



DOCENT NEWS

DOCENT CLASS GRADUATED IN DECEMBER

Eight new and enthusiastic people joined the ranks of the Kitt Peak docents on December 2. It did not take long for some of them to jump right in by volunteering to assist with the latest special program—Midnight Meteor Madness, which ran from midnight to five in the morning on December 13 and 14.

As usual the group comprises individuals from varied backgrounds, some of them scientific. George Aguirre worked in applied optics for Hughes Aircraft; Fred Larson spent sixteen years in credit and finance; Barbara Ann Glaser taught music in school for eight years; Karen Oscar was a technical writer; Marlene Hilligoss practiced nursing for fifteen years and spend many more in public health; Debra Gunter has been a medical unit clerk; Kevin Bond knows hotel management and software support; and Ken Haber is an attorney practicing tax law and

estate planning.

Most of the new docents have made their way to the mountain and shadowed a few of the experienced docents. By late January they should be ready to lead their own tours. Please welcome and assist them.



From back to front and left to right: Barbara Ann Glaser, Kevin Bond, Karen Oscar, Marlene Hilligoss, Fred C. Larson, Debra Gunter, and George Aguirre. Not pictured is Ken Haber.

SOLAR ARRAY COMING TO VISITOR CENTER

Public Outreach contacted Coronado Instruments to inquire about the donation of a solar telescope for use in the Razdow dome. It was to complement the McMath-Pierce tour with a bit of solar observing for the guests.

The response to that inquiry came Friday in the form of a visit from representatives of Coronado and Meade, who now owns Coronado. The purpose of the visit was to discuss the installation of an array of Coronado telescopes in the Razdow dome.

Far from just a telescope for guests to look through, Bill Dean of Coronado and Scott Roberts of Meade proposed installing three refractors mounted on a modified 14-inch fork arm. One telescope would offer guests direct H-alpha views of the Sun. A second telescope would image the Sun in H-alpha while a third would image in calcium K.

The images would be available for download from an internet site and would be displayed in the visitor center as part of the solar exhibit. The web site would also contain a link to the public outreach web page.

One obstacle presented by the Razdow dome is the lack of automation. While the telescopes would track, the dome would not. So Coronado/Meade offered to automate the dome.

The only downside to this incredible proposal is that the department would not accept the 14-inch telescope previously offered by Starizona for installation in the same dome. There simply would not be enough room for both setups.

Watch for developments in the solar exhibit beginning in January. In the meantime, enjoy the coelostat, which is working again.

Points of Interest:

- The docent meeting will be held January 24, featuring dinner and a presentation on Radio Astronomy by Dr. Chris Walker of Steward Observatory.
- January 1: Asteroid 2004 XM29 near-Earth flyby at 0.024 AU.
- January 2: Earth at perihelion at 0.983 AU.
- January 3: Quadrantids Meteor Shower peak.
- January 4: Moon occults Jupiter.
- January 4: 1st anniversary of Spirit Rover landing.
- January 9-13: 205 meeting of the American Astronomical Society, San Diego.
- January 14: Huygens Probe lands on Titan.
- January 25: 1st anniversary of Opportunity Rover landing.

For additional information about these points of interest, visit <http://www2.jpl.nasa.gov/calendar/>.

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Next Docent Meeting January 24

The next docent meeting will be held on Monday, January 24. The meeting will convene at 6:00 in the main conference room and will feature dinner and a speaker. Docents should contact Nick Petrosino in the visitor center to schedule their hours for February prior to the December meeting.

Kitt Peak Docent Program

950 N Cherry Ave
Tucson, AZ 85719

Docent Forum: <http://groups.yahoo.com/group/docentforum/>

Volunteering at Kitt Peak: <http://www.noao.edu/outreach/kpoutreach.html>

Calcium Calendar: <http://www.noao.edu/perl/Calcium>

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NEW CLOUDS ADD TO TITAN'S MYSTERY

Using adaptive optics on the Gemini North and Keck II telescopes on Mauna Kea, Hawaii, a U.S. team has discovered a new phenomenon in the atmosphere of Saturn's largest moon Titan.

Unlike previous observations showing storms at the south pole, these new images reveal atmospheric disturbances at Titan's temperate mid latitudes-about halfway between the equator and the poles. Explaining the unexpected activity has proven difficult, and the team speculates that the storms could be driven by anything from short-term surface events to shifts in global wind patterns.

"We were fortunate to catch these new mid-latitude clouds when they first appeared in late 2004," said team leader Henry Roe (California Institute of Technology). "We are not yet certain how their formation is triggered. Continued observations over the next few years will show us whether these clouds are the result of a seasonal change in weather patterns or a surface-related phenomenon."

The causes of these storms might include activities that disturb the atmosphere from the surface. It's possible that geysers of methane "slush" are brewing from below, or a warm spot on Titan's surface is heating the atmosphere. Cryovolcanism-volcanic activity that spews an icy mix of chemicals-has also been suggested as one mechanism that would cause disturbances. It's also possible that the storms are driven by seasonal shifts in the global winds that circulate in the upper atmosphere. Hints about what is happening on this frigid world could be obtained as the Huygens probe from the Cassini mission drops through Titan's atmosphere in mid-January, 2005.

