



# the Webfooted Astronomer

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Seattle Astronomical Society • October 2003

## October Meeting

*Speaker:* Tom Gwilym

Poor Man's CCD  
Astrophotography: New Ideas,  
Cameras and Images.

Wednesday, October 15  
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!

## October Meeting: Poor Man's CCD Astro- photography: New Ideas, Cameras and Images.

Tom Gwilym is an amateur astronomer living in Renton. Tom has been experimenting over the last two years using inexpensive webcams for astrophotography (see the January 2003 SAS newsletter article).

Webcam imaging has a large following of amateur astronomers around the world that are meeting in several Yahoo groups sharing images, ideas, and advice on the

hobby. With less than \$100, a simple webcam, a laptop computer, and some free software from the Internet, it's fairly easy to take amazing images of the moon, planets, deep sky objects, and even the ISS.

At the October meeting, Tom will share his latest adventures with webcam imaging. His fascinating PowerPoint presentation will feature results from his latest camera, an SAC8 color webcam. He'll also bring his hardware so that everyone can see how his system works. Software tools such as K3CCDTools, Registax, and Photoshop will be also be reviewed.

This is a "don't miss" opportunity to learn more about this fascinating extension of our hobby. It's a great topic for beginners and experienced members alike!

# Seattle Astronomical Society

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## From the President's Desk...

by Stephen Van Rompaey

As we move into October I have been amazed at the amount of great observing weather we've had. The last weekend in September provided excellent conditions for viewing at Table Mountain, at the Brooks Memorial State Park, and at the local Tiger Mountain star party. As the Tiger Mountain keymaster I have been involved in most of this summer's star parties and I have noticed that many new members have taken advantage of the opportunity to observe there. The goal of the Tiger Mountain star parties is to provide a safe and convenient location for observing for all club members, but I have been very happy that so many new members have been present. **The Tiger Mountain star party is an excellent location for getting started and is sufficiently dark to observe many objects found on both the Messier and Herschel 400 lists.**

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**All of the current board members, with the exception of Roger Steyaert (Third VP-Membership), will stand for re-election in November.**

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Now that the leaves are changing into their Autumn colors we are reminded that SAS elections are upon us once again. **All of the current board members, with the exception of Roger Steyaert (Third VP-Membership), will stand for re-election in November.** The VP-Membership responds to e-mails and telephone inquiries about SAS membership. This person is responsible for sending the new member packets that include a cover letter, SAS

brochure, schedule of SAS events for the current year, and other information that may assist a new member in getting started with the amateur astronomy. This requires purchasing address labels, envelopes, and stamps, and using a personal computer to generate letters and address labels from a list of new members provided each month by the SAS Treasurer.

Roger Steyaert has done a lot of work this year automating the process for generating letters and labels, and this should make the work very efficient for the new VP-Membership. **I have noted that we experienced a mild surge in new members this summer and I was hoping that one of our new members would be interested in taking on this position.** I believe that a new member would bring a greater sense of

*continued on page 4*



what new members need from the SAS. Perhaps there was additional information they wanted in the new member packet or some additional activity they feel would be particularly helpful. The VP-Membership is a voting member of the SAS board and is involving in the governance of the club. **If anyone would like more information about this position or would like to be nominated for VP-Membership, please contact me as soon as possible.**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

## How Low Can You Go?

**Black hole produces a tone that is 57 octaves below middle C**

*Compiled from AP sources*

Last month, the Chandra X-ray Observatory picked up sound waves for the first time from a cluster of galaxies 250 million light years away. Many of us likely read about the event, but just how low, exactly, is a B flat, 57 octaves below middle C?

The graphic at right will give you an idea. To play this note in your symphony, you'll need one immense grouping of galaxies held in formation by the powerful tug of a supermassive black hole.

This is a tone frequency more than a million, billion times deeper than the limits of the human ear, said Dr. Andrew Fabian, an X-ray astronomer at the Institute for Astronomy at Cambridge University in England.

