



National Aeronautics and Space Administration

## Voyages in Education and Public Outreach An Office of Space Science Newsletter

May 2002

Issue 5

### Techbridge Girls Take a Virtual Field Trip to NASA JPL

*Etta Heber and Linda Kekelis, Chabot Space & Science Center*

How do you bring together a group of girls from Oakland, California that are interested in technology and female scientists from the Jet Propulsion Laboratory in Pasadena? With technology, of course. What began as a dream, culminated in a satellite broadcast via NASA Select Television on January 13, 2002. Approximately four hundred young women and their families participated in the live event in the Tien MegaDome Theater at Chabot Space & Science Center and the von Karman Auditorium at NASA JPL, listening to presentations from women scientists and asking questions of the panelists.

This event supported Chabot Space & Science Center *Techbridge* program to inspire girls' interest in technology areas. Stephenie Lievens, Educational Outreach Coordinator at JPL, comments that, "NASA has a unique opportunity—and I think responsibility—to provide role models to young women in math, science, and technology. The *Women in Technology and Science* broadcast was one way to do that. The relaxed format allowed us to dispel the myth that scientists are nerds with lab coats and pocket protectors, and to present women engineers and scientists as the interesting and approachable people they are."

NASA JPL is not lacking for women scientists and engineers who wish to reach out to young girls. Panelists Jo Anne Alano, Andrea Donnellan, Ayanna Howard, Jennifer Mindock, Tracy Williams, and Shonte Wright enjoy their work and are committed to making careers in science and technology a more realistic pursuit for young women. These women were as moved by the

event as were the girls they inspired. "It is an incredible feeling to know that I am helping to open a girl's mind to the true possibility of a career in technology and science," says Jennifer Mindock.



### On the Inside

#### Updates

2001 E/PO Annual Report	2
E/PO Product Review	3
Solar System Ambassadors	3
Touch the Universe	4
Space Place <i>en Español</i>	4

#### Education Products

Mars Activities	4
Galaxy Hunter	5
Planet Quest	6
XMM-Newton Web Center	6
Space Mysteries	7

#### Education Programs

Connecting Sun City: Sun-Earth Connections	8
OSS E/PO Products Training Workshop	9
Chicago Space Science Symposium	10

#### Scientists in Education & Public Outreach

<i>On the Horizon</i>	12
-----------------------	----

Techbridge students, Alice Li and N'Gala McCoy, were invited to JPL for the satellite broadcast and to job shadow the role models. Both students returned with career aspirations influenced by their meetings with the JPL scientists. Techbridge teacher, Judy McGinty, chaperoned these students and shared that, "I was reminded of the powerful influence a teacher can have as these role models at JPL frequently cited their teachers as the persons who inspired them in the direction of their careers."

The impact of the broadcast did not stop the night of the event. Teachers and students have asked to show the videotaped broadcast to audiences at their schools so that they can get the message out to many more students. Etta Heber, Principal Investigator of *Techbridge* and Director of Exhibits, Media, and Technology at Chabot, is looking ahead, "We're already discussing how *Techbridge* and NASA JPL can build upon this success and follow up with an event next year."

*Techbridge* programs are hosted at middle schools and high schools in Oakland, California and at the California School for the Blind. Designing web pages, making movies, publishing a school newsletter, programming, and building robots are just some of the projects underway this year. In addition, the program offers training and resources for teachers, counselors, and parents. *Techbridge* is funded by the National Science Foundation. If you are interested in learning more about *Techbridge*, please visit the Web site at <http://www.chabot.space.org/visit/programs/techbridge.asp> or contact Dr. Linda Kekelis at (510) 336-7332. Learn more about JPL's outreach program by contacting Stephenie Lievensen at (818) 393-6729, <http://www.jpl.nasa.gov>.



Alice Li and N'Gala McCoy at NASA JPL.

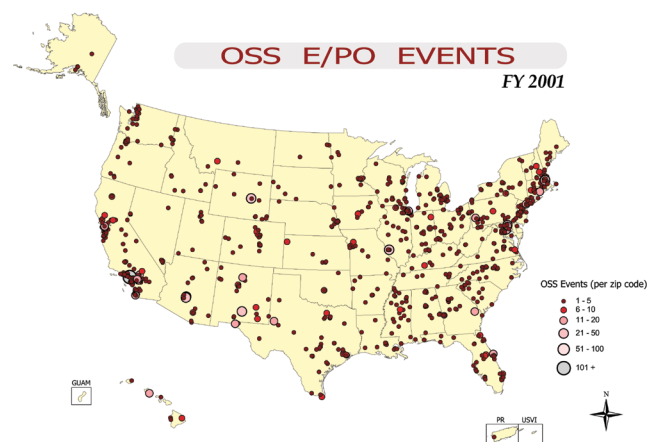
## Updates

### FY 2001 Annual Report Exceeds Expectations

The FY 2001 OSS E/PO Annual Report summarizes more than 400 Office of Space Science (OSS) education and public outreach (E/PO) activities carried out and new products developed in FY 2001. Taking into account that many of the reported activities involved multiple events that took place in a variety of venues, the total number of E/PO events reported was nearly 3,000. Events took place in all 50 States, the District of Columbia, and Puerto Rico.

