the Webfooted Astronomer

The Seattle Astronomical Society

May 2005

Special points of interest:

- Extremely Large Telescopes
- Newsletter Editor Needed
- Mars Reconnaissance Orbiter

May Meeting:

"Future of the Hubble Space Telescope"

Bruce Balick,
Chair of the Astronomy Department,
University of Washington

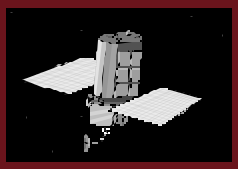
Bruce Balick joined the faculty in 1975 and became the Chair of the Department in 2001. His primary research interest areas are late phases of stellar evolution and the hydrodynamical evolution of the gas that is ejected in these phases. The study of such gas provides important historical insights into the manner in which an evolving star sheds its outer layers. In the past few years he has been analyzing some spectacular images of planetaries from the Hubble Space Telescope.

Meeting Information

Wednesday, May 18
7:30 p.m.

Physics-Astronomy Building
Room A102
University of Washington
Seattle

Come early at 7 p.m. for coffee and snacks and to visit with your fellow members!



In this issue:

Seattle Astronomical Society

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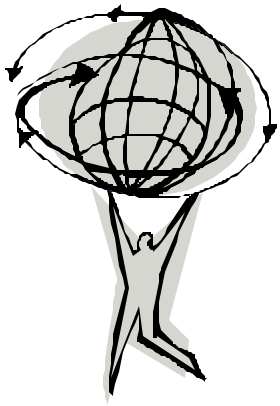
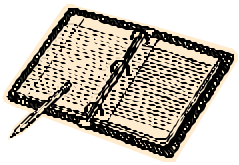




From the President's Desk…

Dark Sky Site

By Thomas Vaughan

Over the past month, I've received several questions about the Dark Sky site, and the mechanics of membership. A form has been posted on the SAS website, to make purchasing and/or donating easier, and hopefully more straightforward:

Link: http://www.seattleastro.org/dark-sky.html.

If you have questions, don't hesitate to ask! Email me directly at president@seattleastro.org. I'll answer quickly, and I'm collecting common questions and answers on the website. The dark sky committee and SAS Board have been working on the proposal for almost a year now, taking suggestions from SAS members and other clubs around the country that have dark sky sites.

The Seattle Astronomical Society is on the verge of acquiring a great dark sky site!

Some of the most common questions I've received:

- **Has a particular site been selected yet?** Not yet. The proposal (at the link above) lists our selection criteria. We're looking for around 20 acres of land in Eastern Washington, with dark skies, not too far off I-90 for quick access from Seattle. As in purchasing a home, we won't be able to get serious about properties until we have financing approved, which requires hitting our fundraising target.

- **What are the benefits of being a dark-sky member?** Only dark-sky members have unlimited access to the site. Only dark-sky members can be on the Dark Sky Governing board, and dark sky members get to vote on improvements to the site.

After almost 60 years, the Seattle Astronomical Society is on the verge of acquiring a great dark sky site. I myself am really looking forward to having a nearby site to set up

a telescope and camp overnight. But it will require the participation of many members. Please purchase a membership and/or make a donation now!

Astronomy Day

Thank you to all who helped out at this year's Astronomy Day! I think there were more people in attendance than the 2003 event, and the SAS had a strong showing. We had 3 different solar telescopes, and another telescope for lunar viewing. The day was surprisingly sunny, and the telescopes were a big draw outdoors.

Newsletter Editor Wanted

Rose and Saurabh, our excellent newsletter editors for the past year, are stepping down at the end of their term in June. Please help keep the newsletter going--volunteer to put the newsletter together! If you are interested, please contact me (president@seattleastro.org).

Seattle Public Library

Hopefully you had a chance to walk by the downtown library branch and see the SAS display that Janice Edwards put together. If you didn't, don't worry: we'll be installing this display at other libraries in Seattle and King County.

Happy Observing-

-Thomas ¤

SAS April 2005 Club Meeting Minutes

Announcements:

UW Astronomy day went very well. Thanks were relayed to members who showed up for the event.

Club quota of awards being met (thanks mostly to one member). Burley Packwood received the Dark Sky Binocular Award. Reminder that SAS volunteers at the UW Observatory. The SAS youth group will begin using the observatory as their home base. See Margaret Stoermer or Karl Schroeder for info on the youth group.

The SAS display at the main library is going well and will be there through mid-May. Thanks to Janice Edwards. At least one person present at this month's meeting was there as a result of what they saw at the display.

Details and membership form are being finalized for the SAS Dark Sky Site. Initial buy in will be $250.00 with a yearly maintenance fee of $60.00. Donations beyond the initial buy in are tax deductible.

A drawing was held for five passes to a pre-showing of the new movie, "Hitchhiker's Guide to the Galaxy". A poster and paperback copy of the novel were also given out.