Bruce Margon, of the Space Telescope Science Institute, said "We've known that a black hole can give off energy as light and heat and now we are seeing a third way -- sound." He said that the Perseus Black Hole may play only one note, but it has been playing for about three billion years. "Although this symphony does not have a lot of variety, it is surely the longest lasting symphony that we know," said Margon.

"We would expect that every cluster and group of galaxies has its own note," said Fabian. "So if you look at the whole universe, there are many tunes being played."

This is, said Fabian, "the lowest note known in the universe."

# 2004 Awards Banquet

**When:** January 24, 2004

**Time:** 6:00-6:30 p.m. — No host bar  
6:30 p.m — Dinner served promptly

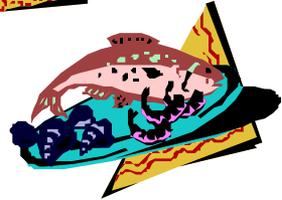
**Where:** Rock Salt on Latitude 47° Restaurant & Catering  
1232 Westlake Ave North  
Seattle, WA 98109

**Cost:** \$30.00 per person

**Entrees:** Roasted King Salmon  
Prime Rib  
Vegetarian Lasagna



**Your entree will come with:**  
Caesar Salad  
Baked Potato  
Bread & butter  
Coffee or Tea  
Dessert



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★★ AFTER JANUARY 7, 2004 ★★

★★ ANYONE WITHOUT A PRIOR RESERVATION ★★  
★★ WILL NOT BE ADMITTED ★★

**Send your entree choice and a check for  
\$30 per person (made out to Kathy Steyaert) to:**

Kathy Steyaert, Banquet Chairperson  
20609 SE 271st Street  
Covington WA 98042  
(425) 432-2714



## (un)Fasten your Seatbelts

by Patrick Barry and Tony Phillips

The “fasten seatbelts” light turns off, and you get up to ask the stewardess for a pillow; it’s going to be a long flight. Only a kilometer ahead in the cloudless sky, a downward draft of sheering winds looms. When the plane hits these winds, the “turbulence” will shake the cabin violently and you could be seriously hurt.

You don’t know about those winds, of course, and neither does the pilot. Today’s weather satellites can’t see winds in clear skies: they rely on the motion of clouds to infer which way the winds are blowing.

“Believe it or not, their best indication of wind sheer right now is warnings from aircraft that have gone through it ahead of them,” says Bill Smith of NASA’s Langley Research Center.

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**GIFTS is an infra-red sensor that can detect winds in cloudless skies by watching the motions of atmospheric water vapor.**

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But a new satellite technology being pioneered by NASA and NOAA could improve this shaky situation. It’s called GIFTS, short for Geosynchronous Imaging Fourier Transform Spectrometer.

GIFTS is an infra-red sensor that can detect winds in cloudless skies by watching the motions of atmospheric water vapor. Water vapor is mostly invisible to the human eye, but it reveals itself to GIFTS by the infra-red radiation it absorbs.

Smith is the lead scientist for EO-3, a satellite designed to test out this new technology. Slated for launch in 2005 or 2006, EO-3 will carry GIFTS to Earth orbit where it can produce 3-dimensional movies of winds in the atmosphere below.

