



# the Webfooted Astronomer

Seattle Astronomical Society • April 2004

## March Meeting

*Speaker:* Professor David Catling

The Evolution of Mars

Wednesday, April 21  
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!

## April Meeting

### “The Evolution of Mars”

Today Mars is a cold, dry global desert. However, there is much evidence to suggest that Mars must have been different in its deep past when liquid water flowed across the Martian surface and volcanoes belched gases and ash into the atmosphere. The evidence for different ancient environments comes from the geology of the surface, the details of the atmospheric composition, and inferences about what lies below the surface from Martian meteorites and spacecraft data. Professor David Catling will discuss recent results

from spacecraft missions to Mars and what they mean for the evolution of the Red Planet.

Biographical information:

Prof. David Catling is jointly appointed to the University of Washington’s cross-campus Astrobiology Program and the Department of Atmospheric Sciences. Prior to coming to the UW, he worked at NASA’s Ames Research Center, near San Francisco, from 1995 to 2001. He currently works on various NASA programs to investigate the evolution of the environments on Earth and Mars.

*For a comparison of Earth vs. Mars, see page 6.*

*For an article on The Chemistry of Mars, see page 13.*

# 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](mailto:webftweb@scn.org)  
**E-mail:** [info@seattleastro.org](mailto:info@seattleastro.org)

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**Webmaster:** Paul Rodman,  
425-889-8273,  
[webmaster@seattleastro.org](mailto:webmaster@seattleastro.org)

**Club Telescopes & Equipment:**  
Thomas Vaughan, 206-774-4040,  
[equipment@seattleastro.org](mailto:equipment@seattleastro.org)

**Club Library:**  
Karl Schroeder, 206-362-7605,  
[library@seattleastro.org](mailto:library@seattleastro.org)

## Special Interest Groups

**Dark Sky Northwest:**  
Bruce Weertman,  
[bruce@weertman.com](mailto:bruce@weertman.com)

**Telescope Makers:**  
Peter Hirtle, 206-363-0897,  
[atm@seattleastro.org](mailto:atm@seattleastro.org)

**Astrophotography:**  
Keith Allred,  
425-821-5820,  
[astrophoto@seattleastro.org](mailto:astrophoto@seattleastro.org)

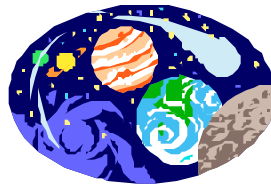
**Vive La Lune (Moon):**  
Pat Lewis,  
206-524-2006,  
[lunar@seattleastro.org](mailto:lunar@seattleastro.org)

**Sidewalk Astronomers:**  
Paul Ham,  
206-522-7410,  
[paulham@webtv.net](mailto:paulham@webtv.net)

## Webfooted Astronomer

**Editor:** Pam Stucky  
[editor@seattleastro.org](mailto:editor@seattleastro.org)

**Circulation Managers:**  
Pat Lewis and Joanne Green,  
206-524-2006,  
[circulation@seattleastro.org](mailto:circulation@seattleastro.org)





## From the President's Desk...

by Stephen Van Rompaey

As promised, this month's newsletter will be the last bulk mailing to the entire SAS membership. From now on, we assume that most members will download or read the newsletter on the SAS website. This decision was reached as a compromise on whether or not to raise the club dues for all members. Instead of doing that, we have retained the same dues level for members willing to read the newsletter online and increased the dues for members who still want to receive the newsletter by mail. We hope that this accommodates most members and will also preserve the fiscal stability of our SAS finances.

For current members, the default is now that you will obtain the newsletter from the SAS website. If you want to continue receiving the hard copy in the mail, you must contact the SAS Treasurer and opt-in. Members are still eligible to receive the newsletter in the mail during the term of their current membership without having to pay any additional cost. When a current member renews their membership in the future, then the member will have to pay the increased dues amount in order to continue receiving the

newsletter by snail mail. Effective April 1, 2004, the \$30 annual dues is required to receive the newsletter by mail. If you have any questions about this change regarding the newsletter, please feel free to contact me or the SAS Treasurer for further clarification.

Another important step is being taken by the SAS this month regarding the club's library. For many years the library has been stored at Karl and Judy Schroeder's house, but they now need the space and the SAS Board decided to dispose of the library. The library is not used frequently by members of the club and we felt that the emergence of the internet and astronomical software had replaced the need to maintain centralized

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**As promised, this month's newsletter will be the last bulk mailing to the entire SAS membership. From now on, we assume that most members will download or read the newsletter on the SAS website.**

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resources for members. I realize that other members may disagree with this decision, but we could not justify storing hundreds of books and magazines for the 2 to 3 members a year who used them.