These efforts were made possible by the direct participation of more than 100 OSS missions and programs and nearly 900 OSS-affiliated scientists, technologists, and support staff. They relied heavily on high-leverage partnerships with nearly 500 institutions and organizations, including science museums, precollege educational organizations, research laboratories, professional societies, libraries, and community organizations.

Public recognition of the quality of these efforts was shown by the more than 50 awards and other forms of recognition that they received. The Annual Report is available online at <http://spacescience.nasa.gov/education>. Inquiries about this report may be directed to Dr. Philip Sakimoto at [phil.sakimoto@hq.nasa.gov](mailto:phil.sakimoto@hq.nasa.gov).



Nearly 3,000 E/PO events took place under OSS sponsorship in FY 2001, encompassing all 50 States, the District of Columbia, and Puerto Rico.

## NASA OSS Education Product Review

Elaine Lewis, NASA GSFC

Developers submitted fifty four education products and resources for K-12 audiences to the 2001 NASA OSS Education Product Review. Panels of educators, curriculum and instructional design specialists, teacher trainers, and space scientists reviewed these newly developed or updated space science education products which had been developed or funded by NASA OSS. The recommendations were as follows:

- 8 were ready for broad distribution
- 8 were ready for broad distribution and use in educator workshops
- 8 were ready for broad distribution with revisions in the next printing
- 3 were ready for educator workshops with revisions in the next printing
- 19 needed minor to moderate revisions
- 5 needed major revisions
- 1 was not recommended
- 2 were products for informal education venues

Having products reviewed has several benefits for the developers, including official endorsement and national recognition. Products recommended for national distribution are considered for printing and distribution by NASA at national conferences. Products recommended for distribution through teacher workshops are included in the annual OSS Education Products workshop for NASA educators (see story on page 9). Recommended products are listed in the OSS Space Science Education Resource Directory (<http://teachspacescience.stsci.edu>) as having achieved exemplary status through the review process.

Web sites are reviewed in a separate process through *SciLinks* (<http://www.scilinks.org>), a joint effort between NASA and the National Science Teacher Association (NSTA) and may be submitted at any time. *SciLinks* is an online supplement to textbooks with links to the latest information related to textbook topics. The web sites that pass the review are listed in the OSS Education Resource Directory and also become *SciLinks* sites.

The products for the 2002 Review are being submitted in May 2002 and the results of the review will be released in September. Product

developers should contact the OSS Forum Review Leads for information on submitting for next year's review.

### OSS Forum Product Review Leads

#### Sun Earth Connection

Elaine Lewis: ([lewis@mail630.gsfc.nasa.gov](mailto:lewis@mail630.gsfc.nasa.gov))  
(301) 286-3337

#### Solar System Exploration

Rosalie Betruie: ([Rosalie.Betruie@jpl.nasa.gov](mailto:Rosalie.Betruie@jpl.nasa.gov))  
(818) 393-5388

#### Structure and Evolution of the Universe

Sandra Daly: ([sdaly@cfa.harvard.edu](mailto:sdaly@cfa.harvard.edu))  
(617) 496-4784

#### Astronomical Search for Origins

Carole Rest: ([crest@stsci.edu](mailto:crest@stsci.edu))  
(410) 338-4590

## Solar System Ambassadors

*Kay Ferrari, NASA Jet Propulsion Laboratory*

The NASA Solar System Ambassadors program has inducted its 2002 class of 278 Ambassadors, representing all 50 states and Puerto Rico. The Solar System Ambassadors Program is a public outreach program using motivated volunteers across the nation to organize and conduct public events communicating exciting discoveries and plans in Solar System research, exploration and technology at nontraditional venues, e.g. community service club meetings, libraries, museums, planetariums, star parties, mall displays, etc. Last year, Ambassadors conducted about 960 events directly reaching 2.6 million people in communities across the country. There are 124 new Ambassadors and 154 are continuing from the 2001 program. This is the first year since the formation of the Solar System Ambassadors Program in 1999 that all 50 states will be served by these enthusiastic volunteers. Their success has been noted by frequent press coverage of their events, offers of support by private companies, and increasing numbers of requests for ambassadorships from volunteers inside and outside the United States. The Ambassadors program was featured in *Voyages*, January 2001, <http://spacescience.nasa.gov/education/news>.

