

# Up To Date

NASA IV&V Facility  
Educator Resource Center  
Newsletter

September, 2008

Volume 1, Issue 2

## NASA IV&V Facility ERC

### NASA Update: Hubble Space Telescope Servicing Mission 4



The Hubble Space Telescope (HST), which has precisely measured the age of the universe, found evidence of dark energy, and brought us images of distant galaxies in the young universe will soon look onto the universe with new eyes, after the upcoming HST Servicing Mission 4 (SM4).

SM4 has an ambitious program of activities and three objectives:

**First Objective:** Extend HST's operational life by 5+ years. Through five spacewalks, astro-

nauts will replace all six gyroscopes, install new batteries, replace a degraded Fine Guidance Sensor, install replacement thermal insulation on critical component bays, and attach a mechanism that will aid in Hubble's final de-orbiting.

**Second Objective:** Enhance HST's scientific power. Astronauts will install two new instruments. The Wide Field Camera 3, which sees in visible, infrared, and ultraviolet light will improve HST's sensitivity 10-30 times. The Cosmic Origins Spectrograph will improve Hubble's sensitivity at least 10 times and is particularly important because it sees in ultraviolet light. The Earth's atmosphere's absorption of ultraviolet light from space makes ground based observations impossible.

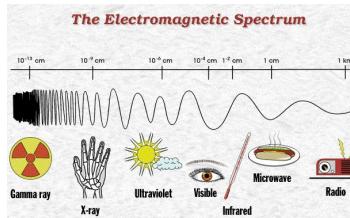
**Third Objective:** Repair Hubble's out-of-commission instruments.

The Imaging Spectrograph was used to examine black holes, quasars, and planets before it stopped working in 2004. The Advanced Camera for Surveys is Hubble's most prominent camera and gave us the Hubble Ultra Deep Field Image, NASA's deepest view of the cosmos before it failed in 2007.

These updates will keep Hubble functioning at the pinnacle of astronomy well into the next decade.

All information and image obtained from [http://hubblesite.org/servicing\\_mission\\_4/](http://hubblesite.org/servicing_mission_4/).

Learn more about the HST at our ERC Info Session, Sept 23, 6pm.



### Featured Implementer: This Could be You and Your Learners!

Remember, this section is just waiting for you. We want to feature how you are implementing NASA materials from one of our workshops or equipment from our equipment loan program in your educational setting (classroom, afterschool program, etc).

To submit, send us an article picture with caption, and article between 175-225 words in length to [erc@ivv.nasa.gov](mailto:erc@ivv.nasa.gov).

If your article is chosen for this newsletter, you will receive hard copies of the article and a NASA surprise for each of your

learners who participated in the described activity.

Submissions are accepted on continuous basis, but deadline for submission is the 15<sup>th</sup> of every month for the following month's edition. Articles may be held for future editions.

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### Important Dates:

- Sept 13 Robotics Workshop at ERC
- Sept 14+ Launch of TacSat-3
- Sept 23 Hubble Space Telescope Workshop at ERC
- October 5 Launch of IBEX
- October 6 MESSENGER 2nd Flyby of Mercury
- October 10+ Launch of STS 125 Hubble Space Telescope Servicing Mission 4
- October 8 Imagine Mars Workshop at ERC
- October 14 Lunar Nautics Workshop at ERC

Don't forget to  
register!

## Upcoming Workshops

Don't forget these great **September** workshops at the NASA IV&V Facility ERC in Fairmont, WV.

**Robotics** kicks off this fall with a workshop on Saturday, Sept 13 from 10:00-4:00.

The **Hubble Space Telescope** informational session Sept 23 at 6:00.

**Please register at least one week prior to all workshops.**

### October Workshops

October 8 is the **Imagine Mars** workshop for educators of grades 3-8 at 6:00. This national educational initiative that leads learners to create a futuristic Mars community. Ties with math, science, social studies, and language arts standards.

**Lunar Nautics** comes to educators of grades 3-8 on October 14 at 6:00. Explore how your students can assume roles in a fictional aerospace company to design a lunar mission.

Learn the Engineering Design Process with **Engineering Design Challenge: Launch Platform**, a Project Based Learning activity on October 28 from 6:00-8:00. Targets educators of grades 5-12.

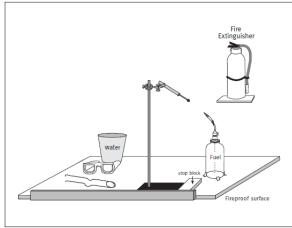
This month you can learn to program LEGO NXT robots and learn about the Hubble Space Telescope Servicing Mission 4 all at your ERC in Fairmont, WV!