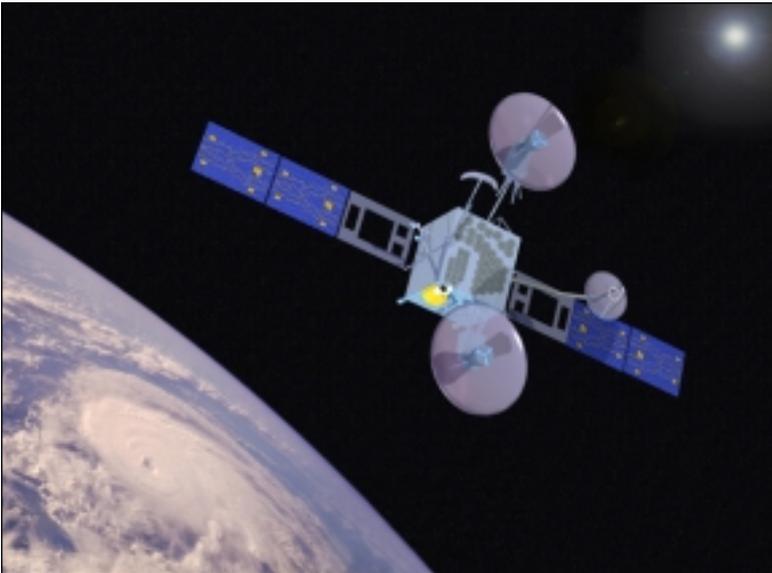
These wind data will not only improve safety, but also help the airlines save money. Knowing the winds along a flight route allows airlines to adjust the plane’s fuel load accordingly, thus reducing the weight that the engines must lift. Saved fuel means saved money and less pollution.

GIFTS can help planes avoid another potentially lethal problem, too: Ice forming on their wings. If a cloud contains “supercooled” water droplets whose temperature is below freezing, those droplets will form ice on the wings of planes that pass through it. By looking at about 1700 different frequencies of the light coming from clouds, GIFTS can measure the temperature of the cloud top and determine whether it contains water droplets that could cause aircraft icing. With information from GIFTS in hand, pilots can simply avoid clouds that appear dangerous.

Once EO-3 demonstrates the accuracy of GIFTS, airlines will be able to capitalize on this potential to make flying a cheaper and safer experience.

Learn more about the GIFTS instrument and other advanced technologies being tested on the EO-3 mission at [nmp.jpl.nasa.gov/eo3](http://nmp.jpl.nasa.gov/eo3). Kids can go to The Space Place to play a data compression game related to EO-3 at [spaceplace.nasa.gov/eo3\\_compression.htm](http://spaceplace.nasa.gov/eo3_compression.htm).

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



*EO-3, carrying the GIFTS instrument, will be in a geosynchronous orbit for extended monitoring of large regions of our planet and enabling observation of weather patterns at higher resolution than possible with existing geostationary satellites.*



# October 2003

| Sun | Mon                            | Tue | Wed   | Thu  | Fri  | Sat   |
|-----|--------------------------------|-----|---|--|--|---|
|     |                                |     | 1<br>UW Public Viewing Night 7 p.m.   |  2<br>UW Astronomy Colloquium: Re'em Sari, CalTech 4 p.m. | 3  | 4<br>Green Lake & Paramount Park Star Parties   |
| 5   | 6                              | 7   | 8   | 9<br>UW Astronomy Colloquium: Bruce Balick, UW 4 p.m.  |  10 | 11<br>Amateur Telescope Makers SIG Meeting 6:30 p.m.  |
| 12  | 13                             | 14  | 15<br>Monthly SAS Meeting UW Room A102 7:30<br>UW Public Viewing Night 7 p.m. | 16<br>UW Astronomy Colloquium: Wm. Abbett UC Berkeley 4 p.m.   | 17   |  18  |
| 19  | 20                             | 21  | 22  | 23<br>UW Astronomy Colloquium: Erica Bohm-Vitense, UW 4 p.m.   | 24   |  25<br>Tiger Mountain Star Party 7:00 p.m. |
| 26  | 27<br>SAS Board Meeting 7 p.m. | 28  | 29  | 30<br>UW Astronomy Colloquium: Geo. Coyne Dir. of Vatican Observatory, Vatican 4 p.m.  | 31   |   |



