Space Science
National Aeronautics and Space Administration

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

May 2001 Issue 2

Dear Colleague:

After just receiving the first *Office of Space Science (OSS) Education and Public Outreach (E/PO) Annual Report for FY 2000*, I believe it important to recognize those individuals and teams that have provided the impetus and hard work to bring the knowledge derived from our space science program to the education community. Special recognition goes to OSS Associate Administrator, Dr. Edward Weiler, whose personal commitment to education is central to his beliefs and actions. He has provided the philosophical foundation upon which this effort has been built. Ed's capable staff and my colleagues, Jeff Rosendhal and his staff, Phil Sakimoto, Dan Woods, and others have provided the leadership and dedication to create this significant effort. Equally important have been the OSS scientists, educators, and the OSS E/PO "support network" which have truly begun to build the program upon its strong foundation. A job well done….but just begun.

Since NASA's inception in 1958, NASA and our nation's education efforts have traveled parallel paths. We share the same goals – exploration, discovery and the pursuit of new knowledge. NASA's success depends on the nation's educational system to produce the highly skilled and knowledgeable workforce that is necessary to perform this cutting edge work. Likewise, the nation's educational system looks to NASA for inspiration and to exemplify doing things that once were only imaginable - feats that motivate and encourage our students to study science, mathematics, technology and engineering.

The NASA Education Program is both national and comprehensive, involving informal science institutions, public outreach and precollege (K-12) and higher education communities in all 50 states, Washington, D.C. and Puerto Rico. But what makes NASA unique? What does NASA bring to the education table that other Federal agencies can't?

First and foremost, the NASA mission is unique and gives educators and students an opportunity in which to participate and a visible, tangible example of using science and technology to achieve national goals.

Second, NASA's mission is carried out by people – people from all walks of life, backgrounds, and educational levels. It is this human resource, representing approximately

## On the Inside

18,000 NASA civil servants, our contractor community, and our university principal investigator community, that provides role models, mentors, teachers, curriculum consultants, and volunteers to the education community.

The third unique element that NASA brings is our facilities and the laboratories and universities where spacecraft are developed, rocket engines are tested, the Shuttle and its payload are readied for flight, or where new models of the Earth and its interactive systems are visually studied. It is the ten NASA Centers and our related facilities that provide real life classrooms to hundreds of thousands of teachers and students every year.

The NASA Office of Space Science E/PO Program is an important component of the overall NASA Education Program. I am convinced that OSS's ability to embed education and public outreach into OSS flight missions and research programs has been and will continue to contribute significantly to NASA's comprehensive education program. As importantly, the meaningful engagement of OSS principal investigators in this process can serve as a model to other scientists. Both Jeff Rosendhal and I are committed to ensure this happens.

*Frank Owens*
Director, Education Division
Office of Human Resources and Education

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## NASA OSS Education and Public Outreach Annual Report FY 2000

The FY 2000 Annual Report on NASA Space Science Education and Public Outreach is now available in print and on a searchable website. This is the first comprehensive compilation of OSS E/PO activities that has been attempted.

Nearly 400 OSS E/PO products and activities are included. The activities involved over 1500 discrete events, which took place in all 50 states, Washington, D.C., Guam, Australia, Canada, Mexico, and Peru. Over 200 partner institutions and organizations were involved in developing these products and in carrying out these activities. The report contains a narrative summary, followed by appendices and indices that provide additional details of individual programs, participants and partnerships, etc.

This FY 2000 Annual Report is undoubtedly incomplete, as many excellent products and activities were not reported to OSS. Preparations are underway to capture a more complete picture for FY 2001. NASA OSS wants to ensure that the many dedicated members of the space science community involved in E/PO have their work included in future editions of this report.

The report may be viewed on the OSS home page at http://spacescience.nasa.gov under the link to "Education and Public Outreach." Printed copies may be requested from the editor, Dr. Philip Sakimoto, at phil.sakimoto@hq.nasa.gov

## Space Place Team is a Winner!

NASA's New Millennium Space Place Team is the recipient of the International Technology Education Association (ITEA) Presidential Citation "for efforts above and beyond the call of duty in service to the Technology Education profession."