## **Touch the Universe published by the Joseph Henry Press**

*Bernhard Beck-Winchatz, DePaul University*

*Touch the Universe - A NASA Braille Book of Astronomy* (see *Voyages*, September 2001) is now available through the Joseph Henry Press, which is a division of the National Academy of Sciences. Orders can be placed on the National Academy Press web site - <http://www.nap.edu/catalog/10307.htm>. The book was developed with funding from the Hubble Space Telescope (HST) Guest Observer Program. It contains tactile representations of twelve HST images, and two images of the telescope itself, supplemented by explanatory text in Braille and large print. For more information regarding *Touch the Universe*, please contact Bernhard Beck-Winchatz, [bbeck@condor.depaul.edu](mailto:bbeck@condor.depaul.edu).

## **NASA Targets Kids *en Español***

*Nancy Leon, NASA Jet Propulsion Laboratory*

NASA's popular educational Web site, *The Space Place*, has launched a new Spanish language version for children, their families, and their teachers. The Web site at <http://spaceplace.nasa.gov> and its new Spanish language companion at <http://spaceplace.nasa.gov/espanol> target children from 8 to 13 years of age. Each site currently includes about 50 activities, including projects, interactive demonstrations and games, and "amazing facts" about space, Earth, and NASA.

The Spanish version of the site was developed to respond to the over 27 million people living in the US for whom Spanish is the primary language. What is more, of those, nearly 13 million do not feel very comfortable with English. Dr. Jeffrey Rosendhal, Education and Public Outreach Director for NASA's Office of Space Science, Washington, D.C., says, "This Web site is dedicated to reaching that audience. NASA is committed to explaining the results of its programs to the entire American public in all its diversity."

*The Space Place* Web site launched in early 1998 and continues to be enhanced and adds new activities each month. Its educational value has been recognized and commended by several organizations, including the National Science Teachers Association and the International Technology Education Association, and has received more than a dozen children's educational Web site awards.

*The Space Place* is an outreach effort of the New Millennium Program, but is open to participation by all NASA missions. Currently, 36 missions are represented. The New Millennium Program is managed for NASA by the Jet Propulsion Laboratory, Pasadena, California.

*The Space Place* outreach program, which includes other educational products in addition to the Web site and a has wide network of dissemination partnerships, was featured in *Voyages*, January 2001, <http://spacescience.nasa.gov/education/news>.

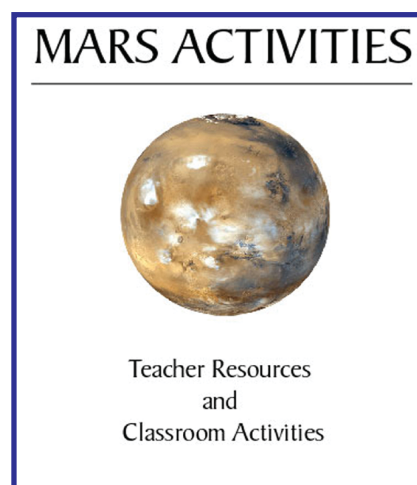
## *Educational Products*

### **Mars Activities: Space Exploration in the Classroom**

*Keith Watt, Arizona State University*

Teachers across the country have discovered that the excitement NASA's exploration brings to their students can also serve as a very effective motivator and springboard for learning. However, teachers often have difficulty finding a motivating hands-on resource to use – particularly one that is aligned with science education standards.

To address this need, the Mars Education Program at Arizona State University in Tempe, Arizona, has produced a book entitled, *Mars*



*Activities: Teacher Resources and Classroom Activities.* This 128 page document assembles a collection of over twenty-five standards-aligned, hands-on activities for teachers of students in kindergarten through twelfth grade. Each activity has been extensively field tested by master teachers across the United States and in a wide range of educational settings. In addition to being available on CD-ROM, this activity book can be downloaded from the Mars Student Imaging Project Web site (<http://msip.asu.edu/pages/pdfs/MSIP-MarsActivities.pdf>) in Adobe's Portable Document Format (PDF).

Each activity follows a similar format. An introductory section provides the background and context for the activity and often provides tips for implementing it in the classroom. The standards (National Science Education Standards [NRC, 1996]) met by the activities are identified. A materials list is included with every activity. The materials required are generally very common, low-cost, and easy to find. The activity procedure itself is designed to be very teacher-friendly, further enhancing the appeal for the collection to the classroom teacher. Activities range in topic from standard science topics such as lava layering and the relative sizes of the moon and planets, to current topics in space exploration, such as the current generation of Mars spacecraft and the search for life on Mars. All of these topics and activities can be readily integrated into the science curriculum of any K-12 classroom.

