



# the Webfooted Astronomer

News from the Seattle Astronomical Society

December 2007

## A visit to Lowell Observatory

by Burley Packwood

I recently visited Lowell Observatory located on Mars Hill one mile west of Flagstaff, Arizona. It is one of the oldest observatories in the United States and in 1965 was designated a National Historic Landmark. The observatory was founded in 1894 by Percival Lowell, who in 1896 installed the \$20,000, 24-inch Alvan Clark Refracting Telescope. The telescope was assembled in Boston and shipped by train to the Mars Hill campus. Although it served as the observatory's primary research telescope for many years, today it is used only for public education.

Percival Lowell (March 13, 1855–November 12, 1916) was a businessman, author, mathematician, and astronomer who championed the beliefs that there were canals on Mars and that Mars had once sustained intelligent life. He authored three books on the subject (*Mars* in 1895, *Mars and Its Canals* in 1906, and *Mars As the Abode of Life* in 1908). Lowell devoted the last eight years of his life to the search for Planet X, a planet beyond Neptune. Planet X (Pluto) was eventually discovered by Clyde Tombaugh based on Lowell's calculations fourteen years after Lowell's death. Pluto was named in part because the first two letters are Lowell's initials.

While at the observatory I took one of the guided campus tours which are given hourly from 1 to 4 p.m. The tour was excellent and is the only way for the public to access the telescopes. Our first stop was the Lowell Observatory, which houses the 24-inch Clark telescope. Although a brass finderscope is still attached to the scope, the staff find objects by using a Telrad! The observatory dome rotates on 1952 Ford pickup tires and is constructed entirely of pine and fir.

*Continued on page 4*

### NEXT MEETING

**December 19 — 7:30 p.m.**  
University of Washington  
Physics/Astronomy Building,  
Room A-102

#### **Dr. Ron Hobbs** **"Our Local Moon** **and Mars"**

Dr. Ron Hobbs, Public Programs Assistant at the Museum of Flight and Solar System Ambassador for NASA's Jet Propulsion Laboratory, is "back by popular demand"! In September, Dr. Hobbs treated SAS to a marvelous overview of the Solar System via amazing photos and facts procured by various space probes. This evening Dr. Hobbs will focus on an in-depth exploration of the Moon and Mars – our next destinations for manned spaceflight. Join us for another magical journey with Dr. Ron Hobbs.

[http://www2.jpl.nasa.gov/ambassador/profiles/Ron\\_Hobbs.htm](http://www2.jpl.nasa.gov/ambassador/profiles/Ron_Hobbs.htm)

# SAS Calendar

**December 9 — New Moon**

**December 13-15**

Peak of Geminid meteor shower

**December 15 — 7 p.m.**

Seattle Astronomical Society Star Parties

- ◆ Green Lake, Seattle
- ◆ Paramount Park, Shoreline

**December 17 — First quarter Moon**

**December 18 — Mars closest to Earth until 2016**

**December 19 — 7:30 p.m.**

Seattle Astronomical Society Meeting  
Guest speaker: Dr. Ron Hobbs, Our Local Moon, and Mars. Details on page 1.

**December 22 — 6:30 p.m.**

Amateur telescope makers SIG meeting  
Contact: [atm@seattleastro.org](mailto:atm@seattleastro.org)

**December 23 — 5:44 p.m.**

Full Moon occults Mars!

**December 24 — Mars at opposition**

**January 3-4**

Peak of Quadrantid meteor shower

**January 8 — New Moon**

**January 12 — 7 p.m.**

Seattle Astronomical Society Star Parties

- ◆ Green Lake, Seattle
- ◆ Paramount Park, Shoreline

**January 15 — First quarter Moon**

**January 20 — 6:30 p.m.**

Seattle Astronomical Society Banquet  
Rock Salt Restaurant

## Gwilym visits SAS

Astrophotographer extraordinaire Tom Gwilym was the guest speaker at the November meeting of the Seattle Astronomical Society. Gwilym, president of the Eastside Astronomical Society, wowed the gathered SAS members with many of his incredible photographs.



