors to Type Ia due to accretion of M giant stars. Melissa Graham shared some of the CFHT (Canada France Hawaii Telescope) supernova legacy. The environments of Type Ia Supernovae studied by the Canada France Hawaii telescope may better define dark energy. What is the link between radio galaxies and enhanced SNIa rate? She is working on this and wants to find 2000 or more events to provide even better constraints.

George Wallerstein gave a brief talk on the composition of red giants in the globular cluster NGC 6388. It has been determined that the metallicity is quite high; this is an unusual globular cluster. James Davenport, from Palen Radio Observatory talked about the University of Washington's undergraduate radio telescope project. In 2002, over \$200,000 was obtained from UW to encourage undergraduate research projects. His group also received \$8,000 in grant funding to build

a new radio telescope. They used a kit from MIT to build a 2.7 meter dish which can be used remotely. They are looking at the 21cm atomic hydrogen line in particular.

During the lunch break, we talked to attendees about our displays. They were disappointed that Rick Kang wasn't there but enjoyed looking at the poster session he sent, which we had put up on the wall in the morning. We had a display up for Pine Mountain Observatory as well.

The conference reconvened with Chris Laws talking about the research and educational opportunities at Manastash Ridge Observatory (MRO) near Ellensburg. He encouraged folks to visit as there are quarters with kitchens for visiting astronomers. It has a one-meter scope financed by UW and a 30" Boller & Chivens with a fast CCD camera.

<http://www.astro.washington.edu/morgan/MRO/home.page/mro.html>

Julie Lutz and Kristine Washburn discussed the SDSS website as being a great resource for college and high school astronomy courses. It is a good source for both educators and students.

<http://www.sdss.org/education/>

Andrew Vanture next spoke about lecture tutorials and lab exercises for astrobiology. There are barriers to how people learn. A student can learn to solve complex problems without any meaningful understanding of the underlying physical processes. Sometimes students enter courses with preconceived and inaccurate beliefs about how nature works. In order to promote active learning use these guidelines:

- Individual questioning
- Think-pair-share exercises
- Talk to neighbor
- In-class writing assignments

The main thrust was that educators should promote analytical thinking rather than critical thinking.

Erika Harnett from UW gave a brief talk on Access to Space, a class that gives an introduction to electronics and space physics for non-science majors. They have had some very successful balloon launches attaining an altitude of 100,000 feet.

<http://www.ess.washington.edu/Space/ESS205>

The invited speaker was Dr. Don Brownlee, from University of Washington, who gave a lively and educational presentation on the results of the Stardust Mission thus far. He called the mission "catching a comet

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Photo courtesy NASA.

Launch of Mission Stardust, February 7, 1999.

and bringing it home." We can't see the body of the comet from earth and even space based telescopes can only see the coma and tail.

The spacecraft was launched February 7, 1999. It took seven years and three loops around the sun to encounter Comet Wild 2. The collector was only 234 kilometers from the comet when it gathered samples. Some of the "mother ship" is still orbiting and will be back in about three years. The solar flare of November 8, 2000 affected the spacecraft and the cameras went into "zero mode" for awhile but it did recover. On January 4, 2006, it finally went by the comet. The particles it collected came from deep within comet; particles which have never changed since solar system began some 4.6 billion years ago.

The collector material was aero gel. This is the least

dense solid, in which tiny spheres of bonded silicon and oxygen atoms are joined into long strands separated by pockets of air.

The capsule came back in at world record entry speed and landed near Salt Lake. This is the longest trip any space craft has completed out in space AND come back!

One of the goals of the Stardust Mission was to find out what fraction of the comet came from the solar system and what was formed from other stars. It looks like both. The comet is a mixture of solar system materials. There are 200 people around the world organized into sub-teams working on the bulk composition, organics, mineralogy, isotopes, spectroscopy and craters in the

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Public Education, Outreach Report

July 2006

by Rick Kang

OUR CLASSROOM OUTREACH STATISTICS HAVE been compiled for the 2005-2006 school year. Although our Fall, 2005 stats were down from the prior year, our Spring 2006 stats were larger than the Fall by a factor of 2.5, (there are two more months of school in that half but we were indeed a lot busier) bringing our Spring efforts to similar levels of other years, and giving us a respectable total for the school year. Teachers seemed unusually busy last Fall and were often difficult to contact and to set dates with for outreach classes.