### Test Your Skills as a "Galaxy Hunter"

*Space Telescope Science Institute*

In *Galaxy Hunter*, a new, online educational lesson, ninth through twelfth-grade students can use actual data from the Hubble Space Telescope to study galaxies in deep space. They can journey to the deepest regions of space to wrestle with the cosmic giants called galaxies and learn mathematical skills scientists have used to unlock many galactic secrets. The galaxies they study are part of the Hubble North and Hubble South Deep Fields, the clearest, most distant views of the universe ever obtained.

The interdisciplinary lesson blends astronomy and math skills and was produced by the Office of Public Outreach at the Space Telescope Science Institute in Baltimore, Maryland. A team of

scientists, teachers, artists, and web programmers developed interactive activities to bring the results of cutting-edge astronomical observations into the classroom. Students can now analyze the same faraway galaxies that dazzled astronomers and sample the types of galaxies found in the early universe. Then they can compare their samples with those of astronomers to determine whether the galaxies in the two deep fields are similar. Along the way, they'll learn about bias in sampling techniques and the role of sample variability in determining the optimal sample size. Based on their sample analysis, students will try to answer the same question as the astronomers who observed the deep fields: "Does the universe look the same in all directions?"



Released in January 2002, *Galaxy Hunter* also includes a teacher guide that helps prepare educators to present the lesson in the classroom. In the guide, teachers can find science background information, which explains the galaxy types, the galaxy classification system, and how astronomers selected the Hubble Deep Fields. The lesson also adheres to national education standards for grades 9 to 12. When students are finished hunting for galaxies, they can try unscrambling the schedule for a Hubble telescope servicing mission. In *Be the Mastermind Behind the Mission*, another online, interactive activity, students can play the role of NASA scientist by attempting to fix a mixed up order of events for the Hubble servicing mission. Their job is to place, in proper order, the schedule of servicing mission events, which includes spacewalks and the launch of the space shuttle. The interdisciplinary lesson tests reading and technology skills, and is aimed at sixth- through eighth-graders. The lesson was released in February 2002 to coincide with Servicing Mission 3B to upgrade the Hubble telescope.

Both lessons can be found on the Amazing Space Web site:

<http://amazing-space.stsci.edu>.

## Navigator Program debuts *Planet Quest*

Randal Jackson, NASA Jet Propulsion Laboratory

The Navigator Program has launched a comprehensive Web site for news about extrasolar planets and the missions that study them. The site is called *Planet Quest: the Search for Another Earth* and the URL is <http://planetquest.jpl.nasa.gov>.



The Navigator program brings together the Keck Interferometer, the Space Interferometry Mission (SIM), Terrestrial Planet Finder (TPF), StarLight and related projects as part of the long-range quest to find habitable planets outside our solar system.

The *Planet Quest* Web site is for nontechnical audiences who may have heard about the discovery of new planets and want more information. At the same time, *Planet Quest* includes technical sections targeted toward engineers and scientists. The site has articles that cover the history of planet searches, current theories about planet formation, the science of interferometry, and the various methods used to detect unseen planets located light-years away, as well as detailed descriptions of the Navigator program missions. For educators, there is an extensive catalog of online resources related to planet searches. The site also includes several interactive modules:

- A virtual-reality tour of the Keck Interferometer, located at 4,150 meters (13,600 feet) on an extinct volcano in Hawaii. More than 200 digital images were stitched together to create a seamless virtual walk through of this remote location, which few get to visit in person. Clickable “hotspots” provide descriptions of what viewers are seeing.

- A 3-D model of Upsilon Andromedae, the first multiple-planet system discovered around another star. This simulation allows users to select various viewpoints from which to explore a distant planetary system.

- *The New Worlds Atlas* provides a complete database of all extrasolar planets that have been discovered thus far. Users can sort the information

by method of detection, type of planet, visibility of the host star to the naked eye, and other search criteria.

Those who are really keen to keep up with the latest developments can sign up for membership in the *Planet Finder Club* for special news alerts and opportunities for direct participation in projects.

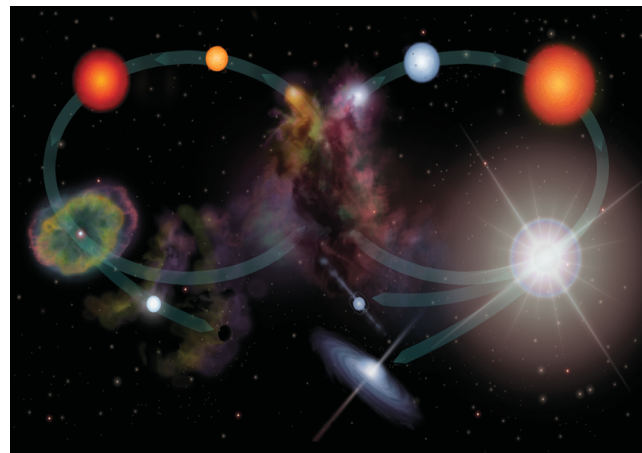
Response to the site has been enthusiastic and has drawn widespread media coverage, with articles by CNN.com, Space News, Yahoo!, the Christian Science Monitor, and Science magazine. The ultimate goal is to provide a definitive news and information portal on planet hunting for both the public and technical communities.

