



# the EYEPIECE



the FORT WAYNE ASTRONOMICAL SOCIETY • PO Box 11093 • Fort Wayne, IN 46855

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Editor: Gene Stringer, 9609 Colsons Hill, Fort Wayne, IN 46825, (260) 489-8135

E-Mail: [genestringer@mac.com](mailto:genestringer@mac.com)

FWAS Web page: <http://fortwayneastronomicalsociety.com>

## GENERAL MEETING

Visitors Welcome

Tuesday Evening, July 15, 7:30 PM

Star\*Quest Observatory, 1730 S Webster Rd,  
New Haven, IN 46774

### Placing Humans on Mars

by Jon Thomas

Join us for a lively discussion as Dr. Thomas outlines the schemes for overcoming the many hazards that mankind will encounter in colonizing Mars.

General Meetings are held the third Tuesday of each month, 7:30pm. Check our web site for location.

## Have Rocket, Will Travel

After more than 40 years since the missions to the Moon ended, many believe that it is time for another great human adventure, this time one that would place humans on Mars.

It is the logical choice. It could very well unlock the secret of life in the universe and humanity must eventually establish itself on other worlds for its preservation. Any volunteers?

You might want to listen to this talk first, since it explores the hazards and obstacles that will face astronauts as they journey to, explore and return from the red planet.

You are invited to stay for an evening of stargazing, weather permitting.

## Calendar Events Jul-Aug

Scheduled events for the next two months:

**Saturday Public star gazing at Jefferson Township Park April Thru November.** (Observatory is available for members to use, except for scheduled observing events)

### July

General Meeting Tuesday, July 18

Board Meeting Tuesday, July 25

### August

General Meeting Tuesday, Aug 15

Solar Eclipse Monday, Aug 21

Board Meeting Tuesday, Aug 22

## Deep Sky Star Parties

Deep Sky observing events are scheduled for FWAS members and their guests to observe the fainter objects in the sky from a location away from city lights. These events are closed to the general public to allow members to plan observing and photography projects that will be undisturbed.

This year you are invited to come to the **Star\*Quest Observatory (S\*QO)** for observing times, scheduled for Fridays near the new moon each month. The remaining dates this year are: **July 21, Aug 18, Sep 15, Oct 20, Nov 17.**

## Public Star Parties

The public observing season started in April. We need trained volunteers to run the Richard Johnston (RJ) Telescope. **If you wish to participate, with the RJ scope, with your own telescope or without a scope, contact Mark Anderson (260)416-4094, to get on his volunteer list.** This is a great way to contribute to our community service.

Current events are:

**July dates at Girl Scout Camp Logan: Wed July 12, 19 & 26, Mon July 31.**

**Tues Aug 1 at 1 pm, at S\*QO, Solar viewing for Little Princess Daycare,**

**Sat Aug 19, Gene Stratton Porter at Rome City, call Larry Clifford at (260)824-2655 for details on time and place.**

**Fri 1 Sep at S\*QO, Cancer Research Fund (Backup 8 Sep)**

## Star\*Quest Update

by Gene Stringer

Since the grand opening of Star\*Quest Observatory on 20 May we have had record attendance on Saturday evenings, even during inclement weather when it was not possible to open the roof. This past Saturday more than 35 people took advantage of a clear night despite the glare of a full Moon. I attribute most of this to the excellent publicity given to us by the television and newspaper media.

We still have construction support activities to complete:

**3. Install Red Lighting** (Leader Alan Paries)

**5. Landscaping** (Leader Laura Ainslie)

**8. Plan, procure and install observatory equipment** (Leader: Gene Stringer)

Additional tasks include a modification of the HC scope

*Continued on Page 2*

## Board Meeting Highlights

- Board met on Tues, 27 June in Phil Hudson's office.
- Treas reported current holdings of \$2,912 for General operations and \$3,800 for S\*Q
- Discussed preparations for the 21 August solar eclipse.
- The next board meeting will be on Tuesday, 25 July, at 7:30 p.m. in Phil Hudson's office.

### FWAS OFFICERS

President: Larry Clifford 824-2655  
Vice-Pres: Laura Ainslie (260)740-9162  
Secretary: Gene Stringer 489-8135  
Treasurer: Julie Kaufman (260)579-1777

### APPOINTED POSITIONS

Observatory Director: Mark Anderson  
(260)416-4094

Web Master: Sarah Suraci 797-2776

Star\*Quest Project Manager: Gene  
Stringer 489-8135

Star\*Quest Treas: Julie Kaufman  
(260)579-1777

### EDITORIAL STAFF

Eyepiece editor, Gene  
Stringer, 489-8135

Membership: Sara Harper  
444-4042

Distribution, Gene Stringer  
489-8135 & Phil Hudson  
484-7000

Submissions to the Eyepiece  
are cheerfully accepted by  
E-mail (preferred) or on CD  
or other media, or on paper.  
Submissions may be edited  
for space or style.