For the School Year, I participated in 114 events (mostly classes, but also star parties, lectures, and displays) at 75 schools (all around Oregon and also one school at McDermitt, Nevada). With my 736.5 primarily donated hours I provided 318 classes, visiting 239 classrooms (sometimes holding multiple sessions). I worked with 298 teachers, and with 5358 students. I earned \$1385 for Friends of PMO. To do this I drove 6037 miles, and had an additional \$3117.32 of travel expenses. Schools (mostly the teachers themselves, this year) wrote checks for \$3222.60 to offset my expenses (FOPMO and I are still owed several hundred dollars from a handful of schools). My time and my mileage have thus, not been compensated yet.

Some comparison figures from the 2004-2005 schoolyear: I taught 422 classes, 7765 students, 639 teachers and brought FOPMO \$1915. Mary Hill, Greg Hogue, and Kent Fairfield have also provided volunteer visits to several classrooms each and have performed a number of public lectures and starparties around Oregon this past school year. Greg, Kent, and I have also been involved with the North Coast Teachers Touching the Sky teacher development program (a collaboration of UO, George Fox University, and FOPMO, funded through Federal grant), where last school year a dozen teachers from Tillamook schools spent time at PMO and had us visit their classrooms. Professor Kevin Carr from George Fox, led a "capstone" event

in June where our group launched a weather balloon with instruments that the teachers built tethered to the balloon's tail. The balloon ascended to around 110,000 feet before the payload got parachuted back to Earth, yielding temperature data for classroom use. Our second NCTTS cohort begins next week at PMO.

This past year, several schools lost opportunities when they did not have funding to cover our travel costs and we had to decline providing a program. This is the first year where that situation has occurred. We also had to turn down several schools during the Spring when my schedule was totally booked.

With costs increasing and budgets decreasing, we critically need sound funding if our outreach program is to continue, to grow, and to become a permanent and ongoing part of the FOPMO educational efforts. This ties closely to the construction of the Education Center at PMO, the staff who provides educational programs there will be the same people who do the traveling outreach.

Our programs are well established, we are well known around Oregon and beyond as leaders in providing quality standards-based, inquiry-based science education programs, featuring digital technology and a lot of hands-on, data-based activities.

I encourage you to prompt your children's teachers to have us visit their classrooms the coming school year, to attend our sessions when we're there to get a flavor of our programs, and to browse our website to see some of the materials and resources that we provide, plus the details of our outreach programs.

We have a tested product that fits directly with the current hue and cry for better math, science, and technology education that we hear everyday from industry leaders, leading educators, and all sorts of bureaucrats. Please help us get out the word about our programs and help us locate a secure funding base so that our outreach efforts can become a permanent part of the FOPMO services to your community and State. ❖

Summer Meeting Notice

ANNUAL FRIENDS OF PMO MEMBERSHIP Meeting, Bi-Annual Election, and Summer Board of Directors' Meeting Saturday, August 12th, 2006, at Pine Mountain Observatory 12 noon, bring sack lunch as usual plus some snacks or beverages to share. We will have elections of Officers, we need a new President (Mary, who has guided us so well for so many years, is stepping down), so please step up! Stick around for sky viewing, Perseids Meteor shower is near its maximum (peak will have been prior morning, and Moon is pretty Full, but you never know what surprises there may be).

Agenda items: Mary Hill
visions@pacifier.com

NW Astrocon ————— continued from pg. 5



Image courtesy NASA.

Stardust collector returns to earth.

aluminum holding frame. They will be presenting their research papers later this summer.

