the Webfooted Astronomer
News from the Seattle Astronomical Society
May 2008

Janky takes SAS on tour of spring galaxies

by Greg Scheiderer

"I consider April to be galaxy month," said Seattle Astronomical Society member Denis Janky at the start of his presentation at the club's April meeting. "I think it's the best time of the year for observing galaxies." Janky's talk, "An Amateur's View of Galaxies," included a historical synopsis of galaxies, reasons to observe, tools, techniques, and favorite targets.

Janky noted that our understanding of the true nature of certain nebulae, particularly "spiral nebulae," came about only recently, as a hundred years ago our universe was considered to be a much smaller place.

"As far as most astronomers were concerned, the Milky Way galaxy was the entire universe," Janky explained. "The size of the Milky Way was estimated to be 7,000 to 30,000 light years in diameter instead of the 100,000 light year diameter estimate that we think is correct today." In 1924 Edwin Hubble, making precise observations with better instruments, calculated that some "nebulae" were way distant, and that they were galaxies of their own right. There are billions of them.

Why look at them? Janky cites first and foremost the "Wow!" factor.

"Galaxies are extreme objects," he said. "They're unimaginably huge and unimaginably bright." He notes that galaxies can be millions or even billions of light years away. "They must be shining with enormous light output for us to be able to see them at all."

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NEXT MEETING

May 21, 2008 — 7:30 p.m.
University of Washington
Physics/Astronomy Building,
Room A-102

Searching for Life Beyond our Solar System

In the vast blackness of space, our home planet is a single sparkling oasis of life. Whether the universe harbors other worlds that can support even simple life is a question that has been pondered, yet remained unanswered, for over two thousand years.

Over the next two decades, NASA will launch a series of spaceborne telescopes that will search for Earth-sized planets around other stars, and examine those planets for signs of life. But which observations should we make? And what should we look for?

In this talk, Prof. Victoria Meadows of the UW will explain how we will search for and identify planets that might support life around other stars, and describe results from the new science of astrobiology that will help us recognize signs of life on these distant worlds.

SAS Calendar

May 10 — 7 p.m.
Seattle Astronomical Society Star Parties
- Green Lake, Seattle
- Paramount Park, Shoreline

May 10
Moon skirts Beehive Cluster

May 11 — First quarter Moon

May 17 — 6:30 p.m.
Amateur telescope makers SIG meeting
Contact: atm@seattleastro.org

May 18 — 2 p.m.
Astrophotography SIG meeting
Contact: astrophoto@seattleastro.org

May 19— Full Moon

May 21 — 7:30 p.m.
Seattle Astronomical Society Meeting
Guest speaker: Prof. Victoria Meadows.
Details on page 1.

May 21 — 9 p.m.
UW Observatory — Public viewing night

May 22-23
Mars visits the Beehive Cluster

May 31 — 8:30 p.m.
Tiger Mountain Star Party (members only)

June 3 — New Moon

June 7 — 1 p.m.
New member orientation meeting

June 7 — 7 p.m.
Seattle Astronomical Society Star Parties
- Green Lake, Seattle
- Paramount Park, Shoreline

June 10— First quarter Moon

The check's in the mail

Refund checks were mailed to SAS Dark Sky project members May 5. You should have yours by the time you see this newsletter.

Direct any questions to SAS Treasurer Maxine Nagel, treasurer@seattleastro.org.

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The Webfooted Astronomer is the monthly publication of the Seattle Astronomical Society (SAS). All opinions expressed herein are those of the contributors and not necessarily those of SAS. Advertising display rates: full page (7" x 9.5") $50; half page (7" x 4.75") $30; less than half page: $5 per page inch (1" x 5"). Personal ads are published free to current paid members of the SAS. For all others, 10 cents per word, 50 word minimum charge. Submit article ideas to Editor, The Webfooted Astronomer, PO Box 31746, Seattle, WA 98103, or e-mail to editor@seattleastro.org.