## XMM-Newton Web Center: Lesson Plans and Activities on Chemistry and Spectroscopy of Stars and Supernova Remnants

Ilana Harrus, NASA Goddard Space Flight Center

When and where are the chemical elements created? How do gases get heated to X-ray emitting temperatures? How far back in time can we detect X-ray emission from quasars? These are some of the questions that XMM-Newton, an X-ray satellite put into orbit by the European Space Agency will help us answer.

The XMM-Newton E/PO effort is being led by the University of California at Santa Barbara and the XMM-Newton Guest Observer Facility at the NASA Goddard Space Flight Center (GSFC). A Web site has been established with a simple introduction to spectroscopy, which is the primary



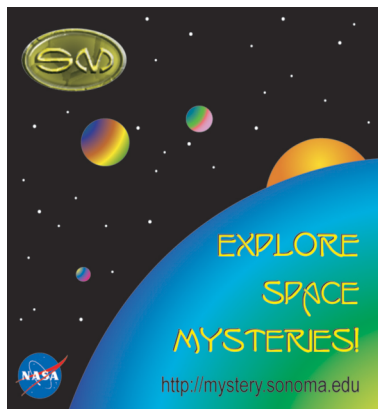
Life Cycles  
Credit: Alfred Kamajian

technique used by the XMM-Newton mission, and lesson plans for teachers. The lesson plans were designed by curriculum resource developers, Allie Hajian and Maggie Masetti in collaboration with teacher interns. Each section of the lesson plan has several pages of background material relevant to the associated activities and the lesson plan as a whole. The background sections include short exercises or questions developed to help students reach a better understanding of the material presented. Each section also has activities designed to bring important concepts in astronomy into the classroom. Each activity is correlated to national science and math standards for grades 9-12. For the younger audience, the XMM-Newton Learning Center offers a variety of games from puzzles to drawing-by-numbers. Children use the puzzle to recreate images from XMM-Newton and in the process learn about the satellite and X-ray pictures of the universe.

The XMM-Newton Learning Center also has a press center where all the discoveries and important results are posted within a day or two of their release. The Web site of the XMM-Newton Learning Center is [http://heasarc.gsfc.nasa.gov/docs/xmm\\_lc/](http://heasarc.gsfc.nasa.gov/docs/xmm_lc/). A mirror site is at Santa-Barbara <http://outreach.ucsb.edu/xmm/>.

### **Space Mysteries: A Fun, Interactive Way to Teach Physical Science, Mathematics and Astronomy**

*Lynn Cominsky and Philip Plait, Sonoma State University*



Are the strange sounds heard by the recording executive really coming from aliens? What is causing the star O2.2 to emit a tongue of flame? And does it have anything to do with what is causing the earthquakes on the planet 2-Alpha? The answers to these questions and many more can be uncovered as part of an interactive learning environment called *Space Mysteries*.

Developed by Professor Lynn Cominsky's team at Sonoma State University and funded by NASA through the LEARNERS project, *Space Mysteries* are inquiry-driven, interactive, Web investigations aimed at high school and college students. The student plays the part of a "Space Sleuth" who is given an assignment to solve an astronomy-related Whodunit. Played individually or in teams, a series of clues must be deciphered to solve the mystery. Each mystery has been constructed to teach at least one of the important physical science standards (e.g. interactions of energy and matter, structure and properties of matter, energy, motion, or forces), and is accompanied by materials to be used by the classroom teachers.

Two of three planned mysteries have been completed and are now available online. In the first, *Alien Bandstand*, strange signals have been detected coming from space. The student's job is to determine if the signals are from aliens, or have a natural cause. The second mystery, *Live! From 2-Alpha*, takes place in the future when Ace Reporter Parnell lands on an alien planet as part of an exploration team. When the planet's star and then the planet itself begin to act strangely, it's up to the students to save Parnell before things get out of control.

One of the key aspects of the game is the use of an encyclopedia where terms and concepts are defined. A major portion of the encyclopedia is a series of video interviews with research scientists who are leaders in their respective fields. These scientists include the following:

- Jill Tarter, from the SETI Institute, who talks about how SETI searches for alien signals, and how they can be distinguished from natural causes;
- Dale Frail, from the National Radio Astronomy Observatory, who takes the student on a video tour of the Very Large Array in New Mexico;
- Gibor Basri, from UC Berkeley, who discusses stellar evolution;
- Geoff Marcy, also from UC Berkeley, who talks about the search for extrasolar planets;
- Jocelyn Bell-Burnell, from The Open University in the United Kingdom, on how she discovered pulsars;
- Craig DeForest, from the Southwest

Research Institute, on how the Sun's emissions can be translated into sound; and

- Susan Sakimoto, from NASA Goddard Space Flight Center, about the interior structures of planets and how planets form.