# November 2003

| Sun  | Mon                            | Tue | Wed   | Thu  | Fri | Sat  |
|--|--------------------------------|-----|---|--|-----|--|
|  |                                |     |   |  |     |  1<br>Orientation Meeting; Green Lake & Paramount Park Star Parties |
| 2  | 3                              | 4   | 5<br>UW Public Viewing Night 7 p.m.   | 6<br>UW Astronomy Colloquium: Mordecai-Mark Mac Low 4 p.m. | 7   | 8<br>Amateur Telescope Makers SIG Meeting 6:30 p.m.  |
|  9<br>Astrophotography/Imaging SIG Meeting 2 p.m. | 10                             | 11  | 12  | 13<br>UW Astronomy Colloquium: Leon Koopmans STScI 4 p.m.  | 14  | 15   |
| 16<br>  | 17                             | 18  | 19<br>Monthly SAS Meeting UW Room A102 7:30<br>UW Public Viewing Night 7 p.m. | 20<br>UW Astronomy Colloquium: TBA, 4 p.m.                 | 21  | 22<br>Tiger Mountain Star Party 7:00 p.m.  |
|  23   | 24<br>SAS Board Meeting 7 p.m. | 25  | 26  | 27<br>UW Astronomy Colloquium: TBA, 4 p.m.                 | 28  | 29<br>Green Lake & Paramount Park Star Parties   |
|  30   |                                |     |   |  |     |  |



# September Minutes Galaxy Evolution in Clusters

by Thomas Vaughan

Speaker: Vendana Desai

## Announcements

The meeting began with the following announcement:

- ★ The SAS Banquet is scheduled for January 24, 2004, at Latitude 47. Cost is \$30 per person; checks should be made out to Kathy Steyaert (see announcement in this newsletter, and online at [www.seattleastro.org](http://www.seattleastro.org)).

## Talk: Galaxy Evolution in Clusters

Vendana is a graduate of CalTech, now a graduate student at the University of Washington. She talked about some of her recent work, concerning the evolution of galaxies in clusters. Because clusters are so crowded, interactions between galaxies are critical in determining the final (or current) shape of a galaxy.

Ever since galaxies have been observed in telescopes, astronomers have noted that there is a great variety of shapes, sizes, and colors. The great astronomer Edwin Hubble first attempted to classify galaxies. He theorized that galaxies started out as blobby ellipticals, finally evolving into either spirals or barred spirals. As a consequence, one expected spiral galaxies to be recently created.

Hubble's picture of galactic evolution is now considered too primitive. Some of Vendana's simulations have shown that many ellipticals are the descendants of spirals which have been ripped apart by intra-cluster interactions.

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**...one of the ironies is that although dark matter's exact nature is very uncertain, it is far easier to model in simulations than**

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Also, Vendana's simulations incorporate dark matter. Although we have only a fuzzy idea of what dark matter is, we do know how it interacts with regular matter. As Vendana pointed out, one of the ironies is that although dark matter's exact nature is very uncertain, it is far easier to model in simulations than regular matter.

If dark matter is "cold" (that is, moving fairly slowly relative to regular matter), then galactic formation tends to take place in a hierarchical manner:

- ★ First, galaxies form as ellipticals or spirals in small groups.
- ★ Clusters form as bunches of groups interact.
- ★ As groups congregate to form clusters, galactic interactions become more frequent and (often) more violent.

Vendana showed that spiral galaxies tend to form only in "calm" environments. This means that they interact only with smaller galaxies.

If a spiral encounters a large galaxy, gravitational forces will stretch and rip the spiral, leaving ragged pieces that form into misshapen ellipticals.

Another result of the simulations is that large central galaxies in the cluster usually keep growing, by gradually accumulating other smaller galaxies.

The end result is that Vendana's simulations match observed galactic clusters pretty well. And this new, interacting view of galaxies has replaced Hubble's model of evolving galactic shapes.

## **Slides: Table Mountain**

After the talk, Bob Suryan showed several slides from Table Mountain, both this year's outing and some from decades ago. Certainly both the mountain and the event have changed over time!

Bob gave a general feel for the layout of the event, then focused on the many telescopes there. There were a large number of good-sized Schmidt-Cassegrains and Dobsonians there, up to a 30" homemade Dobsonian! Bob's favorite was a smaller homemade Dobsonian, which was both very practical and also exhibited excellent woodworking skills.

# Articles of Astronomical Interest:

Articles available online or in magazines this month. To read the full articles, go to the magazines or websites listed.

