

# Lunar Librarian Newsletter

## May 2007

Vol. 2. Issue. 5

### LRO News



Have you seen the new look of the Explore! To the Moon and Beyond page created by LPI? This new webpage follows the motif of the other Explore pages and the color scheme of the LRO page. So you are probably wondering what else is new... The presentations from the most recent workshops have been posted. Please feel free to use these in a presentation of your own. Also available are the earlier issues of the *Lunar Librarian Newsletter*. Catch up on the latest list of activities and ideas from other librarians. Don't forget to let us know what you have been up to! For more information, please visit:

<http://www.lpi.usra.edu/education/explore/LRO/>

### Lights! Camera! Take Off!

Ron Howard may have directed *Apollo 13*, but *Return to the Moon: The Journey Begins Now*, movie trailer is just the hint of what NASA has in store for humans going back to the Moon. Just as next fall marks the beginning of our return, the first spacecraft seen 'flying' by the Moon in the trailer is LRO. [http://www.nasa.gov/mission\\_pages/exploration/main/index.html](http://www.nasa.gov/mission_pages/exploration/main/index.html)

On the LRO multimedia site, an animation illustrating the mission sequence of LRO and LCROSS is available. This animation starts with the launch, continuing into the data collection of LRO and LCROSS, concluding with ultimate fate of LCROSS. To see and download this animation, please go to:

<http://lunar.gsfc.nasa.gov/images/multimedia/LROanimation0107.mov>

### LRO EPO Welcomes Colorado Librarians.

In early May, the LRO EPO team headed out to Denver, Colorado to meet the next class of Lunar Librarians. This workshop took place at the Denver Museum of Nature and Science, <http://www.dmns.org/main/en/>. Our host was Polly Andrews, the EPO lead for LAMP (Lyman-Alpha Mapping Project). Our guest speaker was Dr. Joel Parker from the Southwest Research Institute, works on the data analysis portion of LAMP. His presentation is available on the Explore! webpage. LRO's own Mission Systems Engineer, Dave Everett also presented. <http://www.lpi.usra.edu/education/explore/LRO/presentations/>

*Adventures in Earth and Space* ~Blog. This Blog was created by Stephanie Stockman and her team to share our projects and look for ways to involve more people in our missions. Please feel free to check it out and comment. <http://geosteph-adventuresinearthandspace.blogspot.com/>

## NASA News

### A Visit from the Queen

(By John Leck & Heather Weir)

On May 8, 2007, Queen Elizabeth II visited NASA Goddard Space Flight Center as part of her official State Visit. The Queen and her husband, Prince Philip, the Duke of Edinburgh, planned this trip to commemorate the 400<sup>th</sup> anniversary of the Founding of the Jamestown colony. She began her time at GSFC by speaking with the astronaut crew aboard the International Space Station. She then walked over to GSFC's administrative building for a special presentation. Only 200 of the more than 13,000 GSFC employees and contractors were able to attend her presentation. At the presentations, she received a print (see below) showing satellite images of Jamestown and London, as well as the Chesapeake Bay. Those who were not able to attend had the opportunity to catch a glimpse the Queen as she walked between buildings.

While the Queen was attending her special presentation, Prince Philip toured one of the buildings where satellites and hardware are tested before going into space. During his visit, he donned astronaut gloves and learned what it is like to work instruments in space.

The Queen and Prince Philip visited the Visitor Center for three events. First, they observed middle school students working on NASA science lesson. The Queen and Prince Philip visited the three learning stations and spoke with the children at each. This was one of the highlights for Queen Elizabeth II, who enjoys interacting with children. The royal couple had the opportunity to see students learning about how NASA uses light for exploration. Students explored three questions: "How is light used to study the universe?"; "What is the electromagnetic spectrum?"; "Why is light used to study Earth?" The Earth lesson was adapted from the *Exploring Ice in the Solar System Lesson 11: Investigating Icy Worlds* series.



