the Webfooted Astronomer

The Seattle Astronomical Society

February 2005

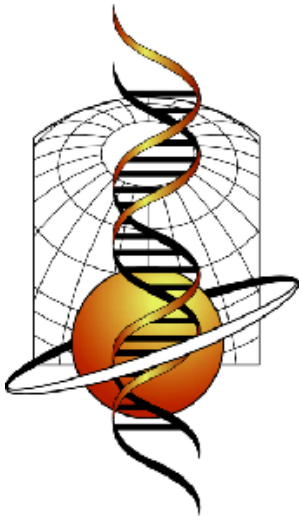
Special points of interest:

- Service Awards
- Moss Grows in a Spiral… in Space
- Weather in Space

February Meeting:

"Astrobiology, What's New in the Past 5 Years" with Dr. Woody Sullivan.

This new field of science, Astrobiology, combines the disciplines of astronomy, atmospheric sciences, biochemistry, earth sciences, microbiology, oceanography, among others to investigate the factors influencing the origin and evolution of life in the Universe. Woody will also devote a portion of the talk to Project AstroBio.



Meeting Information

Speaker: Dr. Woody Sullivan

Wednesday, February 16
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

Address
PO Box 31746
Seattle, WA 98103-1746
SAS Info Line: 206-523-ASTR

Web Page:
http://seattleastro.org
WebfootWeb: webftweb@scn.org
E-mail: information@seattleastro.org

Board & Committees

President: Thomas Vaughan,
206-772-1282,
president@seattleastro.org

Board Chairperson: Stephen Van Rompaey,
425-564-8619,
chair@seattleastro.org

First VP–Programs: Bruce Kelley,
425-869-8347,
programs@seattleastro.org

Second VP–Education: Burley Packwood,
education@seattleastro.org

Third VP–Membership: Janice Edwards,
membership@seattleastro.org

Fourth VP–Publicity: Rod Ash,
206-938-2069,
publicity@seattleastro.org

Treasurer: Scott Cameron,
425-745-5057,
treasurer@seattleastro.org

Secretary: Open,
secretary@seattleastro.org

Astronomical League: Bob Suryan,
206-789-0599,
alcor@seattleastro.org

Webmaster: Paul Rodman,
425-889-8273,
webmaster@seattleastro.org

Club Telescopes & Equipment: Thomas Vaughan,
206-772-1282,
equipment@seattleastro.org

Special Interest Groups

Dark Sky Northwest: Bruce Weertman,
bruce@weertman.com

Telescope Makers: Peter Hirtle,
206-363-0897,
atm@seattleastro.org

Astrophotography: Keith Allred,
425-821-5820,
astrophoto@seattleastro.org

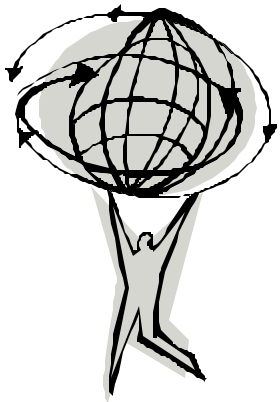
Vive La Lune (Moon): Pat Lewis,
206-524-2006,
lunar@seattleastro.org

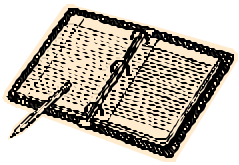
Sidewalk Astronomers: Paul Ham,
206-522-7410,
paulham@webtv.net

Webfooted Astronomer

Editor: Saurabh Saxena
Co-editor: Rose Millican
editor@seattleastro.org

Circulation Managers: Pat Lewis & Joanne Green,
206-524-2006,
circulation@seattleastro.org





From the President's Desk… Saturn Madness

By Thomas Vaughan

What a fun Banquet! Toby Smith's talk was timed perfectly. We were presented with some of the latest results of the Cassini/Huygens mission, with Toby's energetic and entertaining spin on the analysis. Although Toby warned us that much of what he was showing us could be proved wrong as more data came in, it looks like he was dead on the mark with talk of liquid methane carving out the surface of Titan.

Also, a big Thank You to Rick and Becky Eckel, two new members who took on the task of organizing the Banquet. The venue (Rock Salt) and food was excellent. My benchmark for judging banquets is the quality of the chocolate cake, and this one was excellent.