Gwilym noted that there's a wide range of gear one could use to get started in astrophotography. You could rig up a Webcam for as little as \$30, or pop for the latest digital cameras for anywhere up to eight grand.

Gwilym's camera of choice these days is a Canon 350D. His newest favorite toy is a hydrogen alpha filter, handy for cutting through light pollution and delivering amazing photos.

See some of Gwilym's work and visit the EAS "Astro Shack" observatory at [www.eastsideastro.org/observatory/](http://www.eastsideastro.org/observatory/)

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# SAS mirrors Seattle's independent spirit



*From the president's desk*  
*By Jon Bearscove*

Time flies, so the saying goes, and 2007 is nearly over, with the new year rapidly approaching. At our annual meeting in November, a new slate of officers was elected by the general membership (see the story on page 4), and all's well on the Western Front.

Speaking of the Western Front, I've come to the conclusion that the nature of the Seattle Astronomical Society is rooted in the very nature of Seattle itself, going back to the 1850s when Seattle was founded by the Denny Party. Back then, Seattle had a somewhat wild and independent reputation. People out on the fringe, so-to-say. Some sources called it a "freebooting and relatively lawless" town.

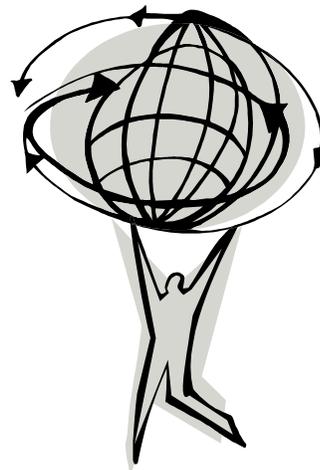
Simply put, folks were doing their own thing. I think this spirit of independence and carefree attitude has perhaps carried forward in time and has been passed down through generations, as we astronomers are also an unusual bunch of folks. We enjoy being alone at the eyepiece, and at the same time we like to socialize with our peers and engage in lively conversation and debate. We all have our own level of involvement, whether it's an active role or otherwise, and we're all still here, part of a unique group.

In 2008, I hope to continue promoting astronomy in this wild part of the country.

Consider this: We've got bad weather all the time, too much light pollution, we're scattered all over the Puget Sound, we mostly don't like star parties or volunteering, when the sky finally clears up we don't want to go outside, our favorite skies are on the other side of the mountains, we fear dew, we don't have a dark sky site, in most cases, we've never even met. But guess what? We are here to stay.

We're the SAS, and we ain't goin' nowhere. Just like those wild folks who settled before us, who thought a tide flat was a great place to settle, we will always consider Seattle a great place for astronomy, no matter what. Don't know why, or how, but it's a great place for stargazing.

Let's all have a great 2008, and commiserate a little more together this year over our plight. You never know, the sky just might clear up and we might actually see a few stars together.



## SAS elections add new board members

The Seattle Astronomical Society elected officers at its Nov. 21 meeting, and two new members were picked for the board of directors. Jingchun Chen was elected VP-programs, and Connie Griffith was chosen as secretary. Rod Ash, who had been serving as co-treasurer, was elected as VP-membership. The rest of the officers noted below return for another year. A big thank you to departing board members Anita Eclissi and Zach Drew for their work on the board.

In addition, president Jon Bearscope appointed Denis Janky and Kari Christensen as trustees to the board. David Dorais has offered to make his library of some 200 astronomy books available to SAS members. We're still seeking a librarian for the SAS collection of loaner scopes.