*Continued from page 1*

mount for polar alignment, and fixing a leak in the well of the RJ scope.

If you have not already volunteered and/or wish to support any of the above tasks please contact the task leader or Gene Stringer at (260)489-8135 or email at: [genestringer@mac.com](mailto:genestringer@mac.com) to volunteer.

## Juno Spacecraft Flies Over Jupiter's Great Red Spot

Just days after celebrating its first anniversary in Jupiter orbit, NASA's Juno spacecraft on 10 July flew directly over Jupiter's Great Red Spot, the gas giant's iconic, 10,000-mile-wide (16,000-kilometer-wide) storm. This was humanity's first up-close and personal view of the gigantic feature -- a storm monitored since 1830 and possibly existing for more than 350 years.

"Jupiter's mysterious Great Red Spot is probably the best-known feature of Jupiter," said Scott Bolton, principal investigator of Juno from the Southwest Research Institute in San Antonio. "This monumental storm has raged on the solar system's biggest planet for centuries. Now, Juno and her cloud-penetrating science instruments will dive in to see how deep the roots of this storm go, and help us understand how this giant storm works and what makes it so special."

The data collection of the Great Red Spot is part of Juno's sixth science flyby over Jupiter's mysterious cloud tops. Perijove (the point at which an orbit comes closest to Jupiter's center) was on Monday, July 10, at 6:55 p.m. PDT (9:55 p.m. EDT). At the time of perijove, Juno was about 2,200 miles (3,500 kilometers) above the planet's cloud tops. Eleven minutes and 33 sec-



*This true color mosaic of Jupiter was constructed from images taken by the narrow angle camera onboard NASA's Cassini spacecraft on December 29, 2000, during its closest approach to the giant planet at a distance of approximately 10 million kilometers (6.2 million miles). Image Credit: NASA/JPL/Space Science Institute*

onds later, Juno covered another 24,713 miles (39,771 kilometers) and was directly above the coiling crimson cloud tops of Jupiter's Great Red Spot. The spacecraft passed about 5,600 miles (9,000 kilometers) above the Giant RedSpot clouds. All eight of the spacecraft's instruments as well as its imager, Juno-Cam, were on during the flyby.

On July 4 at 7:30 p.m. PDT (10:30 p.m. EDT), Juno will have logged exactly one year in Jupiter orbit. At the time, the spacecraft will have chalked up about 71 million miles (114.5 million kilometers) in orbit around the giant planet.

Juno launched on Aug. 5, 2011, from Cape Canaveral, Florida. During its mission of exploration, Juno soars low over the planet's cloud tops -- as close as about 2,100 miles (3,400 kilometers). During these flybys, Juno is probing beneath the obscuring cloud cover of Jupiter and studying its auroras to learn more about the planet's origins, structure, atmosphere and magnetosphere.

Early science results from NASA's Juno mission portray the largest planet in our solar system as a turbulent world, with an intriguingly complex interior structure, energetic polar aurora, and huge polar cyclones.

*Note: This article was downloaded and edited from NASA's web site: <https://www.jpl.nasa.gov/news/news.php?feature=6891>*

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## The Shape of the Solar System

By Marcus Woo

When Stamatis (Tom) Krimigis was selected for the Voyager mission in 1971, he became the team's youngest principal investigator of an instrument, responsible for the Low Energy Charged Particles (LECP) instrument. It would measure the ions coursing around and between the planets, as well as those beyond. Little did he know, though, that more than 40 years later, both Voyager 1 and 2 still would be speeding through space, continuing to literally reshape our view of the solar system.

The solar system is enclosed in a vast bubble, carved out by the solar wind blowing against the gas of the interstellar medium. For more than half a century, scientists thought that as the sun moved through the galaxy, the interstellar medium would push back on the heliosphere, elongating the bubble and giving it a pointy, comet-like tail similar to the magnetospheres—bubbles formed by magnetic fields—surrounding Earth and most of the other planets

“We in the heliophysics community have lived with this picture for 55 years,” said Krimigis, of The Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland. “And we did that because we didn’t have any data. It was all theory.”

But now, he and his colleagues have the data. New measurements from Voyager and the Cassini spacecraft suggest that the bubble isn’t pointy after all. It’s spherical.

Their analysis relies on measuring high-speed particles from the heliosphere boundary. There, the heated ions from the solar wind can strike neutral atoms coming from the interstellar medium and snatch away an electron. Those ions become neutral atoms, and ricochet back toward the sun and the planets, uninhibited by the interplanetary magnetic field.