As usual, we had a good number of door prizes. Congratulations to the winners! Also, we'd like to recognize the companies and organizations that made donations for the event:

- Anacortes Telescope and Wild Bird
- Astronomical Society of the Pacific
- Lumicon International
- Orion Telescope
- Pacific Science Center
- Sky Publishing Corporation

If you missed the Banquet, you may be one of the members that joined us for Saturn Madness at the UW on the 26th. Professor Smith gave an expanded version of his talk at our Banquet, updated with more new data from the Cassini mission.

I appreciate the efforts of all the SAS members who showed up with telescopes! Sadly, the weather did not cooperate, and we were unable to show the public anything more exciting than the bright undersides of low-lying clouds. But we will try again.

It is January as I write this, so 2005 still feels like a new year. What were your New Year's Resolutions? Did they involve recommitting yourself to astronomy and public outreach? Of course they did!

Fortunately, the SAS is here to help you with your resolutions. For starters, why not volunteer at the UW Observatory? The SAS has been helping out at the UW's Theodor Jacobsen Observatory for over a year now, and our involvement keeps expanding. If you have a free Wednesday evening every once in a while, why not join the SAS volunteers? Contact Mike Langley (mlangley123@aol.com) for information.

Also, the Society is still looking for a Secretary. Recording the society's club and board meetings is a straightforward job, but it is a big part of our communications effort. If you are interested in helping out the Society, please let me know - (president@seattleastro.org).

SAS is looking for a Secretary

If you are interested, please contact president@seattleastro.org

Don't forget the New Member Orientation and public star parties on February 12th. Hopefully the skies will be as clear as they are tonight!

Happy Observing-
-Thomas ¤

Service Awards

Service Awards were given for service to the SAS during 2003 and 2004 to the following people:

- Mary Ingersoll for her service as Board Chairperson
- Mike Langley for VP-Education
- Mark de Regt for VP-Publicity
- Jim Peterson for Treasurer
- Thomas Vaughn for Secretary

What is Astrobiology?

Astrobiology seeks to understand the origin of the building blocks of life, how these biogenic compounds combine to create life, how life affects - and is affected by the environment from which it arose, and finally, whether and how life expands beyond its planet of origin. None of these questions is by any means new - but for the first time since they were posed, these questions may now be answerable. Astrobiology seeks to provide a philosophical and programmatic underpinning whereby life's place in the universe can be explored - at levels of inter-related complexity ranging from molecular to galactic.

At some point everyone has a stake in Astrobiology. The challenge which lies ahead is not so much the framing of questions as it is of how to channel all relevant expertise to the right task so as to answer these questions. It also requires the willingness of all participants to challenge old assumptions and conceive of novel ways to do things.

Extrasolar planets: finding them and evaluating their biological potential

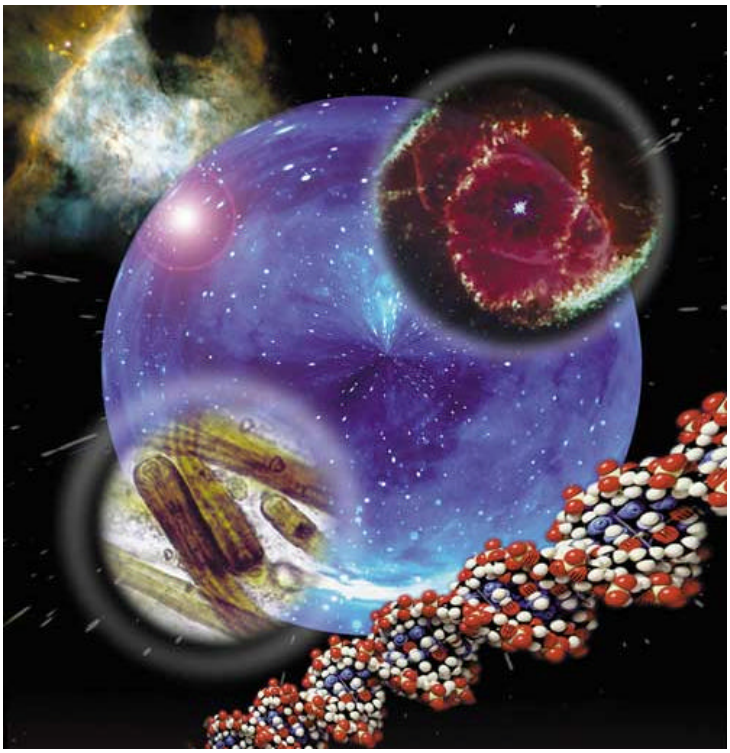
Astronomers, climatologists, and ecologists will be called upon to devise a strategy whereby extrasolar planets capable of fostering the development of life can be located. Recent discoveries seem to show that planet formation is a common phenomenon in the universe. While only large Jupiter-class planets have been detected thus far, it is only a matter of time before smaller, Earth-class planets are expected to be found.