### SAS officers

**President**, Jon Bearscope  
[president@seattleastro.org](mailto:president@seattleastro.org)

**Board chair**, Thomas Vaughan  
[chair@seattleastro.org](mailto:chair@seattleastro.org); 206-772-1282

**VP Programs**, Jingchun Chen  
[programs@seattleastro.org](mailto:programs@seattleastro.org)

**VP Education**, Mike Langley  
[education@seattleastro.org](mailto:education@seattleastro.org)

**VP Membership**, Rod Ash  
[membership@seattleastro.org](mailto:membership@seattleastro.org)

**VP Publicity**, Greg Scheiderer  
[publicity@seattleastro.org](mailto:publicity@seattleastro.org)

**Secretary**, Connie Griffith  
[secretary@seattleastro.org](mailto:secretary@seattleastro.org)

**Treasurer**, Maxine Nagel  
[treasurer@seattleastro.org](mailto:treasurer@seattleastro.org)

## Lowell Observatory

*Continued from page 1*

Outside the Lowell Observatory is Lowell's mausoleum, which was built in 1923, seven years after he died. The tour then proceeded to a 350 foot long "Solar System Walk," which ends at the Pluto Discovery Telescope. This telescope is the 13-inch Astrograph used by Clyde Tombaugh in 1930 to discover the dwarf planet Pluto. The tour ends with a visit of the Slipher Building Rotunda which houses the library and astronomic memorabilia including copies of the original 14" x 17" photographic plates Tombaugh used to first photograph Pluto.

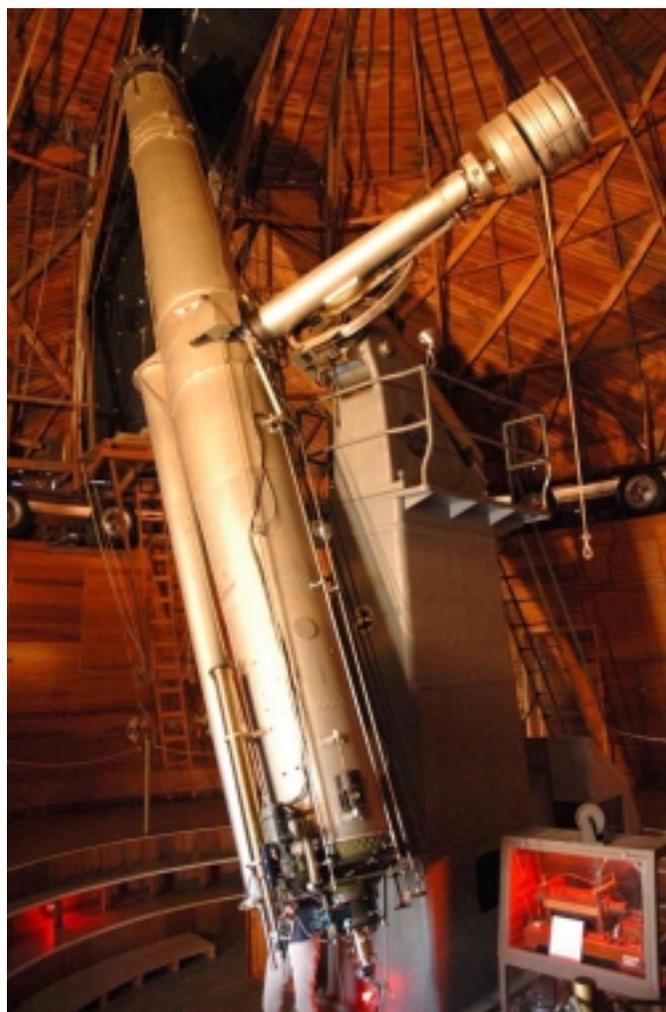


*This 13-inch Astrograph telescope was used by Clyde Tombaugh to discover Pluto. Photo by Burley Packwood.*

Although Lowell Observatory is best known for its founder, Percival Lowell, and Clyde Tombaugh, it is also noted for a number of other discoveries, including the study of large recessional velocities of galaxies by Vesto Melvin Slipher between 1912 and 1914, co-discovery of the rings of Uranus in 1977, periodic variation in the brightness of Halley's Comet, study of the three largest known stars, atmosphere of Pluto, accurate orbits of two of Pluto's moons, Nix and Hydra, detection of oxygen on Jupiter's moon Ganymede, discovery of carbon dioxide ice on three Uranian satellites, and evidence that the atmosphere of HD 209458 b (an extrasolar planet that orbits the Sun-like star HD 209458 in Pegasus) contains water vapor.