Some interesting things about the mission:

Most of the mass ejected from comets are rocks! Not dust gas & dust. The impacts are visible with naked eye on the collector panel – some particles are almost like sand grain size. In every case the cometary debris were visible at the bottom of every track. Track profiles were called stylus, ginseng, turnip, carrot for the distinctive track they left. They found 10 micron-sized rocks made up of very exotic material. Found GEMS – glass with embedded metal and sulfides. Possibly interstellar amorphous silicates? Discovered olivine! This is considered a “spectacular” find by Dr. Brownlee and associates. Olivines have trace elements of magnesium, calcium and chromium. Found anorthite, diopside, vanadium titanium nitride – also found in meteorites, formed in very high temperatures. This shows they were close to the Sun at one time.

In a new project called stardust@home, University of California, Berkeley, researchers will invite Internet users to help them find the particles captured by the spacecraft within the aero gel plates. Dr. Brownlee said it could be online this summer. ❖

Perseids Meteor Shower

In Sync With
Summer Membership Meeting
But Also In Sync With Full Moon

by Rick Kang

THE ANNUAL PERSEIDS METEOR SHOWER, CAUSED by Earth passing through the debris of dust grains left by Comet Swift-Tuttle, peaks the evening of Saturday, August 12th, into the morning of the 13th.

Note that the Annual FOPMO Membership Meeting is that Saturday, at PMO! Come on up and stay for the meteors that evening. The only downside is that the Moon will have been Full on the 9th, so there will be a waning gibbous Moon rising around 10:30 PM the 12th, and lighting the sky through the predawn hours of the 13th. Many of the Perseids are bright, so even with moonlight you should be able to at least see a few every hour. ❖



Go Digital ❖ Observer PDF Available Online

<http://pmo-sun.uoregon.edu/~pmo>

contact V.P. Bob Ewing

bewing@pcc.edu or (503) 614-7324

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Spring 2006 Meeting Minutes

FRIENDS OF PINE MOUNTAIN OBSERVATORY

APRIL 22, 2006 AT PCC ROCK CREEK

Minutes taken by Dareth Murray

Meeting was called to order by President Mary Hill at 12:13 p.m.

Attending:

Executive Committee members: Mary Hill, Robert Ewing, Mark Dunaway, Bob McGown

Board Members

Richard Berry, Dr. Greg Bothun, Lauri Crandall, Frank Crandall, Dave Hill, Rick Kang, Sig Peterson III, Norma Leistiko, Dareth Murray, Kent Fairfield, John Bak-kensen, Karl Alan Oestreich.

Guest

Eric Carlson (membership to FOPMO pending)

Previous meeting minutes

- The Winter 2005 meeting minutes were approved as written in the newsletter.

Treasurers Report – Mark Dunaway

- Mark Dunaway handed out the treasurer's report.
- Mark discussed cost of gas might be reimbursed for people who volunteer to stay on the mountain – carpool to save gas – for volunteering for the 2006 season. Rick suggested allocate X amount of dollars for gas per weekend – 16 weekends per season. The apportionment for gas expenses will be done by the crew chief.

Motion – Mark moved to allocate \$50 per weekend to defray gas costs. Bob McGown seconded. Motion carried.

- Question regarding building account – \$3,500 still in there.
- Forest service has \$7,000 surplus funds from the Environmental Assessment project which they plan to allocate for tree harvesting.
- Greg Hogue has financial difficulties right now, still wants to be tour leader but \$\$ problems. Mark wants to pay him \$100 a night. It won't be coming out of FOPMO account but out of Ebbighausen account. Just for this season. Discussion: re being a member of board. Remove him from Executive Board (member at large.) He will be a regular member of the board, just can't vote on his stipend.

Motion: It was moved, seconded and carried that Frank Crandall becomes the new member at large.

- Mark has 20-year plan on his computer, available at the break.

Membership Report – Bob Ewing

- About 275 on membership list. That is how many "Observers" were sent out. Mary said that form for dues is in newsletter. It needs to go on paper.
- Discussion: re going to online only. Bob doesn't have very many email addresses.
- Dr. Greg reported that 25-30 paper copies come back every issue.