Can these planets be directly imaged? What do we look for when we try to ascertain where a planet supports life? Can planetary phenomena indicative of life be detected across interstellar distances? Are there aspects of a planet's atmospheric composition that are indicative of the disequilibria we expect life to maintain? Are there aspects of ice-covered ocean world such as Europa which can be detected from a distance? Are we going to look for evidence chemistries that are different than those than Earth-based life uses? Can we determine what the habitable zone is for a star? Can planets - and the conditions for life arise in multiple star systems?

Are there features a technological race leaves that can be detected across interstellar

distances? Do these features outlive their creators? Are we going to be looking for Dyson spheres or other means whereby a star's output is harnessed or modified? Will we be looking for star systems with more than one habitable world, perhaps terra-formed planets? Does the act of traversing interstellar space leave detectable traces? (are some gamma ray bursts actually from starships?)

How are the raw ingredients of life formed, distributed, and recycled in the universe?



Astronomers and astrophysicists will be called upon to understand how stars produce the elements required for life, how these materials are organized into planetary systems, how these materials are processed during planetary system evolution, and how they are recycled when the host star goes supernova or lost when the host star fades and dies.

Is there a galactic ecology wherein biogenic materials are produced and recycled though stars? How prevalent are so called "organic compounds" across the universe? Are there other compounds that might be indicative of life? How are these materials organized and concentrated such that life can form? Are some regions of our galaxy that are more (or less) likely to contain biogenic precursors? Are planets and moons the only places wherein life or its immediate precursors can form?

Is life a natural consequence of planetary formation?

Geologists, astronomers, chemists, and climatologists will be called upon to under-

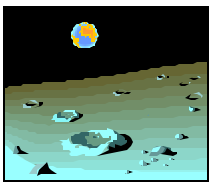
stand how planets accrete, how they differentiate, how they recycle materials, and how these factors combine to create and sustain an environment conducive to life's origin and perpetuation.

Are stellar birth processes and protoplanetary disk formation common (and inherently similar) phenomena? That is, do similar materials go into the formation of planets across the universe - and is our solar system similar to these other solar systems? If life is found on worlds other than Earth, how common is it throughout our solar system? Throughout the universe? If life is common in our solar system can this be extrapolated to other solar systems - indeed, the entire universe?

How will human culture adapt and evolve in extraterrestrial environments?
Everyone mentioned above, plus people with no particular expertise, will be called upon to understand what it will take for humans and other terrestrial life forms to survive, thrive, and evolve within new environments in space and upon other worlds.

Aside from the biomedical issues, will humans bring existing social and cultural values with them as they spread out across the universe? What sort of new cultural adaptations will be made? At what point will humans living off-Earth identify more with their current home and less with Earth? Should plans be made before settling other worlds as to how these worlds will be self-governing or should we just let human nature take its course? Will microgravity environments alter the way humans interact with one another? What might happen on a world with low gravity where humans could conceivably strap on wings and fly? How will humans adapt to long periods of space travel - possibly taking more than one human lifetime to complete? How might hibernation make long space flights more tolerable and what happens when people wake up in the future? If humans spread out across the stars will they stay in touch with other worlds or sever all ties?

What happens if we meet another sentient species?



February 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1	2	3 U.W. Astronomy Colloquium	4	5 Tiger Mountain/Poo Poo Point Star Party (members only!)
6	7	8	9	10 U.W. Astronomy Colloquium	11	12 New Member Orientation Meeting Greenlake Paramount Park Star Party
13	14	15	16 SAS Meeting	17 U.W. Astronomy Colloquium	18	19
20	21 SAS Board Meeting	22	23	24 U.W. Astronomy Colloquium	25	26 Amateur Telescope Makers SIG Meeting
27	28	1	2 UW Campus Observatory public viewing night	3 U.W. Astronomy Colloquium	4	5

March 2005

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

Stardust Up Close

[by Patrick L. Barry and Dr. Tony Phillips]

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

Like discarded lumber and broken bricks around a construction site, comets scattered at the edge of our solar system are left-over bits from the "construction" of our solar system.

Studying comets, then, can help scientists understand how our solar system formed, and how it gave rise to a life-bearing planet like Earth.