Lowell Observatory also operates four research telescopes at its Anderson Mesa dark sky site 12 miles southeast of Flagstaff. These include the 72-inch Perkins Telescope (in partnership with Boston University) and the 42-inch John S. Hall Telescope. Lowell is a partner with the United States Naval Observatory and NRL in the Navy Prototype Optical Interferometer (NPOI), also located at that site. The Observatory also operates smaller research telescopes on the Mars Hill Campus and in Australia and Chile. Lowell Observatory is currently building the 4.2-meter Discovery Channel Telescope in partnership with Discovery Communications, Inc. This telescope will be the fifth largest in the continental United States.

Some of Lowell Observatory's current research programs include a search for near-Earth asteroids, a survey of the Kuiper Belt beyond Neptune, a search for extrasolar planets, a decades-long study of the brightness stability of the sun, and a variety of investigations of star formation and other processes in distant galaxies. ★



*The 24-inch Alvan Clark Refracting Telescope, inside the dome of the Lowell Observatory. The dome, constructed of pine and fir, rotates on 1952 Ford pickup tires! Photo by Burley Packwood.*

**For further information about Lowell Observatory, see:**

<http://www.lowell.edu/index.php>

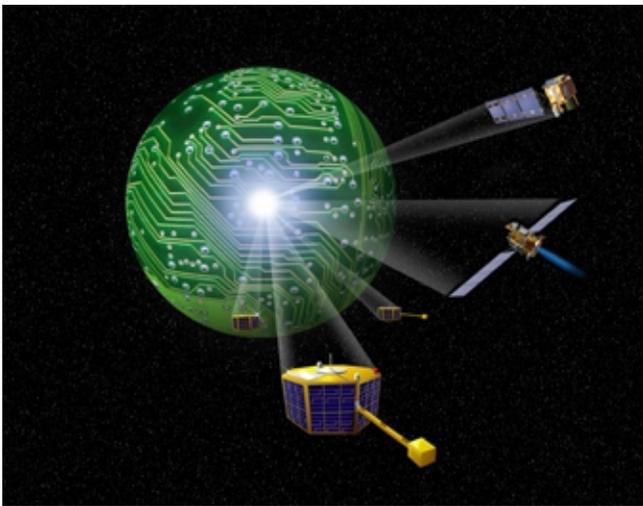
**Submit articles about YOUR astro-tourism adventures to [editor@seattleastro.org](mailto:editor@seattleastro.org)**

# Going My Way?

Not many endeavors require that you plan the mode of transportation before you even know what it is you are transporting. But weighing the physics and economics of getting any sort of cargo to space is a major part of designing a space mission.

It's one of the first issues that NASA's New Millennium Program (NMP) considers when planning a new mission. NMP has the forward-looking job to identify promising new technologies for space exploration. It then helps to mature the technology so it will be available to space missions of the future. If the technology cannot be tested adequately on Earth, the last part of this process is to actually send the technology into space. With carefully documented test results, future mission planners can confidently incorporate the new technology into their designs.

But where to begin? On call from the start, Linda Herrell is the New Millennium Program Architect. Given a list of proposed technologies, she has the job of figuring out the feasibility of wrapping a mission around them.



*NASA's New Millennium Program selects breakthrough technologies that will be of the greatest use to future space and Earth science missions and that are perceived to be risky to the first user.*

"We might be considering six or more technologies, anything from solar panels to imagers to masts for solar sails to more intelligent software. Of those, we may choose four. My job is to answer the question—can the selected technology be transported to and operated in space within the constraints of a low-cost technology validation project?"