In addition, different scientific instruments are available in each mystery to gather data that the students use to understand what is happening. The mysteries also include actors who set up the story line and provide clues, as well as plenty of red herrings! To test the knowledge acquired by the students, two different assessment strategies have been implemented. In *Alien Bandstand*, a quiz is given to test the student's mastery of the properties of waves and reading graphs, part of

the deductive process needed to decipher the strange signals. In *Live! From 2-Alpha*, a series of challenges is presented, each of which must be passed in turn in order for the mystery to progress.

Teachers' guides for each game are available, with suggestions for additional activities and enhancements, as well as providing sample worksheets for the class. To find out all about the mysteries, the available resources, and of course to try to solve them yourself, see <http://mystery.sonoma.edu>. For more information regarding the mysteries, please contact Dr. Lynn Cominsky ([lynnc@charmian.sonoma.edu](mailto:lynnc@charmian.sonoma.edu)) or Dr. Phil Plait ([phil@universe.sonoma.edu](mailto:phil@universe.sonoma.edu)).

## *Educational Programs*

### *Connecting Sun City with Sun-Earth Connections*

*Ramon Lopez, University of Texas at El Paso*

*Connecting Sun City with Sun-Earth Connections* is a program focused on bringing the richness of space science to students and teachers in El Paso, Texas. El Paso is often called the "Sun City" because of its mild, nearly cloudless climate. The program is led by Dr. Ramon Lopez of the University of Texas at El Paso (UTEP) and involves faculty from every department in the College of Science. A key goal is to use the natural interest that students have about space to get them interested in pursuing science majors in college. Program components include the following:

- Visits to high schools
- Special events and a one-week summer science camp at UTEP for high school students
- A one-week summer program for teachers at UTEP, with focus on the Texas Essential Knowledge and Skills, plus school-year follow-up
- Integration of space science content into UTEP undergraduate courses

The program was one of 15 selected by NASA OSS to participate in a major effort to develop space science capabilities at minority universities. (For in-depth coverage see *Voyages*, May 2001, <http://spacescience.nasa.gov/education/news>).

El Paso students, many of whom are Hispanic, often have negative attitudes about science. To interest students in science majors, UTEP now hosts a series of visits by high school science classes. A typical visit begins with a brief introduction, followed by a hands-on activity that has a space science connection. For example, students have learned about the phases of the Moon, and calculated the speed of a Coronal Mass Ejection using a series of images from the SOHO spacecraft. Next there is a tour of UTEP research facilities and an opportunity to speak with undergraduate students, and finally pizza for lunch.

One thing that stands out from data collected before and after these visits is the initially negative attitudes that students have toward science careers. When asked the question, "What would your friends say if you told them that you were going to major in science in college?" - all too often the answer is something like - "They would say I was crazy. My friends don't like science." Fortunately, the post-visit surveys show considerable change in attitudes. A common comment is "I did not know that science is so cool, especially the space stuff." Those changed attitudes can produce surprising results. After one visit, the teacher sent a thank you note to UTEP. He noted that the day after their visit, 22 out the 25 participating students signed up for pre-



AP physics, and credited the visit for sparking that level of interest in the students.

The program also has an extensive effort to provide professional development and space science materials to teachers. The NASA OSS E/PO program has developed a variety of materials that can be used in classrooms in many different settings. However, teachers need professional development to use them. Last summer UTEP conducted a week-long program, in which space science content was presented in an inquiry-centered learning environment. Using a research-based approach to professional development (Mestre, 1994; Loucks-Horsley et al., 1998) provided both pedagogical and scientific content knowledge. Teacher response to the program and follow-up workshops was enthusiastic and teachers showed considerable growth in understanding of NASA Space Science education resources. The participating university faculty also felt that they had gained valuable information they could use in their own classes.

In addition to these teacher programs, another set of activities was undertaken with the Insights Science Museum which is located in El Paso. Insights Science Museum was exhibiting the *Space Weather Center*, a small traveling exhibit about space weather and its effects on Earth (*Space Weather Center* was featured in *Voyages*, January 2001, <http://spacescience.nasa.gov/education/news>.) Cheri Morrow, from the Space Science Institute, in Boulder, Colorado, came to El Paso and helped conduct a teacher workshop. By again providing effective models of science teaching with significant science topics, the evaluation showed considerable gains by the teachers, as well as a very positive response to the workshop as a whole. Most importantly, the workshops are building a sense of partnership with area teachers.