But comets have long been frustratingly out of reach -- until recently. In January 2004 NASA's Stardust probe made a fly-by of the comet Wild 2 (pronounced "Vilt"). This fly-by captured some of the best images and data on comets yet ... and the most surprising.

Scientists had thought that comets were basically "rubble piles" of ice and dust -- leftover "construction materials" held together by the comet's feeble gravity. But that's not what Stardust found. Photos of Wild 2 reveal a bizarre landscape of odd-shaped craters, tall cliffs, and overhangs. The comet looks like an alien world in miniature, not construction debris. To support these shapes against the pull of gravity, the comet must have a different consistency than scientists thought:

"Now we think the comet's surface might have a texture like freeze-dried ice cream, so-called 'astronaut ice cream': It's solid and can assume odd, gravity-defying shapes, but it's basically soft and crumbles easily," says Donald Brownlee of the University of Washington, principal investigator for Stardust.

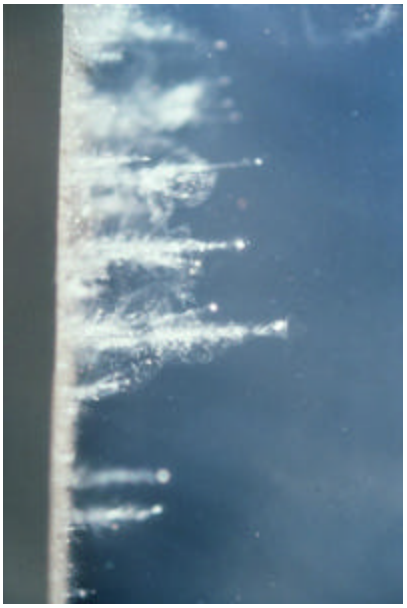
Scientists are currently assembling a 3-D computer model of this surface from the photos that Stardust took. Those photos show the sunlit side of the comet from many angles, so its 3-dimensional shape can be inferred by analyzing the images. The result will be a "virtual comet" that scientists can examine from any angle. They can even

perform a virtual fly-by. Using this 3-D model to study the comet's shape in detail, the scientists will learn a lot about the material from which the comet is made: how strong or dense or brittle it is, for example.

Soon, the Stardust team will get their hands on some of that material. In January 2006, a capsule from Stardust will parachute down to Earth carrying samples of comet dust captured during the flyby. Once scientists get these tiny grains under their microscopes, they'll get their first glimpse at the primordial makings of the solar system.

It's heading our way: ancient, hard-won, possibly surprising and definitely precious dust from the construction zone.

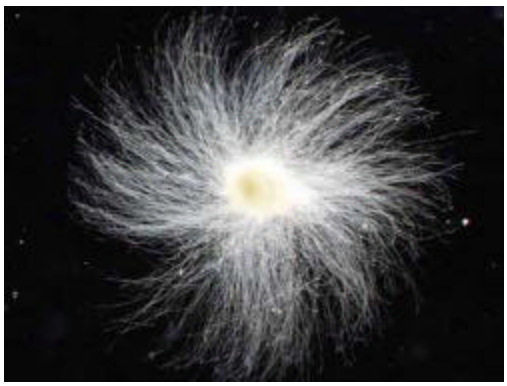
Find out more about the Stardust mission at http://stardust.jpl.nasa.gov. Kids can read about comets, play the “Tails of Wonder” game about comets, and hear a rhyming story about aerogel at http://spaceplace.nasa.gov/en/kids/stardust/. ¤



The Stardust spacecraft used a grid holding aerogel to capture dust particles from comet Wild 2. In this test, high velocity dust particles are stopped unharmed at the end of cone shaped tracks in a sample of aerogel

Space Bits

Moss Grows in a Spiral... in Space



The image above shows the the spiral formation of a moss culture gown during the 2003 Space Shuttle missions. Researchers suspect that those spirals resulted from a residual spacing mechanism intended to control colony growth and the distribution of branches, a mechanism that is normally suppressed by the stronger influence of gravity on earth. (Image courtesy of Volker Kern)

An experiment recovered from the wreckage of the space shuttle Columbia has given researchers valuable insights into how plants behave when they're growing in space. Experimenters were expecting common roof moss to grow in random, confused directions, but instead it grew in an ordered spiral pattern. On Earth, gravity controls the growth of moss so that it grows directly away from the centre of the planet. It's possible that this spiral direction is a backup growth response that existed before the moss evolved the ability to detect gravity. Unfortunately, only 11 out of 87 cultures were salvageable from the Columbia's wreckage.