The plan is to have a book and magazine sale at the April club meeting. I will set aside a few books from the collection for a future SAS youth group, but there will be a lot of good astronomy books for sale. Starting at 6:30 p.m. books will be on sale for \$1 each and magazines for \$.25 each. It would be nice to sell everything, but any leftovers will be donated to the Seattle Library for them to use in their collection or for their annual book sale. The proceeds from the SAS book sale will be used to purchase door prizes for next year's SAS awards banquet.

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**Starting at 6:30 p.m. at  
the April club meeting,  
books from the SAS  
library will be on sale  
for \$1 each and  
magazines for \$.25  
each.**

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As many of you know, Astronomy Day is being held on Saturday, April 24. In the past, the SAS has joined the UW Astronomy Department or Pacific Science Center for some type of activity. This year, neither the Astronomy Department nor Pacific Science Center is holding Astronomy Day activities. As a result, we will limit our Astronomy Day activities on April 24 to the

monthly star parties being held at Green Lake and Paramount Park. In the evening on May 6, the UW Astronomy Department is having an event to commemorate the renaming of the Theodor Jacobsen Observatory on campus. We have been asked to participate in this event and we will need some members to volunteer with their telescopes.

Finally, I regret to inform the club membership that Pam Stucky, our newspaper editor, is leaving her position. It has been a pleasure to work with Pam and her thoughtful contribution to our newsletter will be greatly missed. However, on the bright side, there is now an opportunity for another club member to volunteer and become more involved in the SAS. The editor has the option of attending Board meetings and participating in decision making. As an incentive, membership dues are waived for the editor during their tenure. If you have any questions about what's involved in the newsletter, please contact Pam Stucky or myself.

# Table Mountain Star Party

## Registration Information from **TMPSA.com**

for more info: <http://www.tmspa.com/registration.html> (updated 3/10/04)

Note that this information is from **TMPSA**, not **SAS**.

**The Pre-Registration Forms WILL BE available and ON-Line (at <http://www.tmspa.com/>) (for you to print) on MAY 1, 2004.**

Please Do NOT mail any payments until after we have posted the registration form (after May 1, 2004).

There are several changes this year! Please read carefully!

As we announced at the TMSP 2003 event:

Table Mountain 2004, registration forms ARE NOT sent automatically in the mail from mailing lists!

**We can not offer Late or On-Mountain registration this year, due to attendance once again being limited to the first 700 individuals...**

(we don't want to turn anyone away for any reason!!!!)

We may also have to limit the number of VERY large RVs. (more info on these issues to come based on F.S. limits)

Pre-registration forms will be on line May 1, 2004. Please read all of the registration web page information (<http://www.tmspa.com/registration.html>) and the registration form when posted as well as any updates in the coming months!

Despite what seems to be a bunch of rules, restrictions and guidelines, the Table Mountain Star Party is a fun, safe and family friendly event that is reported by many to be one of "The Best" large Star Parties.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

It is important, that you monitor the **TMPSA** site and/or read your brochure carefully, making yourself aware of all changes in registration policy. If you have attended the **TMS** for the past few years, you are aware of the growth and the popularity of our event and the limited space for vehicle parking.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

# Earth vs. Mars: The Planets Weigh In

By Robert Roy Britt, *Space.com Senior Science Writer*

[http://www.space.com/scienceastronomy/mars\\_tape\\_030819.html](http://www.space.com/scienceastronomy/mars_tape_030819.html)



Mars is the most Earth-like other world known. In this tale of the tape, we present the most pertinent and interesting facts that compare and contrast the two very different worlds.







	<b>Earth</b>	<b>Mars</b>
<b>Diameter</b>	About 7,926 miles (12,756 kilometers) but growing, at least at the equator.	Roughly 4,222 miles (6,794 kilometers), or 53 percent that of Earth.
<b>Life</b>	Yes.	Unknown.
<b>Intelligent life</b>	Some would say so.	No, probably microbes at best.
<b>Distance from Sun</b>	1 astronomical unit (AU), or about 93 million miles (150 million kilometers), on average.	Ranges from 1.381 AU to 1.666 AU, due to non-circular orbit.
<b>Temperature</b>	Way too hot in summer or way too cold in winter, depending on locale, or both. Planetwide: 47.3 degrees Fahrenheit (8.5 Celsius) over land areas. Warmer if surface air above oceans is figured in.	Ridiculously cold most of the time. Freezing in most places. Planetwide: -67 degrees Fahrenheit (-55 Celsius). Can be shirtsleeve during fleeting moments of daytime summer.
<b>Most striking feature</b>	Looks blue from outer space, due to being two-thirds water.	Looks ruddy from outer space, due to being covered in oxidized iron.
	Manageable, protection courtesy a strong magnetic field.	Problematic, due to a weak magnetic field.