The Gemini-Keck II observations were the result of good timing and telescope availability. According to Gemini scientist Chad Trujillo, Titan's weather patterns can be stable for many months, with only occasional bursts of unusual activity like these recently discovered atmospheric features. The chances of catching such occurrences depend largely on the availability of flexible scheduling like that used at Gemini. "This flexible scheduling is absolutely critical to Titan meteorology studies," he said. "Imagine how hard it would be to understand the Earth's diverse meteorological phenomena if you only saw a weather report a few nights every year."

Like Earth, Titan is surrounded by a thick atmosphere of mostly nitrogen. Conditions on Earth allow water to exist in liquid, solid, or vapor states, depending on localized temperatures and pressures. The phase changes of water between these states are an important factor in the formation of weather in our atmosphere. Titan's atmosphere is so cold that any water is frozen solid, but conditions are such that methane can move between liquid, solid, and gaseous states. This leads to a methane meteorological cycle on Titan in analogy to the water-based weather cycle on Earth.

As it does on Earth, seasonal solar heating can drive atmospheric activity on Titan, and this could be the mechanism behind the previously observed south polar clouds. However, the

new temperate-latitude cloud formations cannot be explained by the same solar heating process. If a seasonal circulation shift is causing the newly discovered features, the team theorizes that they will drift northward over the next few years as Titan's year progresses through the southern summer and into autumn. If it is being caused by geological changes, such as methane geysers or a geologic "warm" spot on the surface, the feature should stay at the observed 40-degree latitude as the surface activity spurs changes in atmospheric convection and methane cloud formation. Continued storm formations will be easily distinguishable in future ground-based observations using Gemini, Keck and other adaptive-optics enabled telescopes.

"Using adaptive optics from the Earth allows us to see things that just a few years ago would have been invisible," said Keck Scientist Antonin Bouchez. "These observations show that ground-based telescopes are a perfect complement to space missions like Cassini."

This research is scheduled for publication in the January 1, 2005 issue of the Astrophysical Journal.

Gemini is an international partnership managed by the Association of Universities for Research in Astronomy under a cooperative agreement with the National Science Foundation.

The national research agencies that form the Gemini Observatory partnership include: the US National Science Foundation (NSF), the UK Particle Physics and Astronomy Research Council (PPARC), the Canadian National Research Council (NRC), the Chilean Comision Nacional de Investigacion Cientifica y Tecnolgica (CONICYT), the Australian Research Council (ARC), the Argentinean Consejo Nacional de Investigaciones Cientificas y Tcnicas (CONICET) and the Brazilian Conselho Nacional de Desenvolvimento Cientifico e Tecnolgico (CNPq). The Observatory is managed by AURA under a cooperative agreement with the NSF.

The W.M. Keck Observatory is operated by the California Association for Research in Astronomy (CARA), a scientific partnership of the California Institute of Technology, the University of California, and the National Aeronautics and Space Administration.

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January 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1 New Year's Day CLOSED
2 Jerry	3 Jim M.	4 Phyllis, Joyce	5 Punch, Sheila	6 Jerry, Gene	7 Jessica, Don	8 Eugene, Jerry
9 Anna	10 Bob, Jim M.	11 Larry, Joyce 130 students	12 Punch, Sheila	13 Jerry, Gene 45 stdnts. 10:00	14 Ed, Don	15 Jim O., Jerry
16 Eugene, Anna	17 Bob	18 Lee, Larry	19 Punch, Sheila	20 Jerry, Gene	21 Don, Joyce	22 Phyllis, Jim O.
23 Jerry	24 Jim M. Docent Meeting	25 Lee, Larry	26 Punch, Sheila	27 Jerry, Jim O.	28 Ed, Jessica 30 guests 10:00	29 Jerry, Don
30 Eugene	31 Phyllis, Jessica					

METEOR PROGRAM A SUCCESS

Typically having people drive up the mountain road after dark is to be avoided whenever possible. But because the Geminids meteor shower did not peak until midnight, public outreach took the chance of having guests arrive in the middle of the night for Midnight Meteor Madness.

This was the first time the department tried anything this unusual. Fortunately and thanks to the capable assistance of Chuck Dugan and John Zum Brunnen of the nighttime staff and docents Kevin Bond and Karen Oscar the event went off without a hitch.

The weather could not have been better. The clear skies, moderate temperatures, and absence of even a breeze gave the impression of a custom made evening, in contrast to the snowy and blustery nights of two week earlier.

By 11:00 people were parked in the picnic area. Kevin took shuttle duty and John watched the road for cars to make sure

that no one drove past the parking area and all the way to the visitor center with their lights on.

All thirty three guests were in the visitor center by midnight. After a brief introduction by Adam Block, people set up chairs on the patio and settled in for a night of meteor watching. Those who chose to received instruction on the use of planispheres. Later some of the guests elected to go to the 16-inch telescope for a look at more distant objects. The 8-inch Meade remained set up on the patio throughout the night.

Snack and hot drinks were available until 4:30 a.m. when the tables were set with a continental breakfast. The guests enjoyed a little nourishment before being shuttled back to their cars and making the long drive home.

Based on the evaluations, the guests found the program enjoyable. Look for more such programs in the future; although, they will not all be starting at midnight.