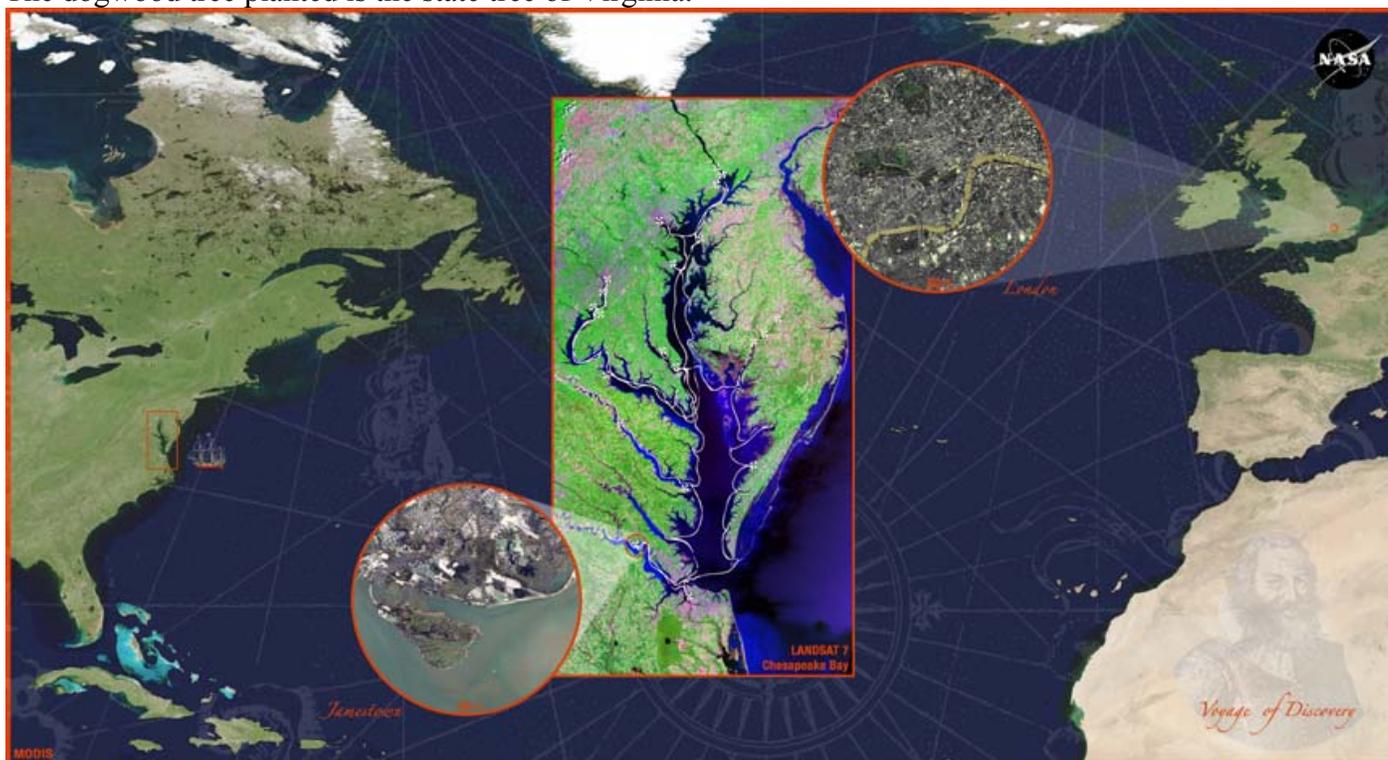
Queen Elizabeth II talks with students at a NASA Explorer School Workshop

Next stop was the Science on a Sphere presentation. In the center of a dark room, four projectors send video onto the suspended, six-foot-wide white sphere. Some of the viewed images projected onto the sphere were scientific datasets from satellites including the Hurricane Katrina sequence, climate change models such as sea ice change, "Nighttime Lights of the Earth", and images of Earth, other celestial bodies, and deep space. The sphere also has the capability to rotate providing everyone in the room a view of the Earth from every angle. <http://www.nasa.gov/centers/goddard/visitor/exhibits/sphere.html>



Queen Elizabeth II and Prince Philip attend a demonstration on Science on a Sphere.