Voyager is now

at the edge of the heliosphere, where its LECP instrument can detect those solar-wind ions. The researchers found that the number of measured ions rise and fall with increased and decreased solar activity, matching the 11-year solar cycle, showing that the particles are indeed originating from the sun.

Meanwhile, Cassini, which launched 20 years after Voyager in 1997, has been measuring those neutral atoms bouncing back, using another instrument led by Krimigis, the Magnetosphere Imaging Instrument (MIMI). Between 2003 and 2014, the number of measured atoms soared and dropped in the same way as the ions, revealing that the latter begat the former. The neutral atoms must therefore come from the edge of the heliosphere.

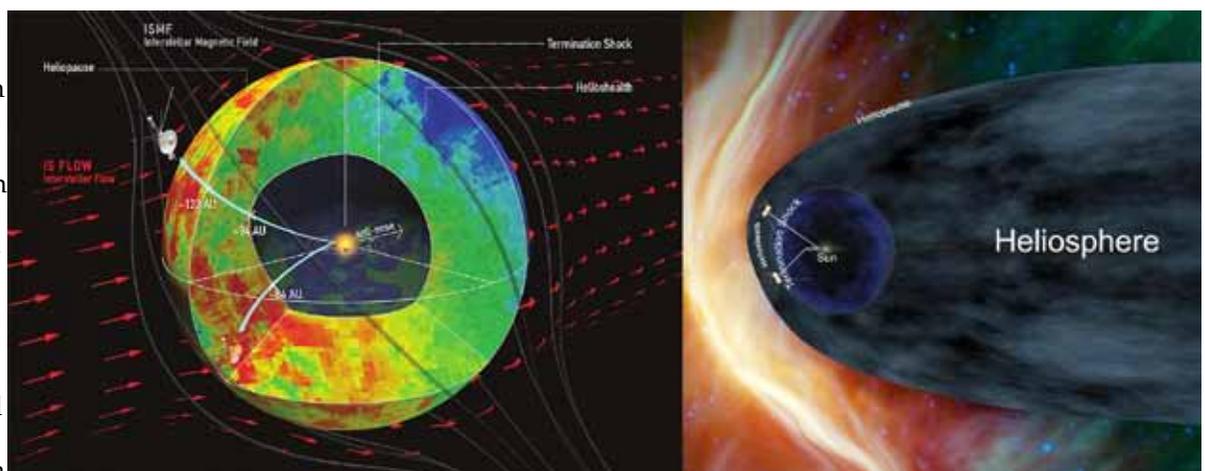
If the heliosphere were comet-shaped, atoms from the tail would take longer to arrive at MIMI than those from the head. But the measurements from MIMI, which can detect incoming atoms from all directions, were the same everywhere. This suggests the distance to the heliosphere is the same every which way. The heliosphere, then, must be round, upending most scientists’ prior assumptions.

It’s a discovery more than four decades in the making. As Cassini ends its mission this year, the Voyager spacecraft will continue blazing through interstellar space, their remarkable longevity having been essential for revealing the heliosphere’s shape.

“Without them,” Krimigis says, “we wouldn’t be able to do any of this.”

To teach kids about the Voyager mission, visit the NASA Space Place:

<https://spaceplace.nasa.gov/voyager-to-planets>



*Caption: New data from NASA’s Cassini and Voyager show that the heliosphere — the bubble of the sun’s magnetic influence that surrounds the solar system — may be much more compact and rounded than previously thought. The image on the left shows a compact model of the heliosphere, supported by this latest data, while the image on the right shows an alternate model with an extended tail. The main difference is the new model’s lack of a trailing, comet-like tail on one side of the heliosphere. This tail is shown in the old model in light blue. Image credits: Dialynas, et al. (left); NASA (right)*



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**P.O. Box 11093**  
**Fort Wayne, IN 46855**

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Next General Meeting  
 Tuesday, July 18, 7:30 pm  
 Star\*Quest Observatory  
 1730 S. Webster Rd.  
 New Haven, IN 46774

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**\*\*PROGRAM\*\***  
**Placing Humans  
 on Mars**  
 by Jon Thomas

**Saturday Night Stargazing**  
 at [Jefferson Township Park](#)  
 every clear Saturday night  
 starting 1 hour after **sunset**  
 and continuing for 2 hours.  
 April through November

Night Sky Network 

JPL Illustration: NASA

**July Night Sky:** Jupiter remains a conspicuous object low above the south-western horizon before sunset as it continues its eastward motion through the constellation Virgo. Saturn starts rising progressively earlier as the month wears on and is the brightest object low above the southern horizon. Look for Mercury low above the western horizon just after sunset during the last days of July. Venus dominates the pre-dawn sky during July, shining at magnitude -4.0 for almost the entire month. 9th is full Moon and known as the Full Buck Moon. New Moon: 23rd. Look for the summer triangle: Vega, Altair and Deneb.