Meeting Topic: Basic Astro-Photography / Astro-Imaging

C. Keith Alfred gave a presentation on his extensive experiences with recording objects on film and electronically. He started with the three necessities: An optical system, a recording device (film camera or CCD camera) and a mount capable of following the relative motion of the object being recorded. Keith provided much useful information on the different techniques available. He spoke of his challenges and successes in getting to the point he's at today, his successes demonstrated by some of the superb images he showed during the meeting.

Meeting was adjourned at around 8:45PM ¤

How an ELT Complements Current Developments in Space and Radio Astronomy

In 1990, George Bush Sr. was the U.S. president, the Nintendo video game system Game Boy was not on the U.S. market, the World Wide Web did not exist for people to "surf" for information, and NASA's Hubble Space Telescope was launched into Earth orbit. Astronomers had dreamed since the 1940s about launching a visible-light telescope into space. Ground-based telescopes are hampered by our Earth's atmosphere, which blurs the light from stars and makes them appear to twinkle.

Dream came true on April 24, 1990, when NASA launched Hubble aboard the space shuttle Discovery. The observatory is first space-based visible-light telescope, orbiting about 380 miles from Earth. Hubble also sees in ultraviolet and near-infrared light. The telescope is named after U.S. astronomer Edwin P. Hubble who, early last century, discovered galaxies beyond our Milky Way and determined that space is expanding.

For many observations a telescope's ability to detect faint sources scales as D2 and the time to carry out a given observation as D4, where D is the primary mirror diameter. The relatively large apertures which are affordable and technically feasible for ground-based telescopes means that these facilities are the natural means to provide maximal light-gathering power. This sensitivity is offset by the brightness of the background sky, and the attainable image quality. In general, both of these are easier to provide in orbit, away from the earth's atmosphere. The net effect is that it is natural to provide complementarities between very large, relatively low-cost ground-based facilities, and special-purpose orbiting observatories. For example, for high-resolution spectroscopic applications the new ground-based Extremely Large Telescopes (ELT) will have a natural balance in performance with the next generation James Webb Space Telescope, the successor to the Hubble Space Telescope.

The primary motivation for the considerable expense of space facilities is to allow observations at wavelengths which are made inaccessible from the ground because of absorption by the Earth's atmosphere, especially in the far-Infrared, ultraviolet, X-ray

A Subset of Future Space Missions and Their Ground-Based Needs			
Mission	**Wavelength range, type**	**Launch Date**	**ELT Follow-up and support**
Plank	CMP map, submm sky survey	2007	Optical/Near-IR imaging & spectra of clusters of galaxies revealed by Sunyaev-Zeldovich effect
GAIA	1.7m optical tel. for stellar kinematics	2011	ELT exploits catalog of solar-systems for exo-earth search
James Webb Space Telescope	6.5m NIR/MIR tel. imaging and multi-object spectra	2011	Spectroscopy and high-resolution imaging of extremely faint sources
TPF and DARWIN	Coronograph and 6(4)x1.5m mid-IR interferometer; exo-Earths imaging and spectra	2014-2020	Complementary approach to ter-restrial planet finding and spec-troscopy

and -ray regimes. The space observatories, such as the flagship X-ray facilities XMM-Newton and Chandra, regularly discover sources which are too faint in the wavelength range readily accessible to the ground, the optical and near infra-red, to be detected or investigated by existing telescopes. Routine images from the Hubble Space Telescope's Advanced Camera for Surveys reveal objects which are so faint the largest existing telescopes are unable to acquire their spectra. Without spectroscopic information we can learn only a limited amount about the basic nature and properties of an astrophysical object. The advent of the James Webb Space Telescope, currently scheduled for launch in 2011, will increase this imbalance. This space telescope will reveal objects an order of magnitude fainter than can be studied in detail with existing telescopes on the ground. Until the astronomical community acquires complementary ground-based facilities which are much larger than those available at present, the majority of future discoveries will be beyond our spectroscopic reach and detailed understanding. This is a major reason why astronomers are urgently seeking to begin construction of the first ground-based Extremely Large Telescopes. Planned next-generation X-ray missions, such as XEUS and Constellation-X, will further increase the need for a major enhancement in the performance of our large optical-near infrared telescopes if the new phenomena which they reveal are to be understood.