*Connecting Sun City with Sun-Earth Connections* is off to a good start. We are engaging students, teachers, and university faculty and expect the links we build with K-12 educators through this project will long outlast the project itself.

#### References:

Loucks-Horsley, S., Hewson, P., Love, N., and Stiles, K., *Designing Professional Development for Teachers of Science and Mathematics*. Thousand Oaks, CA: Corwin Press, 1998.

Mestre, J. P., *Cognitive Aspects of Learning Science*, Chapter 3 in *Teacher Enhancement for Elementary and Secondary Science and Mathematics: Status, Issues, and Problems*, eds. S. J. Fitzsimmons and L. C. Kerpelman, Abt Associates, Inc., Cambridge MA, 1994.



*Cheri Morrow, from the Space Science Institute leads workshop.*

## **NASA OSS E/PO Products Training Workshop**

*Elaine Lewis, NASA GSFC*

The first NASA OSS E/PO Products Training Workshop was held November 15-17, 2001 at Goddard Space Flight Center. The participants included representatives from the NASA Aerospace Education Specialist Program, the NASA OSS E/PO Support Network, the NASA Educator Resource Centers and NASA CORE. The three main goals of the workshop were to :

- train trainers in the use of E/PO products which required additional training in space science content
- establish a national network of qualified persons who can present the content through the educational products
- further develop the resources within the NASA Centers and OSS E/PO Support Network

Four E/PO products were presented by the product developers from each of the four OSS

E/PO Theme Forums. The participants will be using these new products in workshops supporting the educational requirements of the regions which they serve. The first national review and training workshop was an overwhelming success and is expected to facilitate increased use of Space Science Educational Products.

## Space Science in Chicago

*Carolyn Narasimhan, DePaul University*

In January 2002, DePaul University hosted the third annual Chicago Space Science Symposium which brought together one hundred and twenty teachers from the Chicago area. The focus of the Symposium was on integrating space science with reading, writing, and the arts. Lynn Moroney, a Native American storyteller and Dr. Jim Kaler, a university astronomer, gave truly complementary plenary addresses which showed how much a storyteller and astronomer actually have in common – both held the teachers spellbound with talks that reminded everyone of the mystery and wonder that drive our inquiry into the nature of the universe, and the beauty we find which we celebrate in art and literature.



*Dr. Jim Kaler (Left) and Lynn Moroney (Right) share ideas.*

The symposium was a product of the Chicago Teachers' Advisory, a partnership between the DePaul Broker/Facilitators and Chicago teachers. Their goal is to develop ways to bring space science to the school children of Chicago.

Members of the Advisory planned the symposium, led several breakout sessions, and are now taking the lead in developing follow-up activities. A team of ten teachers is building on literacy and science ideas to develop a thematic unit that incorporates story-telling and reading strategies, big ideas in science, and NASA space science discoveries. Another group of teachers will get the opportunity to become certified in the use of the portable planetarium known as StarLab, which was demonstrated at the symposium. A third group will explore ways to work with the Solar System Educators Program (See Voyages, May 2001, <http://spacescience.nasa.gov/education/news>)

Next on the agenda is a Space Science Symposium for teachers from rural Illinois and Indiana at Angel Mounds State Memorial Park, which is near Evansville, Indiana. This event will give the Chicago-area teachers a chance to share their excitement about space science with teachers in a brand new setting.

## *Profiles Of Scientists In Education & Public Outreach*

This profile is based on excerpts of an interview with Dr. Mark Voit about his involvement in Education & Public Outreach, specifically his participation in the traveling exhibition, *Hubble Space Telescope: New Views of the Universe*. The profile was jointly created by Cheri Morrow of the Space Science Institute (SSI), Wendy Pollock of the Association of Science and Technology Centers (ASTC), Christy Edwards of SSI, and Mark Voit, Space Telescope Science Institute (STScI).



*Dr. Mark Voit*

**Current Professional position:**

I am an Associate Astronomer and Lead Outreach Scientist at NASA's Space Telescope Science Institute (STScI) in Baltimore, Maryland. I came to STScI six and a half years ago, after a two-year appointment as a Hubble Fellow at Johns Hopkins University.

**Description of Mark's featured E/PO role:**

Beginning in 1998, I helped to develop *Hubble Space Telescope: New Views of the Universe*, a traveling exhibition produced jointly by STScI and the Smithsonian Institution Traveling Exhibition Service (SITES). Two versions of the exhibition—one totaling 5,000 square feet and the other, 2,000 square feet—began their tours at the Adler Planetarium in June 2000. I have also made public appearances and been a guest on radio programs, talking about the importance of the Hubble mission. For information on the exhibition *Hubble Space Telescope: New Views of the Universe*, please go to <http://hstexhibit.stsci.edu>.