Their final activity at Goddard was a tree planting ceremony, near the large, Delta rocket behind the VC. The dogwood tree planted is the state tree of Virginia.



*Voyage of Discovery*

For more pictures and highlights of Queen Elizabeth II and Prince Philip visit to Goddard, please see: [http://www.nasa.gov/centers/goddard/news/topstory/2007/queen\\_visit.html](http://www.nasa.gov/centers/goddard/news/topstory/2007/queen_visit.html)

## Science News

NASA Science News has published several articles last month. Please follow the links to read the full stories. Check out our RSS feed at <http://science.nasa.gov/rss.xml>!



### **A Massive Explosion on the Sun**

Last December, Japan's Hinode spacecraft observed a massive explosion on the sun. Researchers analyzing the data have produced a must-see movie of the flare's magnetic underpinnings.

[http://science.nasa.gov/headlines/y2007/24apr\\_hubble4sun.htm?list907815](http://science.nasa.gov/headlines/y2007/24apr_hubble4sun.htm?list907815)

### **Noxious Lightning**

Lightning is more than just heat and light: it's a chemical factory that produces a natural pollutant called "NOx" that may affect both local air quality and global climate. NASA scientists are developing new ways to monitor lightning NOx from Earth orbit. [http://science.nasa.gov/headlines/y2007/27apr\\_nox.htm?list907815](http://science.nasa.gov/headlines/y2007/27apr_nox.htm?list907815)

### **Fantastic Flyby**

NASA has released stunning new images of Jupiter and its moons taken by the New Horizons spacecraft. Highlights include a movie of a volcanic eruption on Jupiter's moon Io; a nighttime shot of auroras and lava on Io; a color photo of the "Little Red Spot" churning in Jupiter's cloudtops; images of small moons herding dust and boulders through Jupiter's faint rings. The gallery featured in today's story is a must-see.

[http://science.nasa.gov/headlines/y2007/01may\\_fantasticflyby.htm?list907815](http://science.nasa.gov/headlines/y2007/01may_fantasticflyby.htm?list907815)

## Preventing "Sick" Spaceships

Wherever humans go, microorganisms follow--and that includes space. Bacteria and other microbes living aboard spaceships may not only cause health problems for the crew, but also cause the spaceship itself to malfunction. Read today's story to learn more about this problem and what NASA is doing to prevent it.

[http://science.nasa.gov/headlines/y2007/11may\\_locad3.htm?list907815](http://science.nasa.gov/headlines/y2007/11may_locad3.htm?list907815)

## The Equivalence Principle

In the folklore of physics, no story is better known than the tale of Galileo dropping balls from the Leaning Tower of Pisa and proving that gravity accelerates all objects equally regardless of their masses or composition. This is called the "equivalence principle," and it is a cornerstone of modern physics. But was Galileo correct? Fantastically small violations of the equivalence principle may in fact exist, providing a test of string theory and pointing the way to an all-encompassing Theory of Everything.

[http://science.nasa.gov/headlines/y2007/18may\\_equivalenceprinciple.htm?list907815](http://science.nasa.gov/headlines/y2007/18may_equivalenceprinciple.htm?list907815)

## Librarian News

Here's what's going with some of the librarians who participated in the workshops

**Colorado:** I would like to welcome all of our new Colorado librarians.

**Pennsylvania:** Leslie Talon, The Free Library of Springfield Township, is planning on having a Space Sleuth camp. Brooke and Heather will be presenting on June 19<sup>th</sup>. The following week, Dave Everett will be presenting an evening with LRO. It should be an exciting time.

## What's going on at your library??

Email Heather, [heather\\_weir@ssaihq.com](mailto:heather_weir@ssaihq.com), with your library's space program activities by June 15<sup>th</sup>, and it will be included in the next Lunar Librarian Newsletter. Feel free to send along pictures from your workshops.