Tour Guide – Rick Kang (for Greg Hogue)

- Rick Kang says training starting in May. Short on volunteers. The Crew Manual was circulated to make corrections.
- There will be groups coming up to the mountain on the three weekends of training.
- Dareth will put call for volunteers on email RCA list.

Gift Shop – Norma Leistiko

- Norma - \$2,700 retail, \$1,700 wholesale in inventory.
- Budget is \$3,000.
- Will send merchandise (books, other) invoices to Mark, he approves, sends check directly to vendor and then the merchandise is delivered to Norma at her home in Portland.
- 55% profit to date - \$1,700
- Dareth mentioned that Sean League has a big box of t-shirts, etc. Norma will contact him.
- Discussion on using credit cards for purchase – can use manual credit card machine. Several suggestions made regarding getting a free one, or buy on e-Bay. Norma will find out what is available.

Education Report – Rick Kang

- Rick continuing with outreach, numbers are coming back up. Jan-April – 34 events as opposed to 29 the previous year. Revenue increasing slightly. Northwest Teacher's Group coming up to the mountain at least once.
- New - Summer camps for students – in mid-August
 - **West Salem HS** – 8 + students with parents
 - **OMSI group** – 10 or more in two groups + parents
- Promoting research in schools not as successful as hoped. Need to do some software adjustments. Need to restructure curriculum.
- Funding is somewhat in limbo. Rick doing a pay as you go with schools is break even. 50% of schools have the teachers writing personal checks. Lots of support for this program from schools, teachers and as well at national level.

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Spring Minutes ————— continued from pg. 8

- Dr. B says program is too small for government (federal level) but should be able to get corporate sponsorship. Jane at UO Department of Development may be able to help.
- Rick has an idea for a fundraiser, can have party on roof of Elliott Hotel in Astoria. Mary says there is a problem with weather. Get fog. Better pick a date in July or August!
- ASP conference in Baltimore perhaps in mid-Sept this year. Should send someone to that. Oregon Science Teacher's convention in Roseburg in October. Governor's conference on Tourism will be held in Sun River next year. Kent thinks it is a valuable resource. Maybe can tap into Oregon Tourism Commission as well.
- Website renovation continues.
- Bob & Dareth are going to the Northwest Astronomy meeting @ Everett, Washington in Rick Kang's place. Rick will get the supporting documentation to them to take for the poster session. Bob & Dareth will do a write up on the meeting for the newsletter as well as provide an invoice for travel and lodging expenses to Mark for reimbursement.

Publicity – Rick Kang

- Wet Spring & rising fuel costs will have impact on folks from PDX coming over. Concentrating on Central Oregon for flyers. Special programs should be put off until later in the summer when more people will come.
- Flyers – only have a few left.
- Has a sample of a flyer (one sided), cost of colored is quite high.
- Three Options:
 - **Option 1** is keep the current one.
 - **Option 2** is a draft colored one – Kent designed. A sample was circulated.
 - **Option 3** is to have a one sided b&w flyer (cheapest).
- Discussion – Option 2 was determined to be the most likely to get results.
- In the past it has been distributed to Central Oregon motels, etc. But that doesn't appear to be very effective. Rick will determine key target areas and distribute to those as well as the High Desert Museum, Eagle Crest and Chambers of Commerce at various cities in area.

Announcement by Mary

Fred Domineack had a severe stroke. Mary says if want to make a donation, send a check to OCCU, PO Box 77002, Eugene, OR 97401 – make checks payable to *Fred Domineack and Bonnie Murdock Benefit Fund* or go to any branch of Oregon Community Credit Union and ask to donate to the "Fred Domineack and Bonnie Murdock Benefit Fund."

Latest news: Fred has been moved from ICU, seems to be getting better. Can communicate somewhat and recognizes friends & family. A get well card was circulated.

Observatory Report – Mark Dunaway

- Kay Coats is coming up to PMO early May for an assessment.
- For safety purposes, need a fence around facility and a gate between the 24" & 32".
- Storage issues – get a half size cargo container – Greg can store his scope as well as the stuff in gift shop. This will look crummy but maybe will make people see how much we need storage. Undecided whether to rent one or buy. Mark will do some research into the matter.
- Porta-Potties will be there in May. Mountain still has too much snow to get them up any sooner.
- Transmitter failed on weather station again. Mark got another transmitter, still didn't work. He got another new one and will install soon.