**How he got involved with this program:**

Actually my involvement with SITES started when I attended an early concept development meeting in place of another scientist who couldn't make it. The people who were at that meeting responded very positively to some of my suggestions and requested that I stay involved with the project.

**How he balances E/PO with research activities:**

Here at STScI, I'm privileged to have a position that allows me to spend half my time on outreach and the other half on my own research. Our Office of Public Outreach believes that it's very important to involve active scientists in the creation of outreach materials.

**Challenges to his E/PO involvement:**

There's so much great content in astronomy that I want people to appreciate. Sometimes it's

difficult not to overwhelm people with too much information. Paring down the content we're trying to deliver to the essentials needed to communicate a fundamental understanding can sometimes be painful, but it's all the more rewarding when people really get the message and respond with heightened curiosity.

**What he got out of his participation:**

It was great fun to see many hours of hard work take physical and permanent form. Attending the opening with my kids was a particular treat, because they were truly excited by the exhibition. In the long run, though, I think the most lasting rewards came from the opportunity to reexperience the excitement of learning astronomy through the exhibit development team. They never let me get away with a shoddy explanation and forced me to rethink how I go about sharing astronomy with others. The hours I spent in exhibit development have paid off in all my other outreach endeavors.

**Mark's words of wisdom about E/PO:**

I have discovered two things in my work that may help others. The first is about the need to adjust scientific content for different audiences. I think a scientist's natural inclination is to present material that is intellectually challenging and cutting edge. That's the stuff we find most interesting, and we want to share our excitement with others. We need to recognize, however, that some people are approaching this material with little or no background.

The second is about learning to listen. I realized that there were many more aspects to designing an exhibition than I had previously perceived. It was very rewarding to see the skills of museum professionals in action. Things went most smoothly when team members took the time to understand each other's point of view before offering criticism. A little respect goes a long way.

## *On the Horizon*

### **Exceptional Needs Workshop**

Cass Runyon, SERCH

The SouthEast Regional ClearingHouse (SERCH) will be holding a second *Exceptional Needs* workshop June 2-5 in Huntsville, Alabama. This workshop is being co-sponsored by NASA Marshall Space Flight Center, the University of Alabama, Huntsville, the National Space Science and Technology Center, the NASA Space Grant Consortium program, and U.S. Space Camp. The purpose of this workshop is to:

- familiarize developers of NASA OSS education materials with the diversity of exceptional classroom and audience needs
- familiarize educators of exceptional students with the wide variety of standards-based space science educational support materials available from NASA
- evaluate several popular classroom materials from the different OSS themes for use in exceptional classrooms
- build a communication and support network of exceptional teachers and NASA mission-related personnel

The specific goals of the workshop are to:

- provide teachers of exceptional students with new resources to use in classrooms and some experience in using them
- provide recommendations for modifications and future design issues to developers of NASA mission-related educational products so that they are readily usable by exceptional audiences
- begin developing a handbook of “best practices” for use in other workshops and educational settings for members of the NASA OSS Education Support Network

In addition to evaluating the products to be presented, participants will also be discussing some of the technology available that can help make some of these products more accessible, such as a laser tracking mouse, special printing equipment, scanners and other tools. Attendance is limited. Contact Ms. Kathryn Guimond at [serch@cofc.edu](mailto:serch@cofc.edu) or call (888) 873-9475.

### **Science Museum Visitors to Explore Cosmic Questions**

Mary Dussault, Harvard University

Debuting in September 2002, a major new traveling exhibition and education project called “Cosmic Questions: Our Place in Space and Time” will enable millions of Americans to learn how recent discoveries have shed light on and raised new questions about our place in the cosmos. Created by the Smithsonian Astrophysical Observatory with funding from the National Science Foundation and NASA’s Office of Space Science, the exhibition will have its premiere opening at Boston’s Museum of Science. In February 2003, it will begin a 3-year national tour under the management of the Association of Science-Technology Centers. The “Cosmic Questions” project also includes a comprehensive program of educational activities and events for museum staff, teachers, students, and the public. Dozens of scientists and space science E/PO programs have contributed to the project design and development, and will continue to participate as the exhibition tours the country. For more information on the content and future itinerary of the exhibition, visit <http://www.astc.org> or email project director, Mary Dussault at [mdussault@cfa.harvard.edu](mailto:mdussault@cfa.harvard.edu).



Visitors at Boston’s Museum of Science test prototype version of an interactive “Multi-Wavelength Sky” display.

If you would like to receive an electronic copy of future newsletters, contribute an article or just have questions about getting involved with the NASA OSS Education and Public Outreach Program, contact Larry Cooper, Editor, at [lcooper1@hq.nasa.gov](mailto:lcooper1@hq.nasa.gov). Prior issues of *Voyages* are online at <http://spacescience.nasa.gov/education/news/>