Editor: Greg Scheiderer

Lunar City

From the president's desk
By Jon Bearscove

As the astronomy season begins to approach us here in the Northwest, I would like to invite all of you to take time out of your upcoming observing schedule to consider the most inconsiderable object in our sky, the dreaded Moon.

Now I'll agree that the Moon is our sworn enemy under the night sky, but she should not be feared all the time. It's true that there is visually little left to discover on the Moon, but as amateur astronomers, there's a lot to personally discover through our telescopes if we take the time.

For example, have you heard of the Gruithuisen's City on the Moon? Most people haven't heard about this city, but at one time in history, this was a hot topic. In 1824, Baron Franz von Gruithuisen announced his "discovery of many distinct traces of lunar inhabitants, especially of one of their colossal buildings." He even describes a "lunar city" with "dark gigantic ramparts." [1]

On June 11, 1870, Michell Whitley described his observations of this lunar city. In a document I found online at Harvard, he describes this city in great detail using an achromatic eyepiece on a 6.5-inch reflector. He concludes by stating that "Those who have not seen this extraordinary formation will find it well worth the search, and it can be made out much further from the terminator than Gruithuisen states; indeed, I faintly traced it when the terminator had passed it nearly 30°; but with a small instrument, no doubt it should be looked for just after sunrise or before sunset." [2]

Moving forward in time to our generation, Gerald North, author of "Observing the Moon," shares observations from Andrew Johnson conducted in 1992 using a 210mm Newtonian. [3] While it's described as a mere "collection of hills," it no doubt is on my list of surface features I want to try to find on the Moon.

I hope you'll join me in the hunt for the lunar city. Of course we know it's not a real city on the Moon populated with Lunarians, but this is what astronomy is all about. If you're up for the challenge, the actual location of the city is [5° N, 353°E]. More details can be found on the Internet. You'll get different results if you search for Lunar City vs Gruithuisen's City. He called the city Wallwerk, so you might want to search under this name as well. Happy hunting!

Footnotes:

1 *Observing the Moon*, Gerald North, Page 219.

2 http://articles.adsabs.harvard.edu/full/1870AReg....8..179B

3 *Observing the Moon*, Gerald North, Page 220, Andrew Johnson's notes from 10th May 1992.

Denis Janky on galaxy observation

Continued from page 1

Janky finds a mind-boggling temporal effect gazing at something so distant.

"Looking at galaxies is a spiritual experience," he said. "You are directly participating in the vastness of creation itself, on a macro scale, when you're looking at galaxies." In addition, they have great aesthetic appeal with their spiral arms, dust lanes, and varied structures.

Bigger is better!

Janky says the first step in galaxy observation is to seek darkness. When it comes to choosing a telescope, he says bigger is better.

"The standard advice I would give is to get the largest aperture telescope that you can afford and are comfortable handling; that is, you can move it comfortably, you can set it up comfortably, and above all you can transport it to a good place comfortably." He takes issue with the notion that aperture is no help in light-polluted urban or suburban skies.

"This is wrong. Big telescope beats small telescope under any sky. Period." This is not to say that a smaller telescope is useless. "There are dozens of galaxies that can be viewed with a four, five, or six-inch telescope," Janky said. "You are not out of the game if you have a small telescope, but if you have a larger telescope you get to see more galaxies and you also can see more structure in galaxies."

Don't scrimp on the eyepieces. A quality one can reveal a galaxy where a cheapie did not. Filters sometimes help a little. Fancy stuff like image intensifiers and video cams can bring out the galaxies, at a price.

Some standard techniques apply. Avoid white light to preserve the dark adaptation of your eyes. Use direct vision for resolution and color, and averted vision for sensitivity and details. Janky noted that the eye's rods can accumulate information like a camera. "It's a very short-term thing – up to six seconds – so the idea is to hold your averted vision for a few seconds and see if it helps you see a little bit more," he said. "I think it's a good thing to try if for no other reason that it teaches you patience at the eyepiece. One of the best things you can do is take your time with an object and look very carefully because certain details just take time to come into view."