## China's Great Leap Upward

**By boosting astronauts into orbit, China hopes to become the newest superpower in space**

*By James Oberg in Scientific American: October 2003 issue; [www.sciam.com](http://www.sciam.com)*

At the Jiuquan Space Center near the edge of the Gobi Desert in northern China, Shenzhou 5 is being readied for launch. The spacecraft—its name means “divine vessel” in Chinese—is nearly nine meters long and weighs almost eight metric tons. Sometime this fall, Shenzhou 5 is scheduled to blast into orbit atop a Chang Zheng (“Long March”) rocket. Four earlier Shenzhou spacecraft have already made orbital flights, but unlike those unmanned test vehicles, Shenzhou 5 is expected to carry a crew of up to three young Chinese military pilots. If all goes as planned, China will become the third nation to send people into space....

## Now You See It . . .

**Five astronomy illusions to trick an unwary autumn sky observer**

*By Bob Berman in Discover Magazine: October 2003 issue; [http://www.discover.com/oct\\_03/gthere.html?article=featsky.html](http://www.discover.com/oct_03/gthere.html?article=featsky.html)*

This month of Halloween brings more than children’s pranks. In October the sky offers a few tricks of its own. [Read the full text about the tricks online or in Discover magazine.]

**TRICK 1 — The frozen constellations.** Over the course of a year, constellations appear to shift steadily to the west....During late summer and the first several weeks of autumn, the heavens seem nearly frozen in place....

**TRICK 2 — The hole in the Milky Way.** Take a look at the ghostly band of the Milky Way, optimally situated in the sky this month. Nearly overhead you will see the Great Rift, a section where the light of our galaxy is strangely missing....



**TRICK 3 — The flattened sky.** The universe stretches for billions of light-years in every direction, so the sky should look like a perfect hemisphere, as distant overhead as it is at the horizon. Does it?...

**TRICK 4 — The giant rising moon.** ...The October 10 hunter's moon, for instance, will seem much bigger during its dusk rising than it will later in the night....This well-known moon illusion applies to star patterns as well. This month the Big Dipper lurks at its lowest point of the year, scraping the northern horizon. The result is startling: The Dipper's familiar shape appears so enormous that it can be hard to recognize.

**TRICK 5 — The vanishing colors of fall.** The vivid yellows, oranges, and reds of fall foliage are vivid only during the day. At night, away from artificial lights, they are replaced with drab green or gray. This happens because the retina loses its ability to detect color in extremely low light....

## The Unexpected Youth of Globular Clusters

**Conventional wisdom says that globular star clusters are the stodgy old codgers of the universe, but it turns out that many of these clusters are young**

*By Stephen E. Zepf and Keith M. Ashman in Scientific American: October 2003 issue; full article in print magazine or online through Scientific American Digital (subscription)*

Throughout most of a galaxy, stars are sprinkled like farmhouses on an open plain. Separated by vast distances, they lead their lives almost independently of one another. Some areas of a galaxy, though, look more like cities than countryside. These are globular clusters—groups of a million or so stars crammed into a volume that elsewhere would accommodate barely a single star. Not only are they congested, they are aged. The roughly 200 globular clusters in our Milky Way galaxy contain some of the oldest known stars in the universe; young inhabitants are nowhere to be seen. Accordingly, astronomers have generally seen globulars as ancient cities, like the historic districts of Rome or Istanbul, formed long ago and little changed—cramped, worn-out municipalities that tell us much about bygone times but little about the way modern galaxies organize themselves....

At least that is what astronomers used to think. Lately they have been busy rewriting the galactic charts (and textbooks). With the penetrating vision of the Hubble Space Telescope, they have seen the lights of new burbs—newfound cities full of bustling activity. Globulars can and do continue to form, apparently when galaxies smash into one another. These discoveries give researchers a handle on key questions in astronomy, such as how and when massive galaxies originate and evolve....

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- 1 shirt    \$4.00
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### The Seattle Astronomical Society

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**Seattle, WA 98103**

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