Each issue of the ITEA publication, *The Technology Teacher,* features an original classroom activity article contributed by the Space Place team. The activities and accompanying curriculum supplements support ITEA's *Standards for Technological Literacy.*

*The Space Place team. (Seated, L to R) Alex Novati (graphic artist), Diane Fisher (writer and webmaster), (standing, L to R) Nancy Leon (team lead), Suzanne d'Mello (writer), and Liliana Novati (photographer, graphic artist). Not shown are Scott Marrett, Space Place partner liaison, and Dr. Marc Rayman, technical advisor.*

NASA OSS is delighted the education community has recognized the contributions of our E/PO efforts and offers its congratulations to Nancy Leon, Space Place program manager and the Space Place team. Visit the Space Place website for more information.

http://spaceplace.jpl.nasa.gov

# Planetarium Shows

## Planetarium Show Takes Audiences on Spectacular Cosmic Journey

*Structure and Evolution of the Universe (SEU)*

As part of NASA's increased emphasis on informal science learning, the SEU Forum co-produced "*Journey to the Edge of Space and Time*" with the Hayden Planetarium at the Museum of Science of Boston. This 30-minute show takes audiences on a dynamic voyage from our Milky Way galaxy to the furthest reaches of the observable universe. Along the way are overviews of some of the major mysteries in the SEU research theme, including black holes, dark matter, and the birth of the universe. The production drew heavily on images and data produced by SEU missions, including the Multi-wavelength Milky Way data archived at NASA Goddard Space Flight Center, and visualizations of time-variable x-ray data from the Rossi X-ray Timing Explorer. A special feature of the show is that it provides a graphic "template" for a live presenter's segment at the end of the scripted show, so that planetarium staff can easily present the latest updates from space-based missions. Indeed, audiences for the original version of the show, which premiered in Boston in 1999, were some of the first to see the amazing images coming from the new Chandra X-ray Observatory.

An evaluation survey of visitors in Boston found that the show significantly enhanced visitors' awareness of characteristics of black holes and the expanding universe, and that it prompted visitors to ask questions about non-optical space telescopes. (The survey also found that dark matter was a confusing concept for visitors — a finding that may be suggestive for future education and public outreach projects in the SEU theme).

Over 100,000 New England visitors saw "*Journey to the Edge of Space and Time*." Since then, the Fels Planetarium in Philadelphia has adapted their own version of the show that has been running twice daily for most of the past year. An updated "show kit" is currently available to planetariums worldwide through the distributor Sky Skan, Inc. (http://www.skyskan.com)

## Explorer's Planetarium Shows

*The Bishop Museum*

The planetarium shows "The Explorers" and "The Explorers of Mauna Kea" are a result of the Explorers project, which is a long-term partnership between NASA and the Bishop Museum in Honolulu, Hawaii.

"The Explorers," a show about Polynesian navigation, space travel, and connections between the two, was shipped to 170 sites in the summer of 2000. The sites included big public domes like the Einstein Planetarium at the Smithsonian Air and Space Museum, small domes such as the Holt Planetarium at the Lawrence Hall of Science in Berkeley, California, and inflatable STARLAB domes. The sites that received the show were a real cross-section of planetariums - about half the sites were school planetariums.

"Explorers of Mauna Kea" debuted at the Bishop Museum in May 2000 and by March 2001, 125 sites had received show kits, with another 45 kits ready for shipping.

Both Explorer shows are half-live, half-prerecorded. The live sections get the audience actively involved in the programs. In "Explorers of Mauna Kea," each audience member is given a small mirror and they try to aim the light from a lamp onto a target. The activity dramatizes the way the Keck telescopes use a system of thirty six mirrors to gather as much light as possible and how difficult it is to do.

Both shows have been adapted for STARLAB inflatable domes. The STARLAB version of "Explorers of Mauna Kea" had its public debut at open houses sponsored by NASA and the Keck Telescope, on the Big Island of Hawaii in early February 2001.

Extensive web resources support the shows. Scripts, slide catalogs, installation notes, and 'Spice' automation files are available. Teacher guides and activities are also available on line.

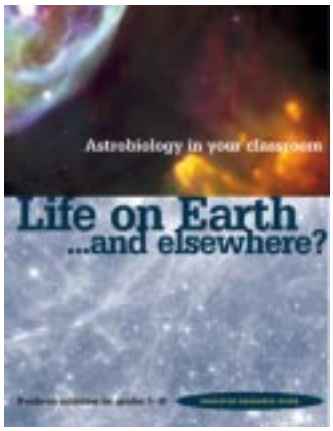
The Explorers web site is -
http://www.bishopmuseum.org/bishop/planet/explores.html

# New Educational Products

**New Teachers Guide for Astrobiology**
*Origins Forum*

Students come to class filled with questions about life on other worlds. They have seen fantastic scenarios presented on television and in films. They have read and heard about exploring and colonizing space. How can teachers provide meaningful answers to the questions that arise out of these experiences?