	<b>Earth</b>	<b>Mars</b>
<b>Weather</b>	Hurricanes, typhoons and tornadoes a real problem. Disgustingly interminable fog in coastal California. Utter lack of rain in parts of Africa. Way too wet in many other places.	Dust storms abound. Sometimes whole planet is obscured. Dust devils that soar higher into the atmosphere than terrestrial tornadoes and hurricane-like storms as big as Texas.
<b>Heft</b>	1 Earth mass. In kilograms, it's about 6 with 24 zeros after it.	About 10.7 percent that of Earth.
<b>Biggest mystery</b>	How life began.	Whether there is life.
<b>Biggest hoax</b>	The one suggesting we didn't go to the Moon.	The purported Face.
<b>Day</b>	23 hours, 56 minutes.	24 hours, 37 minutes.
<b>Year</b>	365 days (the time needed to go around the Sun once).	687 Earth-days, or about 670 Mars days.
<b>Gravity</b>	Normal.	38 percent of that found on Earth at sea level.
<b>Tilt of rotation axis</b>	23.5 degrees.	25 degrees.
<b>Satellites</b>	The Moon, plus several that communicate, and tons of junk as small as paint chips.	Two natural ones, Phobos and Deimos, plus two sent by NASA and more on the way.
<b>Air</b>	Quite a bit. About 76 percent of it is nitrogen, with about 21 percent oxygen. Next most common, in order but in very small amounts: Argon, carbon dioxide, neon.	Not much. Less than 1 percent the density of Earth's air at the surface, and mostly carbon dioxide (95.3 percent). Trace of oxygen (0.15%).

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# April 2004

Sun	Mon	Tue	Wed	Thu	Fri	Sat	
				1	2	3 Amateur Telescope Makers SIG Meeting 6:30 p.m.	
4		5	6	7 UW Public Viewing Night 7 p.m.	8	9	10
11		12	13	14	15	16	17 Tiger Mountain Star Party 7:30 p.m.
18		19	20	21 UW Public Viewing Night 7 p.m. Monthly SAS Meeting UW Room A102 7:30	22	23	24 Green Lake and Paramount Park Star Parties
25	26 SAS Board Meeting 7 p.m.		27	28	29	30	





# May 2004

Sun	Mon	Tue	Wed	Thu	Fri	Sat	
						1 Amateur Telescope Makers SIG Meeting 6:30 p.m.	
2 Astro- photography/ Imaging SIG Meeting 2 p.m.	3		4	5 UW Public Viewing Night 9 p.m.	6	7	8
9	10		11	12	13	14	15 Tiger Mountain Star Party 8:30 p.m.
16	17	18	 19 UW Public Viewing Night 9 p.m. Monthly SAS Meeting UW Room A102 7:30	20	21	22 New Member Orientation; Green Lake and Paramount Park Star Parties	
23	24 SAS Board Meeting 7 p.m.	25	26		27	28	29
30	31						



# March Minutes NASA Outreach

by Thomas Vaughan

Speaker: Julie Lutz, University of Washington

## Talk: NASA's Office of Space Sciences and Educational Resources for Amateur Astronomers

Dr. Lutz gave an overview of the NASA Outreach program, particularly S2N2 (Space Science Network Northwest), the regional outreach program in which the State of Washington participates. Dr. Lutz noted that there are many forms of outreach, from educational resources for teachers to grants for students and programs.

One example is the statewide coalition for Space Grants, which among other things funds

- ★ Scholarships
- ★ Summer undergraduate research programs
- ★ Project AstroBio

Another example is the Educational Resource Center (ERC), which provides training materials and workshops for educators.

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***If you would like to know more, or would be interested in volunteering to help out in any of the many programs, please contact Dr. Lutz at [nasaerc@u.washington.edu](mailto:nasaerc@u.washington.edu). Or visit the Space Science Network Northwest website at [www.s2n2.org](http://www.s2n2.org).***

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S2N2 (our regional program) has four broad efforts:

- ★ Sun-Earth Science
- ★ Solar System Exploration
- ★ Origins of Life
- ★ Structure and Evolution of the Universe

Dr. Lutz recommended that anyone who is interested should drop by the ERC. It is located on the UW campus, at 313 Condon Hall. It is open 9-5 Monday-Friday.

At the end, Dr. Lutz fielded questions, handed out some brochures and cool photos of Mars, and had a drawing for some of the more exotic outreach materials (CD-ROMs, posters, and more).

If you would like to know more, or would be interested in volunteering to help out in any of the many programs, please contact Dr. Lutz at [nasaerc@u.washington.edu](mailto:nasaerc@u.washington.edu). Or visit the Space Science Network Northwest website at [www.s2n2.org](http://www.s2n2.org).