Along with the list of possible mission payloads (the technologies), Linda also has a list of spacecraft to put them on, as well as a list of launch vehicle parameters. All she has to do is try them out in every possible combination (of which there are thousands) and see what might work.

"Fortunately, we have a software tool to help with this analysis," says Linda. When it comes down to it, her job is primarily to figure out how to get the technologies into space.

"Sometimes, it's like figuring out how to get across town when you don't have your own car. You have to get creative."

She keeps a database of all possible options, including riding piggyback on another spacecraft, hitching a ride on a launch vehicle as a secondary payload, or sharing a launch vehicle with other NASA, Department of Defense, or even commercial payloads.

Her assessment is but one of a gazillion factors to be considered in planning a mission, but it is indeed one of the very first "details" that forms the foundation for the rest of the mission.

Find out some of the technologies that NMP has already validated or is considering at [nmp.nasa.gov/TECHNOLOGY/innovative-tech.html](http://nmp.nasa.gov/TECHNOLOGY/innovative-tech.html). Kids will enjoy watching Linda's cartoon alter-ego talk about her job at [spaceplace.nasa.gov/en/kids/live](http://spaceplace.nasa.gov/en/kids/live)

*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.*

## Astronomy in paradise

The extremely dry, clear air above Hawai'i's Mauna Kea volcano is perfect for astronomy, and has attracted 13 telescopes operated by scientists from 11 countries. But now visitors to the "Big Island" don't have to pack a parka and schlep up to the 13,796-foot summit of the mountain, or to the Onizuka Center for International Astronomy at the 9,000-foot level of the peak, to enjoy some astro-tourism in paradise. The 'Imiloa Astronomy Center of Hawai'i is just minutes from downtown Hilo.

'Imiloa means "exploring new knowledge," and the center aims to tell the dual stories of Mauna Kea: Its renowned astronomy as well as its important place in Hawaiian culture. The volcano holds a revered and prominent spot in the native people's tales of creation, as explained in the outstanding planetarium show, "Maunakea: Between Earth and Sky." The original Hawaiians were fabulous astronomers in their own right. The ancient Polynesians used the stars brilliantly in their navigation of vast oceans as they rowed voyaging canoes from island to island. The show tells the story of Pele and Poliahu and the creation of the islands, and delves into the groundbreaking science happening daily on the Mauna Kea summit.

The planetarium also offers a "what's up tonight" feature. This was very helpful, especially for an observer from mid-northern latitudes who was still a little befuddled by the notion of Cassiopeia kissing the horizon and the Big Dipper actually setting.

'Imiloa offers what seems like acres of interactive bilingual exhibits, with texts and explanations in both English and Hawaiian. The Origins and Voyages exhibit explores the origins of the universe and the canoeing expeditions of the Polynesians. The Science on a Sphere exhibit uses spiffy high-tech gadgets to project planetary images on a six-foot sphere, creating an animated globe. The newest exhibit is one called Cosmic Questions, produced by the Harvard-Smithsonian Center for Astrophysics. The exhibit tackles such topics as Our Place in Space, Observing the Universe, Our Place in Time, and Great Mysteries.

The 'Imiloa Center is open Tuesday through Sunday from 7 a.m. until 4 p.m. Admission is \$14.50 for adults.

There's more information on the center's Web site: <http://www.imiloahawaii.org/>

*By Greg Scheiderer*



*The 'Imiloa Center's three cones represent the Big Island's three volcanoes: Mauna Kea, Mauna Loa, and Kilauea. Snow-capped Mauna Kea is in the background. Photo courtesy of the 'Imiloa Center, by Kirk Pu'uhou-Pummill, Gemini Observatory.*

**NEXT MEETING**  
**December 19**  
Dr. Ron Hobbs  
"Our Local Moon  
and Mars"  
Details, page 1

**The Webfooted Astronomer**  
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*Lowell Observatory in Flagstaff, Arizona houses the 24-inch Alvan Clark refracting telescope. The campus is also home to the scope used to discover Pluto. Visit Lowell on page one. Photo by Burley Packwood.*