They can start with astrobiology. Astrobiology is the study of the origin, evolution, distribution, and future of life in the universe. NASA's Astrobiology Institute (NAI) has just produced an *Educator Resource Guide* (ERG) to provide teachers of grades 5-10, a way to explore astrobiology in their classrooms. In addition to the NAI, funding was provided by Dr. David Des Marais, Principal Investigator for the Ames Astrobiology team and Dr. Ken Nealson, Principal Investigator for the Jet Propulsion Laboratory Astrobiology Program. Collaboration of NAI outreach team scientists, its member institutions, educators, and TERC's Astrobiology Curriculum staff was essential in creating this first Astrobiology Educator Guide. More than 20 scientists were involved. The ERG can be obtained in its entirety from the NAI Web site http://nai.arc.nasa.gov




The ERG includes five hands-on activities seeking to answer student questions such as:

- What is life and what does it require?
- Which planets and moons might be habitable?
- How do Earth's extremophiles support the idea of extraterrestrial life?

Each activity takes one to two days to complete. To address different learning styles and vary the pace, the ERG uses a variety of approaches to develop concepts. Students debate different positions, use models, create microbial gardens, conduct experiments, design missions, make estimates, measure calories, play games, graph relationships, and draw inferences about habitability based on data that they examine.

To help teachers implement the activities, the ERG provides -

- overviews and background on each activity's science and mathematics;
- lists of the required materials and of the key concepts and skills;
- implementation strategies and assessment recommendations;
- blackline masters of student sheets and question sets;
- full-color cards examining the habitability of the planets and large moons in our solar system;
- a matrix of the science process skills and the math and science standards met by the activities; and
- links to related Web resources

The NASA Astrobiology Institute scientists and outreach teams partnered with a variety of experts from different fields to contribute to the *Astrobiology Educator Resource Guide: Life on Earth...and Elsewhere?* The collaboration between experts allowed NAI to create an educational product that is of high quality and valuable for educators. The research teams and educators can take this piece and present multi-disciplinary lessons on astrobiology in the classroom. Coupling the compelling story of the search for life with engaging math and science activities produces a powerful educational experience for students. Not only will they want to stay abreast of developments in astrobiology, but also they may even be inspired to become involved in the search for life on other worlds.

### Education and Public Outreach Video

*Solar System Exploration Forum (SSE)*

"*Solar System Explorers Wanted: Share Your Knowledge*" is the title of a 10-minute video produced at NASA JPL in November 2000 for the Office of Space Science Solar System Exploration Education and Public Outreach Forum. The purpose of the video is to show how scientists and researchers participate in diverse education and outreach activities - teaching workshops, working with students, developing museum and science center exhibits, reviewing books, and creating material for websites. The video is available from Leslie Lowes (Leslie.L.Lowes@jpl.nasa.gov), Co-Director of the SSE Forum.

### Product Registration

You can contact an OSS Educational Forum (Solar System Exploration, Sun-Earth Connections, Origins or Universe) for information on how to register your education and public outreach products in the NASA Space Science Education Resource Directory which is at -

http://teachspacescience.stsci.edu

**Forum Websites**

http://www.jpl.nasa.gov/forum/
http://sunearth.gsfc.nasa.gov/
http://origins.stsci.edu/
http://cfa-www.harvard.edu/seuforum/

# Programs

### Space Science Development at Minority Universities

The NASA Office of Space Science in partnership with the Office of Equal Opportunity Programs, has launched a major effort to develop space science capabilities at minority universities. A landmark NASA Research Announcement, entitled the "Minority University Education and Research Partnership Initiative in Space Science," has brought 15 minority universities into partnerships with OSS that will build substantial space science education and research programs on their campuses.

Briefings by the Principal Investigators at a program initiation conference held February 22-23, 2001, in Washington, DC, revealed the breadth and depth of projects underway. New space science courses and degree programs, new space science faculty positions, active participation in space science flight programs, partnerships with major space science research organizations, and the integration of space science content into undergraduate courses and precollege outreach programs were common themes. The accompanying article from the University of Hawaii at Hilo is but one example of the impact that these projects are having on the institutions involved.