New Business

- Mary announced that this is her last year as President. Need to find a replacement by Dec. 2006. Wants a BIG party too! No expense spared.
- Sean M. might not want to serve either so probably need a secretary too.

Star Party/Fundraiser

- UO Dean Joe Stone and Jane Gary met with Mark and selected the new Tower Theater in Bend as a venue for a fundraiser. Kent will put on a talk Thursday, August 10th, with Dean Stone as MC, featuring Professor Jim Brau with special lecture about physics. Very important to have lots of FOPMO volunteers to mingle with potential donors (see announcement elsewhere in OBSERVER).
- Bob Ewing suggested that donation of a vehicle would help Rick Kang continue his traveling outreach efforts.
- Dr. B suggested looking toward corporate sponsors to support our outreach efforts.

Other announcements

- July 10th is newsletter cutoff date.
- Next board meeting is August 12, at noon at PMO.

Meeting adjourned at 2 p.m. ❖

Secretary pro tem – Dareth Murray

Treasurer, education and publicity reports on file with secretary. Copies provided upon request.

Images Extracting the Data

by Rick Kang

WHY ARE IMAGES (PICTURES) ACTUALLY SOURCES of quantitative data?

Consider any image that is created authentically by incoming light (as opposed to an imagined or visualized image that might be painted): The picture might be of a scene in your local area, some foreign land, a person, or of the sky or something specific in deep space.

What features does the image actually show to you, specifically, in terms of the *differences* that you might note in different regions of the image? Think about this from an artist's viewpoint rather than a scientist's viewpoint.

Whether we use our eyes, or a CCD electronic digital detector, we can only *directly* deduce three different features:

Brightness, Color, and Location/Coordinates of each tiny section of the image. Imaging technologies, again whether our eyes, film, or silicon involves *pixelization*, the image is a grid or mosaic of individual tiny pieces.

The picture contains a lot of data, but essentially no direct information about physical characteristics of the items/phenomena imaged (we can't directly determine composition, temperature, size, distance, age, velocity, etc. of the object in the picture.)

OK, so how do we determine all this stuff, if we have these wonderful pixelized sensitive detectors of incoming photons?

Consider an image of a person: how do you know who they are? We have to do a *comparison* with known data. What do we actually compare? A pattern of

brightnesses, geometry and colors. (Fortunately the CCD by its nature gives direct readout of the first two features [by counting electric charge in each tiny photosite], and with a little more added technology, can be coaxed to read out the color or energy of the incoming light from each zone.)

So, a user of digital imaging technology observing an object in space (or anywhere) needs to similarly piece together some comparisons with prior data, and then can also use the features (and changes observed in earlier or subsequent images) to infer and calculate some of the physical characteristics of the target. For example, brightness can imply a distance, diameter, temperature, or presence of intervening material. Color can imply composition of cooler objects (like your shirt, or of a planet), temperature of hotter objects (like a stovetop or a star), and velocity for receding galaxies (red shift). Locations/coordinates can be used to figure out all kinds of interesting characteristics, including velocity, size, distance, volume, mass, and density. As you can imagine, there are crosschecks available from measurements of the three observable features.

So, astrophysics isn't that hard, after all, the science is based on just these three basic observations! (OK, we could throw in polarization of the light!) But, there are challenges: To gather sufficient photons, separate the desired data from the background "noise", and then devise the schemes to do the comparisons and calculations to extract the information that we're after. Next time you view a picture, your computer monitor, or just look out the window, consider the data that you're receiving and how you process it! ❖

PMO Ed Center

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people, scientists, and educators, to our programs. The FOPMO on and off-site outreach efforts are well established and successful approaches to improving STEM issues, but our ability to deliver programs is constrained by lack of staff, funds, and need a much more robust physical "home" at PMO to conduct business.