Link: http://www.universetoday.com/am/publish/moss_grows_spiral.html?2712005 ¤

How Much Did the Earth Move?

Last month's catastrophic earthquake and tsunami were powerful enough that they actually changed the Earth's rotation, decreased the length of day, and moved the North Pole. Not much, of course, but enough that scientists can actually measure the effect. Scientists from NASA found that the length of the day shortened by 2.68 microseconds, and the North Pole shifted by 2.5 centimeters (1 inch). The Sumatran earthquake registered as a 9 on the Richter scale, making it the 4th largest earthquake measured in 100 years.

Link: http://www.universetoday.com/am/publish/earth_shift_earthquake.html?1112005 ¤

Keep an Eye on the Weather in Space

NASA is returning to the Moon--not just robots, but people. In the decades ahead we can expect to see habitats, greenhouses and power stations up there. Astronauts will be out among the moondust and craters, exploring, prospecting, building. Recently, there were no humans walking around on the Moon. Good thing. On January 20th, 2005, a giant sunspot named "NOAA 720" exploded. The blast sparked an X-class solar flare, the most powerful kind, and hurled a billion-ton cloud of electrified gas (a "coronal mass ejection") into space. Solar protons accelerated to nearly light speed by the explosion reached the Earth-Moon system minutes after the flare--the beginning of a days-long "proton storm."

Here on Earth, no one suffered. Our planet's thick atmosphere and magnetic field protects us from protons and other forms of solar radiation. In fact, the storm was good. When the plodding coronal mass ejection arrived 36 hours later and hit Earth's magnetic field, sky watchers in Europe saw the brightest and prettiest auroras in years.

The Moon is a different story. "The Moon is totally exposed to solar flares," explains solar physicist David Hathaway of the Marshall Space Flight Center. "It has no atmosphere or magnetic field to deflect radiation." Protons rushing at the Moon simply hit the ground--or whoever might be walking around outside.

Link: http://science.nasa.gov/headlines/y2005/27jan_solarflares.htm ¤

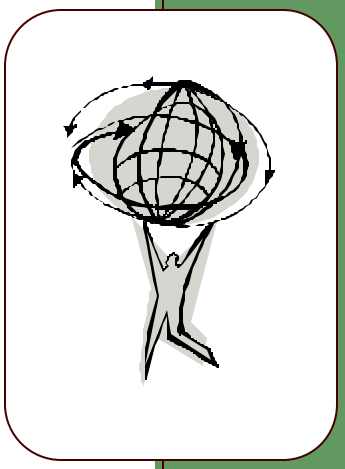
Some Stellar Facts

Earth moves along it's orbit at 30 km per second, covering it's own diameter in 7 minutes.

Io's volcanoes erupt sulfur and ice!

Mercury, being the closest planet to the sun, has the most extreme range of temperatures in the solar system, from 90 K to 700 K, but Venus, the second planet from the sun, is actually hotter! Venus' dense atmosphere produces a run-away greenhouse effect that raises temperatures to over 740 K (above the melting point of lead), even though Venus is almost twice as far away from the sun as Mercury!

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

The Seattle Astronomical Society

PO Box 31746
Seattle, WA 98103-1746

SAS hotline: (206)-523-ASTR
E-mail: information@seattleastro.org

Membership Information

Choose from the membership and subscription options listed and mail this form and your check to the address below. For family memberships, please include the names of persons you want to appear in the membership directory. For student memberships, please include verification of full-time student status (such as student ID card). For renewals, please attach magazine subscription renewal cards.

The Seattle Astronomical Society
PO Box 31746
Seattle, WA 98103

☐	Full-Time Student Membership (copy of student ID required)	$10.00
☐	Individual/Family Membership(s), no print newsletter via mail	$25.00
☐	Individual/Family Membership(s), print newsletter via mail	$30.00
☐	1 year of Sky and Telescope Magazine (optional)	$33.00
☐	1 year of Astronomy Magazine (optional)	$30.00
☐	Donation (optional)	$_____
	Total amount enclosed:	$_____

☐ New SAS Member ☐ SAS Member Renewal ☐ Gift Membership

Name _____

Address _____

_____

Phone _____

E-mail address (optional) _____

☐ Please do not include my information in the SAS membership directory.

Please print above information clearly.

Important: If you move, please send a change of address card to the above address.

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 (5" x 8") $30; less than full 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.

SEATTLE ASTRONOMICAL SOCIETY
PO BOX 31746
SEATTLE, WA 98103-1746

RETURN SERVICE REQUESTED