The fifteen participating institutions are:

Alabama A&M University, Normal, AL
Dine College, Shiprock, NM
Eastern New Mexico University, Portales, NM
Florida A&M University, Tallahassee, FL
Hampton University, Hampton, VA
Medgar Evers College, New York, NY
Norfolk State University, Norfolk, VA
Salish Kootenai College, Pablo, MT
South Carolina State University, Orangeberg, SC
Southern University, Baton Rouge, LA
Southwestern Indian Polytechnic Institute, Albuquerque, NM
University of Hawaii at Hilo, HI
University of Houston-Downtown, Houston, TX
University of Texas at El Paso, TX
York College, New York, NY

Contact Dr. Philip Sakimoto at NASA Headquarters, Office of Space Science (philip.sakimoto@hq.nasa.gov) for more information about this initiative.

## New Opportunities through Minority Initiatives in Space Science (NOMISS)

*University of Hawaii at Hilo (UHH)*

The UHH NOMISS project is designed to simultaneously increase educational opportunities for Hawaii's students from kindergarten through undergraduate levels as well as create student and faculty opportunities through developing partnerships between UHH and observatories atop Mauna Kea.

Principal investigator Dr. Richard Crowe will handle the undergraduate and scientific programs, and facilitate gaining educational access to the observatories on Mauna Kea, including opportunities for paid student internships. He will also oversee the expected transfer of responsibility of the University of Hawaii Institute for Astronomy's 24-inch Air Force telescope to UHH, which will give UHH a presence on Mauna Kea. Both the Northern Gemini Telescope and the NASA Infrared Telescope Facility (IRTF) are currently partnered with UHH in providing student internships and curriculum development in the area of instrumentation instruction.

Co-investigator Dr. Alice Kawakami will be working with teachers from both public and private schools, including the Kamehameha Schools and the State Department of Education, on developing programs to get young students, especially those of Hawaiian ancestry and other underrepresented minorities, excited about observational astronomy. She will focus on combining the cultural aspects of science and astronomy into the curriculum, in order to connect Hawaiian children with their heritage of celestial knowledge, and ultimately to encourage more minority students to choose careers in astronomy or space science. Once these students become university students, they will have the opportunities to become involved in the research being carried out on Mauna Kea.

"NASA wants more people aware of astronomy," explained Crowe. "By including minority students in educational programs, these children will then someday have a stake in what happens up there [on Mauna Kea]. This grant will provide a new link, through UHH astronomy, between the observatories and the community." (See http://schroedinger.uhh.hawaii.edu/nomiss/index.html for details).

*The Mauna Kea Telescopes*

## "Explore!" and "Fun with Science" Informal Education in Public Libraries

*OSS Broker at the Lunar and Planetary Institute (LPI)*

"Explore!" and "Fun with Science" are cooperative projects of the LPI Broker team, NASA's Office of Space Science and public libraries in Louisiana and Texas. The "Explore!" program was developed as a new exciting way to team librarians, community sponsors, and scientists to bring space science to the community at a very reasonable cost. Current space science information and related NASA materials are distributed, using the established, highly leveraged public library systems. Libraries have long provided essential learning resources that strengthen and perpetuate formal and informal education. During the last two years, space science materials for library collections, reference holdings, and vertical files have been distributed to public libraries in Louisiana and Texas.

A second component of the work with public libraries is the "Fun with Science" program. LPI

education and library staff present workshops that feature hands-on activities that librarians can use with young patrons in after-school and summer reading programs. Targeted to preteen youth, the programs have attracted "children of all ages," as entire families participate. After attending a workshop the librarians become Explore! team members. Members can join the Explore! listserve for the exchange of ideas, and their home libraries are added to the distribution list.


"Fun with Science" currently consists of eight activity modules, and more are under development. In addition to the activity, or "hook," each module contains sections on background information, scientific principles, follow-up questions, and additional resources in the form of videos, books, and internet sites. The activities can be customized to facilitate incorporation into each library's existing programs, and cover a range of subjects in space science, from the history of rocketry to impact cratering.

***Beta Testing in Louisiana***

In 1999, Louisiana, one of the states in LPI's Broker/Facilitator region, was chosen as the Beta Testing Pilot State. The State Library of Louisiana had previewed the"Explore!" program plans, and had enthusiastically endorsed it and agreed to help with distribution of materials.

Librarians from the beta test group reported on how they incorporated materials and activities into library Children's and Youth Programs as a result of the initial workshop, reporting attendances from 20 to 128 children—a total of 321.

In 2000, the "Explore!" team took the program statewide. Between October, 1999 and May, 2000, the "Explore!" team trained a total of 84 librarians, representing 137 public libraries in 21 parishes serving a population of 608,634 registered patrons.

The "Explore!" program has reached all 328 libraries in the state with three separate distributions of a variety of resources.