## Did you know?? Where can I find??

## Suggestions for our new librarians?

"I would definitely suggest that the librarians check with their local schools to see at what grade the moon is taught. In one of our literature books there is a story about the moon and it offered a wonderful opportunity for me to collaborate with them. They all came down and we did the sky tellers Moon phases story. It fit in perfectly with what they were doing and gave me chance to highlight other lunar literature!" ~ Jeanne Mayo, Carrolltowne Elementary School

## Links of the Month...

- Explore the Moon ~ LPI. This site contains information about why we decided to go to the Moon and about previous explorations. As this page states: *An extensive source of information on past and future missions to the Moon.* <http://www.lpi.usra.edu/expmoon/>
- “Our Moon” animation by the American Museum of Natural History. “Evidence suggests that the Moon formed when a Mars-sized object collided with the young Earth, and detailed computer models show us how such an impact could form our lunar companion in just one month.” <http://sciencebulletins.amnh.org/?sid=a.v.moon.20061004&src=b>.
- MESSENGER has its second flyby of Venus June 5<sup>th</sup>. On its second flyby, MESSENGER will be taking pictures of Venus and all of her marvel. For more information, please check out: <http://messenger.jhuapl.edu/>
- DAWN, set to launch on June 30<sup>th</sup>, will investigate two of the largest protoplanets in the main asteroid belt, Vesta and Ceres. To find out more, please visit: <http://dawn.jpl.nasa.gov/>
- New Horizons: Images of Jupiter - Graphics from Science Briefing. A variety of different images and graphics of Jupiter and the Galilean Moons are available. They would be a great resource for you in your classroom. [http://pluto.jhuapl.edu/news\\_center/news/050107\\_pressGraphics.htm](http://pluto.jhuapl.edu/news_center/news/050107_pressGraphics.htm)
- TeacherTube. You’ve heard of YouTube, now there’s TeacherTube. “Our goal is to provide an online community for sharing instructional videos. We seek to fill a need for a more educationally focused, safe venue for teachers, schools, and home learners. It is a site to provide anytime, anywhere professional development with teachers teaching teachers. As well, it is a site where teachers can post videos designed for students to view in order to learn a concept or skill.” <http://www.teachertube.com/>

## Monthly Lunar Activity

### Creating a Scale Model of the Earth-Moon System

#### *Background:*

The diameter of the Earth at the equator is 12,756 km, while the Moon's diameter is 3,476 km. Therefore, the Moon's diameter is 27.25% of Earth's diameter. To compare these two on a more manageable scale, we will use an official basketball with a diameter of 24 cm to serve as a model for Earth. A tennis ball having a diameter of 6.9 cm, roughly 27.25% of the basketball will represent the Moon. (The tennis ball is actually 28.8% the size of the basketball.) These values are relatively close to the size relationship between Earth and the Moon.

Finding the circumference of the Earth at the equator:  $C = 2\pi r = \pi d$

Where  $r$  = radius of the Earth and  $d$  = diameter of the Earth  
 $C = 40,074$  km

The average distance between the Earth and Moon is 385,000 km. The actual Earth-Moon distance ranges from about 360,000 to 405,000 kilometers, depending on the position in the Moon's orbit.

We find that the distance to the Moon is approximately 9.5 times the circumference of the Earth.

#### *Activity:*

Using an official basketball and tennis ball, have the students estimate how many times one would have to go around the Earth at its equator to estimate the distance to the Moon. While wrapping the string around the "equator" of the basketball, have the students tell you when to stop. Discuss why they chose that number of revolutions. After the discussion, adjust the number of revolutions accordingly so it is wrapped around the "equator" 9.5 times.

Next, have the students estimate where they think the distance the scaled 'Moon' would be located at or how far 9.5 times the diameter of the basketball is. This should be a class discussion as to where they think this distance is. Once the students have made their decision, mark the distance with either masking tape or have a student stand at that point. While holding one end of the string to the "Earth's" surface (at the equator), have another student walk the "Moon" out the distance of the string. The distance the student should travel will be approximately 7.2 meters when using the basketball/tennis ball system. Did they estimate correctly? Have them discuss why their estimation was off.

You've just constructed a rough model of the Earth-Moon system with scaled size and distance.