## Featured NASA IV&V Equipment Loan Kit: Engineering Design Challenges

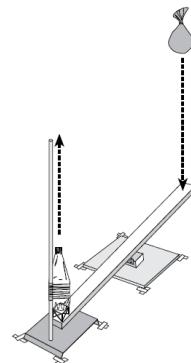
The NASA IV&V Facility ERC has developed two great kits which are ready for you to easily take Project Based Learning into the classroom. Both kits come with a complete educator's guide and all the materials you will need for your students to design and test their solution to the challenge. While each covers their own particular concepts, each allow your students to work with the engineering design process to succeed.

Attend an Engineering Design Challenge Workshop to get certified to take advantage of these kits. Once certified, each kit is available to you for a 2 week loan.

**Thermal Protection System (TPS)** has students work with the concepts of heat and conduction to design a system which will keep their "space craft" safe from the heat of a blow torch, which simulates the heat caused by reentry.



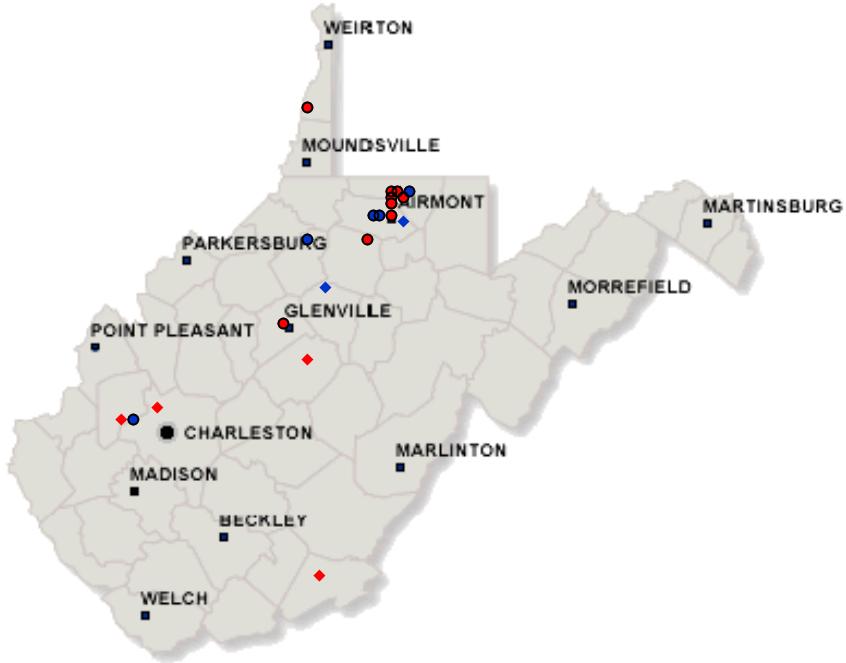
**Launch Platform** works with Newton's Laws and engages learners in the task of building a thrust structure that is both strong and light.



**Opportunities for Certification at ERC:**  
**Launch Platform:** October 28, 6:00  
**Thermal Protection System:** April 29, 6:00

## Where in WV is the NASA IV&V Facility ERC?

- ◆ **August Equipment Loan**
- ◆ **August Workshops**
- ◆ **August Video Conferencing**
- **2008-2009 Equipment Loan**
- **2008-2009 Workshop**
- **2008-2009 Video Conferencing**



# Challenger's Lost Lessons



In 2007, the space shuttle mission STS-118 launched with Christa McAuliffe's back-up Teacher in Space candidate, Barbara Morgan. Over 20 years has passed since the loss of the Challenger's crew on January 28, 1986. That mission, had it been

completed, would have brought Christa McAuliffe's six science lessons to children around the world.

A NASA educational specialist, Bob Mayfield, wrote a description of the six planned activities, focusing on the science and engineering performed in the conception and planning of the lessons, and describing related earth-based exercises. Mock-up planning practices of the activities and zero gravity demonstrations on video were collected with Mr. Mayfield's narratives and are now made available to help teachers understand and teach Christa's lessons. All six scripted experiments include a

materials list, set up and step-by-step instructions for teachers to use in the classroom with students.

Using these activities, teachers can replicate that which Christa was not able to share from orbit. Christa's wonderful teaching gift and spirit are captured on the videos, and her remarks and actions in training accomplish most of her lessons plans.

This information was gathered from and more information can be found at <http://www.challenger.org/programs/51Lessons.cfm>.

**"I touch the future, I teach"**  
~ Christa McAuliffe

## Featured STEM Career: Space Suit Designer

### Job Description:

Currently, develop a new pressure garment for the Constellation Program, which will carry humans back to the moon and beyond. Research what astronauts will need to do in the suits and then develop suit architecture that will allow it. The design should allow the suits to perform different functions while taking up less space.