Credits: The Star Witness News and The Royal Astronomical Society, UK.
Link: http://www.universetoday.com/am/publish/big_observatories_coming.html?842005 ¤

May 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 Texas Star Party	2 Texas Star Party	3 Texas Star Party	4 Texas Star Party UW Campus Observatory public viewing night	5 Texas Star Party UW Astronomy Colloquium	6 Texas Star Party	7 Texas Star Party Tiger Mountain/Poo Poo Point Star Party (Members Only!)
8 Texas Star Party	9	10	11	12 UW Astronomy Colloquium	13	14 New Member Orientation Green Lake / Paramount Park Star Party
15 Astro-photography Imaging SIG Meeting	16	17	18 SAS Meeting UW Campus Observatory public viewing night	19 UW Astronomy Colloquium	20	21 Amateur Telescope Makers SIG Meeting
22	23 SAS Board Meeting	24	25	26 UW Astronomy Colloquium	27 Riverside Telescope Makers Conference	28 Riverside Telescope Makers Conference
29 Riverside Telescope Makers Conference	30	31	1 UW Campus Observatory public viewing night	2 UW Astronomy Colloquium	3	4 Tiger Mountain/Poo Poo Point Star Party (Members Only!)

June 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29 Riverside Telescope Makers Conference	30	31	**1** UW Campus Observatory public viewing night	**2** UW Astronomy Colloquium	**3**	**4** Tiger Mountain/Poo Poo Point Star Party (Members Only!)
5	**6**	**7**	**8**	**9** UW Astronomy Colloquium	**10**	**11** Green Lake / Paramount Park Star Party
12	**13**	**14**	**15** SAS Meeting UW Campus Observatory public viewing night	**16**	**17**	**18**
19	**20** SAS Board Meeting	**21**	**22**	**23**	**24**	**25** Amateur Telescope Makers SIG Meeting
26	**27**	**28**	**29**	**30**	1	2 Tiger Mountain/Poo Poo Point Star Party (Members Only!)

Asian Tsunami Seen from Space

[by Patrick L. Barry]

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

When JPL research scientist Michael Garay first heard the news that a tsunami had struck southern Asia, he felt the same shock and sadness over the tremendous loss of human life that most people certainly felt. Later, though, he began to wonder: were these waves big enough to see from space?

So he decided to check. At JPL, Garay analyzes data from MISR—the Multi-angle Imaging SpectroRadiometer instrument aboard NASA's Terra satellite. He scoured MISR images from the day of the tsunami, looking for signs of the waves near the coasts of India, Sri Lanka, Indonesia, and Thailand.

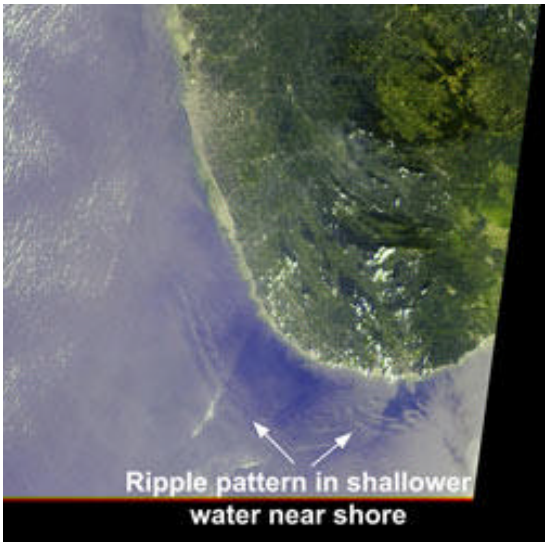
Looking at an image of the southern tip of Sri Lanka taken by one of MISR's angled cameras, he spotted the distinct shape of waves made visible by the glint of reflected sunlight. They look a bit like normal waves, except for their scale: These waves were more than a kilometer wide!

Most satellites have cameras that point straight down. From that angle, waves are hard to see. But MISR is unique in having nine cameras, each viewing Earth at a different angle. “We could see the waves because MISR's forward-looking camera caught the reflected sunlight just right,” Garay explains.

In another set of images, MISR’s cameras caught the white foam of tsunami waves breaking off the coast of India. By looking at various angles as the Terra satellite passed over the area, MISR’s cameras snapped seven shots of the breaking waves, each about a minute apart. This gave scientists a unique time-lapse view of the motion of the waves, providing valuable data such as the location, speed, and direction of the breaking waves.

Realizing the importance of the find, Garay contacted Vasily Titov at the National Oceanic and Atmospheric Administration's Pacific Marine Environmental Laboratory in Seattle, Washington. Titov is a tsunami expert who had made a computer simulation of the Asian tsunami.

"Because the Indian Ocean doesn't have a tsunami warning system, hardly any scientific measurements of the tsunami's propagation exist, making it hard for Dr. Titov to check his simulations against reality," Garay explains. "Our images provide some important data points to help make his simulations more accurate. By predicting where a tsunami will hit hardest, those simulations may someday help authorities issue more effective warnings next time a tsunami strikes."



This December 26, 2004, MISR image of the southern tip of Sri Lanka was taken several hours after the first tsunami wave hit the island. It was taken with MISR's 46° forward-looking camera.