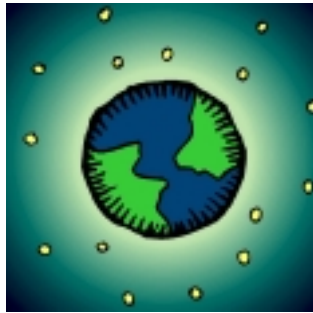


## **New Newsletter Editor Needed!**

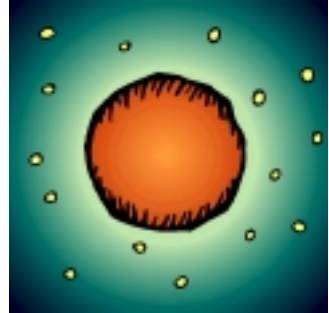
Are you interested in being the next SAS Newsletter Editor? If so, contact SAS President Steve Van Rompaey ([president@seattleastro.org](mailto:president@seattleastro.org)) or Editor Pam Stucky ([editor@seattleastro.org](mailto:editor@seattleastro.org)) to find out more!



**Earth**



**Mars**



<b>Volcanic hazards</b>	Wrong place, wrong time. Say goodbye. Close? Take a photo.	Nothing but remnants of former beasts soaring silently into thin air.
<b>Caves</b>	Many, and they're great places for microbial life to hide.	Maybe, and they're possible places for humans to hide.
<b>Snow</b>	Tons. Like 1,140 inches at Washington's Mt. Baker during the 1998-99 season, a world record. That's 95 feet (29 meters).	Yes, surprisingly, but you wouldn't want to ski on it. And it's melting, perhaps due to global warming.
<b>Water ice</b>	Yes, often invisible and under moving car tires.	Yes, much of it invisible and under the surface or beneath another kind of ice at the south pole.
<b>Dry ice</b>	Sure. 4,200 pounds of it is used weekly in just one Vegas show.	Tons, covering the water ice at the south pole.
<b>Water</b>	Inundates the place, especially in basements and during picnics.	Not a drop that we know of for sure -- yet. But possibly a lot long ago and maybe some today, under the surface.

# The Chemistry of Mars

By Tariq Malik, Staff Writer, Space.com

[http://www.space.com/scienceastronomy/marswater\\_chemistry\\_040303.html](http://www.space.com/scienceastronomy/marswater_chemistry_040303.html)

One of the foundations supporting NASA's case for water's past presence on Mars, at least near the rover Opportunity, is salty chemical forms of sulfur known as sulfates.

Opportunity's Microscopic Imager found this intriguing object, looking more like Rotini pasta. Its odd shape has stirred up Mars researchers, both inside and outside of the NASA Mars Rover Exploration team. Whether or not this object is related to biology has prompted a variety of views.

These mineral salts were found in abundance during Opportunity's studies of a rock outcrop sitting in its Meridiani Planum landing site.

"With this quantity of sulfates, you kind of have to have a lot of water involved," explained Steven Squyres, principal investigator of Opportunity's science package and a professor at Cornell University.

The sulfates were detected with Opportunity's alpha particle X-ray spectrometer, which identifies the chemical elements of a sample, detected high amounts of sulfur in the nearby outcrop during three weeks of intense study by the robust robot. Among the chemical forms of sulfur present were magnesium, iron and other sulfate salts.

Chief among the sulfates found is jarosite, a hydrated iron sulfate detected by Opportunity's Moessbauer spectrometer, a device that scans for iron-bearing minerals.

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**"On Earth, the only place we see this mineral is in areas where there is liquid water," said Cathryn Weitz, a program scientist with the Mars Exploration Rovers program, which includes Opportunity, and Mars Express. Jarosite is typically found in acidic lakes or such as hot springs, she added.**

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“On Earth, the only place we see this mineral is in areas where there is liquid water,” said Cathryn Weitz, a program scientist with the Mars Exploration Rovers program, which includes Opportunity, and Mars Express. Jarosite is typically found in acidic lakes or such as hot springs, she added.

Opportunity’s rock outcrop could also have once sat in an acidic lake or a hot springs environment, NASA officials said.

The detection of magnesium sulfate kieserite, which is similar to epsom salt, and bromide salts were also telltale signs that water existed on the red planet. Both are evaporite minerals, and found on Earth in regions where seas evaporate over time.

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**“This is a classic signature of an evaporite,” Benton Clark III told SPACE.com. “Here, water is evaporating, and the salt comes out in these deposits.”**

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Benton Clark III, a Mars Exploration Rover team member, said Opportunity’s observations showed that the levels of bromide salts increased towards the bottom of the outcrop, but the sulfur levels increased towards the top.

“This is a classic signature of an evaporite,” he told SPACE.com. “Here, water is evaporating, and the salt comes out in these deposits.”

Opportunity’s handlers can’t say for certain that Meridiani Planum was up to its armpits in a salty sea in eons past. It’s just as possible that groundwater percolated through the rocky outcrop on the way into the ground. Rover scientists are busy planning further studies over a broader area may help determine what depth, on the surface or otherwise, Martian water may have reached.



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