### Current Job Holder Qualifications:

Earned a bachelor's degree and a master's degree in mechanical engineering. Co-op student through the NASA Cooperative Education Program.

### Quote from Current Job Holder:

"It's a challenge. You're always widening your path toward the ideal. Ideally you'd build a space suit that weights almost nothing, is very comfortable, allows you to move as if you don't have a space suit on. There is probably an unattainable ideal out there, but you're always working toward that."

### Learn More:

Information gathered from  
*Amy Ross, Space Suit Designer*  
[http://www.nasa.gov/audience/foreducators/stseducation/stories/Amy\\_Ross\\_Profile.html](http://www.nasa.gov/audience/foreducators/stseducation/stories/Amy_Ross_Profile.html)



Astronaut conducts a spacewalk.  
Image Credit: NASA

**When Constellation suits are flow, it will be the first time in 30 years NASA has used a new space suit. According to Ross, the new suits have quite a bit more required of them.**

## Featured NASA Product: Space Ranger Education Series

A new educational initiative between NASA and Disney Parks launched this spring. A 12 inch Buzz Lightyear action figure joined astronauts on the International Space Station as part of the partnership to encourage students to pursue studies in science, technology, and mathematics.

Disney's Youth Educational Series and NASA have developed an online program known as the Space Ranger Education Series. It includes fun educational games for students, as well as materials for educators to download and integrate into their classroom curriculum.

The online games featuring Buzz Lightyear can be viewed by clicking on NASA Kid's Club on [www.nasa.gov](http://www.nasa.gov) or search for educational resources by clicking "Find Teaching Materials" from the Educators Tab.



## Free Web Casts

### **Imagine Mars Online Training**

Providing general overview of the Imagine Mars Project Friday, October 3 8:30pm  
<http://imaginemars.jpl.nasa.gov/getstarted/educatorchats.html>

### **Hubble Public Lecture at STSI**

*An Idea that Would Not Die: The Story of the Hubble Space Telescope and the Visionaries Who Built It* Tues, Oct 7 8:00pm  
[http://hubblesite.org/about\\_us/public-talks.shtml](http://hubblesite.org/about_us/public-talks.shtml)

### **NSTA/ NSDL Web Seminar:**

*Beyond Penguins and Polar Bears: Physical Science from the Poles* Wed, Oct 29 6:30pm  
[http://learningcenter.nsta.org/products/symposia\\_seminars/NSDL3/Webseminar2.aspx](http://learningcenter.nsta.org/products/symposia_seminars/NSDL3/Webseminar2.aspx)

## NASA IV&V Facility ERC

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We're on the web!

<http://erc.ivv.nasa.gov>

**Submit story ideas and pictures to  
marcie.raol@ivv.nasa.gov**

The NASA Independent Verification and Validation Facility Educator Resource Center's goal is to serve teachers, informal educators, and preservice teachers to enable them to reach their goals. Through a grant with Fairmont State University, the NASA IV&V Facility ERC provides materials, equipment for loan, and professional development workshops both at the facility and around the state of West Virginia (scheduled upon request) for educators that reflect NASA's current research and technology.



## Featured Workshop: AmeriCorps Members Take a Galactic Vacation!

48 AmeriCorps Members joined Marcie Raol, Elementary Education Specialist, and Amy Friend, Intern, from the NASA IV&V Facility ERC at Camp Virgil Tate in Charleston, WV to take a galactic vacation. The journey took four hours and participants came back excited to use NASA math and science materials with their students from grades K-8.

The journey began with an activity to learn about discovering distant planets by looking at Stellar Wobble. Then participants gained knowledge about remote sensing and how satellites work.



**Participants find a way to protect their UV Man!**

They explored their first planetary stop by taking core samples and then started making plans about building a community on Mars. Working in groups, participants used the activities from Imagine Mars to learn about Mars and begin to plan a community there for 100 people. They were especially careful to think about ultraviolet rays after their UV men and women were forever altered by their experience in the harsh environment.

Concerned about the length of time the rest of the journey may take, Marcie and Amy lead the group through activities to determine the distance between planets and even created scale models. Seeing they were quite far from home, they decided to return a little closer and explore on the moon.

**Marcie assists participants during an activity.**



On the moon participants learned about craters, explored how craters were formed, and discovered the ways different velocities of meteorites altered the moon landscape.

It was a busy vacation, but one all enjoyed. One participant summed it up with "I really enjoyed this program and they made science really interesting."

Contact Marcie to book your Galactic Vacation!