Find out more about MISR and see the latest images at http://www-misr.jpl.nasa.gov/.
Kids can read their own version of the MISR tsunami story at http://spaceplace.nasa.gov/en/kids/misr_tsunami ¤

Space Bits

Asteroid Belt Discovered Around Our Sun's "Twin"

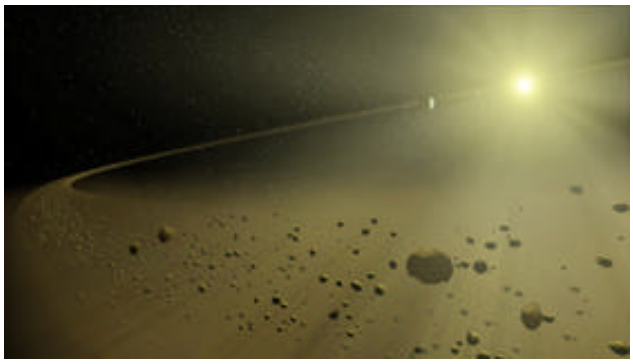


Illustration courtesy NASA

NASA's orbiting Spitzer Space Telescope has found evidence of a massive asteroid belt around a "twin" of our own sun.

Kim Weaver, a Spitzer Space Telescope scientist, said the finding marks "the first time that scientists have found evidence for a massive asteroid belt around a mature, sunlike star."

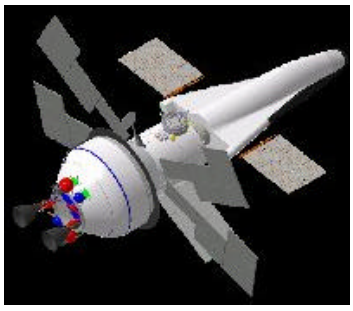
"This region around the star is the sort of place where rocky planets [like Earth] may form," Weaver said yesterday at a press conference from NASA headquarters in Washington, D.C.

The star, dubbed HD69830, is some 41 light-years away—which, in space terms, is practically our own backyard. Part of the constellation Puppis, the star is a tad too faint to see with the unaided eye.

The discovery may help reveal how other Earth-like planets could be formed and whether our own solar system is common or unique in space.

Link: http://news.nationalgeographic.com/news/2005/04/0421_050421_spitzer.html ¤

Teams bid to design new spaceship



The US space agency is reviewing at least two proposals for its next-generation human spacecraft, a vehicle NASA wants to use to fly to the space station after the shuttle's retirement, as well as jump-start a return to the Moon and other destinations.

One team, headed by Lockheed Martin, released artist drawings of its proposed Crew Exploration Vehicle (CEV), a winged craft capable of ferrying six people to and from orbit.

Link: http://www.abc.net.au/science/news/space/SpaceRepublish_1361228.htm ¤

Next Mars Mission Arrives at the Cape

The next mission to make the journey to the Red Planet, the Mars Reconnaissance Orbiter, has arrived at Kennedy Space Center in Florida. Engineers will assemble various components, and test everything to ensure it's ready for launch. If all goes well, the MRO will lift off in August atop a Lockheed Martin Atlas V rocket, and then make the journey to Mars. MRO will study both the surface and underground of Mars in tremendous detail, and survey potential future landing sites.

James Wadsley, McMaster Univ., Hamilton, Ontario. A supercomputer-produced cross-section of part of the universe shows galaxies as brighter dots along filaments of matter, with a sea of dark energy filling in between the galactic islands.

Link: http://www.jpl.nasa.gov/news/news.cfm?release=2005-069 ¤

Near Perfect "Einstein Ring" Discovered

Gravitational lensing happens when the gravity of a relatively close galaxy acts as a telescope lens to focus the light from a more distant galaxy. It allows astronomers to see distant objects they could never have a hope of observing with current instruments, essentially looking back to moments after the Big Bang (cosmically speaking). The galaxies are never perfectly lined up, though, and the "natural telescope" is a bit blurry. But now astronomer Remi Cabanac has found one of the most complete lenses ever discovered: a near perfect Einstein Ring, magnifying a distant galaxy with incredible clarity.

Link: http://www.universetoday.com/am/publish/perfect_einstein_ring.html ¤

Some Stellar Facts

Happy 15th Anniversary, HST: The Hubble Space Telescope let humanity escape the boundaries of space and time to gaze upon the glories of the universe. After 15 years and over 700,000 observations, Hubble continues to astound all who wonder at the cosmos.

The 200-inch mirror for the telescope on Palomar Mountain weights over 14 tons and is 27-inches thick. The telescope gathers 640,000 times as much light as the human eye.

We promise you the sun, moon and 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 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.

We're on the Web!
www.seattleastro.org

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☐	1 year of Astronomy Magazine (optional)	$30.00
☐	Donation (optional)	$_____
	Total amount enclosed:	$_____

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E-mail address (optional) _____

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