Try several eyepieces on each object to see which gives the best view. Try jiggling your telescope; the eye is good at picking up movement. Finally, record your observations. It helps you verify what you saw, and helps you remember what you've seen before. ★

Denis Janky's spring galaxy highlights

M51—The Whirlpool Galaxy. Look for companion NGC 5195 and see if you can spot the "bridge" between the two.

The M81 Group —Includes M81, M82, NGC 2976, and NGC 3077

"Leo Triplet" — M65, M66, NGC 3628

NGC 4565 — In Coma Berenices, this galaxy is "knock you off your ladder stuff." Can you spot the dust lane?

The Whale and the Hockey Stick — So named for their shapes, NGC 4631 and NGC 4656 are in Canes Venatici.

Markarian's Chain — This group of eight galaxies includes the matched pair NGC 4435 and NGC 4438, known as "The Eyes."

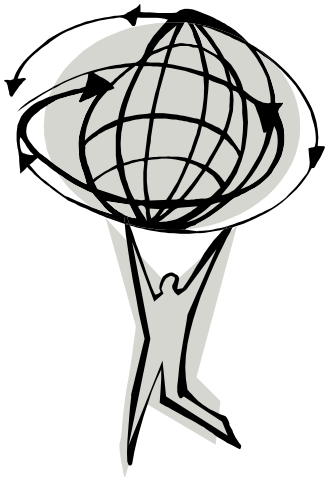
Article on light pollution planned for June issue of *Seattle Metropolitan*

Look for an in-depth article on the issue of light pollution in the city in the June issue of *Seattle Metropolitan* magazine.

News editor Eric Scigliano interviewed a number of amatuer astronomers from the greater Seattle area for the piece, and also attended the most recent meeting of the light pollution working group at the Lighting Design Lab on Capitol Hill back in late March (The *Webfooted Astronomer*, April 2008, page 2).

The June issue of *Seattle Metropolitan* should hit the newsstands right about Memorial Day weekend. Or, you can watch for it on the magazine's Web site:

http://www.seattlemet.com/



We promise you the Sun, the Moon, and the stars... and we deliver!

The Seattle Astronomical Society is an organization created and sustained by people who share a common interest in the observational, educational, and social aspects of amateur astronomy.

Established in 1948, the SAS is a diverse collection of over 200 individuals. A variety of programs and activities is presented by the SAS throughout the year. Monthly meetings feature speakers on a wide range of topics, from the Hubble Space Telescope to electronic imaging to personal observing experiences. The club holds public observing "star parties" at Green Lake and Paramount Park every month, dark sky observing parties outside Seattle, plus such activities as meteor watches, public telescope and astronomy displays, National Astronomy Day, and an annual Awards Banquet.

Get your gummy greenhouse gases

Making science edible—and sweet—is a reliable way to attracts kids' interest. The new "Gummy Greenhouse Gases" activity on The Space Place web site makes it fun and easy to learn a bit of chemistry and to find out why too many of these kinds of molecules in the air are likely to cause Earth to get warmer.

At http://spaceplace.nasa.gov/en/kids/tes/gumdrops, kids use gumdrops and toothpicks to make simple molecules of ozone, nitrous oxide, carbon dioxide, water vapor, and methane. The curious can go on to http://spaceplace.nasa.gov/en/kids/tes/gases to learn more about the greenhouse effect and about the "good and bad" roles of ozone. A short video shows how new space technology can literally paint a 3-D picture of these gases all around the globe. Afterwards, the ghastly gases can be consumed (mind the toothpicks!), thus helping the environment.