If you can help us bring word to communities, particularly to potential donors, please contact either Jane at jgary@cas.uoregon.edu, or Kent Fairfield, FOPMO Spokesperson, at tualatinkent@aol.com, these folks can supply you with media materials.

Note the upcoming major publicity event taking place in Bend, Thursday, August 10th (see article elsewhere). We'll followup with attendees who indicate interest, notifying them about specifics of the Ed Center as we request actual contributions of funds and materials.

Our timeline is to have construction underway within the next year or two, so the publicity and fundraising campaign is urgent. ❖

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COLLEGE OF
ARTS AND
SCIENCES

University of Oregon

Pine Mountain Observatory

Yes! I want to give to the Pine Mountain Observatory.

My check is enclosed, payable to the UO FOUNDATION.

Please charge a one-time gift to my Visa Mastercard
of _____.

exp. ____/____

Signature _____

My name is (please print):

My address is:

My e-mail is (optional):

Gifts are tax deductible to the fullest extent of the law.
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College of Arts and Sciences
<http://cas.uoregon.edu>

Giving Information
<http://giving.uoregon.edu>

Mail payment form and checks to:
College of Arts and Sciences
Development Office
1245 University of Oregon
Eugene, OR 97403
(541) 346-3950

AS04



New Procedure, Address For Contributions Updated Membership Information

TO JOIN OR RENEW YOUR MEMBERSHIP IN FRIENDS AND TO DONATE TO OUR programs, please fill out and mail the form above and send along with your check to the address as printed (College of Arts & Sciences Development Office, 1245 University of Oregon, Eugene, OR 97403); not either of the P.O. boxes used in prior requests.

Please make your check out to the UO Foundation and note on your check's memo area, "For Friends of Pine Mtn." We are unable to include a return envelope at this time.

You can specify by writing a note that your donation is applied to specific Friends' programs: We have a new **Jim Girard Memorial Education Fund** specifically for outreach efforts, our **Education Center Fund** to support construction of our new building at PMO where we'll conduct summer programs and classes year-round, and our regular **Friends of PMO Fund** that is used to support all facets of our operation (this is the default account if none is specified).

We suggest \$20 as an initial annual membership donation. We welcome major amounts towards our Education Center project.

Thanks for your contribution! ❖



Oregon's Highway 20 leads to PMO. Photo courtesy Richard Berry 2002.

The Pine Mountain Observer is the newsletter of the Friends of Pine Mountain Observatory (FOPMO). The *Observer* is published three times per year and is made available at no cost to Friends, the members of FOPMO. Your participation is welcome.

If you have relevant material to contribute to this newsletter, **e-mail** your articles and images to the editor. **Please note**, when sending your images, use the best possible resolution with the least compression. Image files saved as TIF or JPG format along with some descriptive text is helpful.

*Deadline for the Winter 2006 issue is
Sunday, November 12th!*

Amy McGrew, Editor
a.mcgreg@comcast.net



The Pine Mountain Observer

University of Oregon
University of Oregon Foundation
1207 University of Oregon
Eugene, OR 97403-1207

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About the Friends of Pine Mountain Observatory

Friends are citizens across the globe who help PMO by contributing voluntary labor, materials, and/or funds. You are welcome to join the more than 200 current Friends by sending the attached form, with your check, to the address below.

Benefits of Membership and Activities of Friends

Friends may visit PMO free of charge. Members receive several copies of the newsletter each year. The newsletter describes current **Friends** projects, the status of the Observatory's operations, occasional technical articles about ongoing research, and informs

members about upcoming activities. Various **Friends** are directly involved with upgrading telescopes, improving educational programs, organizing publicity, and producing fact sheets, brochures and documents.

The **Friends Board of Directors** meets three times per year, usually in Portland, Eugene, and Bend. All members are welcome. There is also the tradition of a **Special Star Party for Friends**, at Pine Mountain, each summer. Check your newsletter. Contact any Friends officer about meetings. Get involved!

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Find the *Observer* online & other links at:

<http://pmo-sun.uoregon.edu/~pmo>

Contact V.P. Bob Ewing to cancel hardcopy.