Stellar compass for space explorers

by Patrick L. Barry

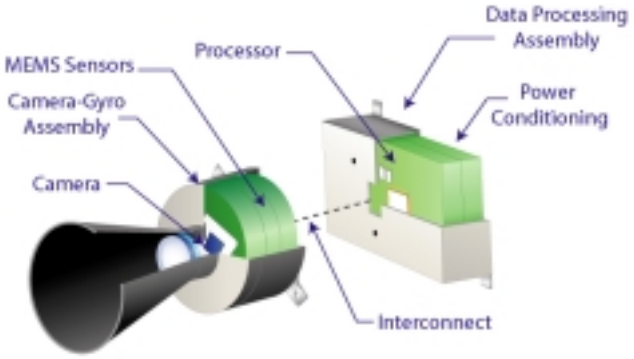
In space, there's no up or down, north or south, east or west. So how can robotic spacecraft know which way they're facing when they fire their thrusters, or when they try to beam scientific data back to Earth? Without the familiar compass points of Earth's magnetic poles, spacecraft use stars and gyros to know their orientation. Thanks to a recently completed test flight, future spacecraft will be able to do so using only an ultra-low-power camera and three silicon wafers as small as your pinky fingernail.

"The wafers are actually very tiny gyros," explains Artur Chmielewski, project manager at JPL for Space Technology 6 (ST6), a part of NASA's New Millennium Program. Traditional gyros use spinning wheels to detect changes in pitch, yaw, and roll—the three axes of rotation. For ST6's Inertial Stellar Compass, the three gyros instead consist of silicon wafers that resemble microchips. Rotating the wafers distorts microscopic structures on the surfaces of these wafers in a way that generates electric signals. The compass uses these signals—along with images of star positions taken by the camera—to measure rotation.

Because the Inertial Stellar Compass (ISC) is based on this new, radically different technology, NASA needed to flight-test it before using it in important missions. That test flight reached completion in December 2007 after about a year in orbit aboard the Air Force's TacSat-2 satellite.

"It performed beautifully," Chmielewski says. "The data checked out really well." The engineers had hoped that ISC would measure the spacecraft's rotation with an accuracy of 0.1 degrees. In the flight tests, ISC surpassed this goal, measuring rotation to within about 0.05 degrees. That success paves the way for using ISC to reduce the cost of future missions.

When launching probes into space, weight equals money. "If you're paying a million dollars per kilogram to send your spacecraft to Mars, you care a lot about weight," Chmielewski says. At less than 3 kilograms, ISC weighs about one-fifth as much as traditional stellar compasses. It also uses about one-tenth as much power, so a spacecraft would be able to use smaller, lighter solar panels.



Compass is built as two separate assemblies, the camera-gyro assembly and the data processor assembly, connected by a wiring harness. The technology uses an active pixel sensor in a wide-field-of-view miniature star camera and micro-electromechanical system (MEMS) gyros. Together, they provide extremely accurate information for navigation and control.

Engineers at Draper Laboratory, the Cambridge, Massachusetts, company that built the ISC, are already at work on a next-generation design that will improve the compass's accuracy ten-fold, Chmielewski says. So ISC and its successors could soon help costs—and spacecraft—stay on target.

Find out more about the ISC at nmp.nasa.gov/st6.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

SAS Gallery

SAS led an educational outreach event May 9 at Naval Station Everett. At left SAS volunteer Karl Schroeder helps the kids build their own planispheres. The skies cleared enough at around dusk to allow viewing of the Moon, below. The Navy invites groups to the base to lead classes for school-age children to help expose them to new hobbies and topics, with the hope that they can explore and discover new activities they will truly enjoy. Photos by Greg Scheiderer.

Sidewalk Astronomers SIG looking up again

Karl Schroeder has volunteered to take over leadership of the Sidewalk Astronomers special interest group, which has been dormant for some time. Sidwalk Astronomers is the main outreach group of the SAS. In addition to doing planned events such as the Naval station gathering, the informal group takes advantage of clear skies, sets up telescopes at public parks to encourage everyone to look at the stars, planets and moon.

To get involved, contact Karl at: KSchroe225@aol.com

NEXT MEETING
May 21

Prof. Victoria Meadows,
"Searching for life beyond
our solar system."

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The Webfooted Astronomer
Seattle Astronomical Society
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