***Expanding to Texas***

Through workshops in the fall of 1999 and the spring of 2000, the "Explore!" team moved into Texas, bringing the total number of "Explore!" member librarians to 139 in the two states. In addition to the hands-on training, the librarians received a CD detailing the materials and activities as well as extensive listings of resources in print or available electronically. Materials and new activities for this program are being developed to provide a broader menu of choices for new and old participants. Training in the upcoming year will include an emphasis on school libraries that have expressed interest in becoming "Explore!" members.

***Feedback from Explore! Librarians***

From a Youth Services Librarian, Ascension Parish Library: *"The kids seem to really enjoy the visuals. We used posters, videos and the images from the "Explore!" CD. Please keep them coming!"*

From a Young Adults Librarian, East Baton Rouge Parish Library: *"The parents as well as the kids enjoyed building and launching the rockets."*

From a Children's Librarian, Iberville Parish Library: *"For the rocket program we had 20 [attendees] and for the comet program we had 21. Previously our pre-teen group was dying out, but the numbers are coming back up this summer. Thanks, Explore."*

From West Shreveport Library: *"Great program! The children enjoyed both activities. The parents were impressed the ideas came from NASA."*

From Harris County Public Library, Stratford Branch: *"Excellent program, kids loved it! It was wonderful. The CD is great. Thanks for your help!"*

From Houston Public Library, Lakewood Branch: *"We made the Pencil Rocket with the straw and the children had a blast aiming it at the Moon target used in our Summer Reading Club Poster. Thank you so much for sharing all those activities with us. I will be using more of your ideas now that summer is over and I start my regular storytimes."*

More information about "Explore!" and "Fun with Science" can be found at the Lunar and Planetary Institute's web site: http://www.lpi.usra.edu/education/EPO/explore.html

## *PLATO* Grants Program off to a Successful Start - *DePaul University Broker*

"A video for teachers and planetarians that explains how to teach space science using nothing but paper plates"; "Updating a popular 10-year old planetarium show in a collaboration between a science museum and minority students from a local high school"; "Bringing together teachers who use portable planetariums in their classrooms in a two-day conference to share ideas" - these are just three of the eight highly innovative projects by planetarians from the Great Lakes Planetarium Association (GLPA) recently funded though the Planetarium Teaching and Learning Opportunities (*PLATO*) small-grants programs from the Broker group at DePaul University.

"During the first year of working with GLPA it became clear to us that here is a group of highly motivated individuals who touch millions of students every year with wonderful ideas that are often doomed to fail because of the lack of as little as a few hundred dollars" says Dr. Lynn Narasimhan, director of the Broker/Facilitator program at DePaul. To maximize the benefit for the planetarium community, DePaul worked closely with an advisory committee of GLPA planetarians, which was led by GLPA president Dr. Jeanne Bishop and president-elect Gary Sampson. "We wanted to make sure that we made the application process as simple as possible so we wouldn't scare away planetarians who are newcomers to the grant-writing process. We want *PLATO* to be a stepping stone to larger programs such as *IDEAS*" remarks Chuck Bueter, an advisory committee member involved in designing the *PLATO* call for proposals.

DePaul and GLPA now look forward to the development of the eight funded programs over the next year. The DePaul brokers already contemplate how the program can be made more effective in the coming years. "This first year is an experiment in the Great Lakes region, but we have already seen a lot of evidence for the huge impact programs such as *PLATO* can have on the small planetarium community in the United States" says Dr. Bernhard Beck-Winchatz, associate director of the DePaul center. "Our limited funds didn't allow us to provide similar opportunities in other parts of the country, but after our initial success with *PLATO* we will definitely explore ways to expand the program."

## Solar System Educator Program

*Solar System Exploration Forum (SSE)*

The Solar System Educator Program (SSEP) is composed of current K-12 educators and others from the informal education community (museums, science centers, planetariums, etc.) with a strong background in teaching science or math and experience in teacher training. These educators traveled cross-country for the opportunity to learn new techniques to engage other educators and students in the wonders of scientific inquiry. Some of the educators work with visually-impaired students, children with disabilities and with underrepresented minorities. So far this year, 74 educators have taken part in the Solar System Educator Program.

The educators attended training institutes held at NASA JPL to learn techniques for training an additional 100 teachers in their state on how to use and incorporate current space missions data into their curriculum to help kids learn about math and science. The goal is to make science a fun and fascinating topic for educators and students.

To date twenty-four of the NASA Space Grant Consortiums across the country have collaborated with SSEP educators in their state for teacher outreach training. Many Space Grants have also contributed their funds to the training being sponsored. Twenty-five Solar System Educators have received additional grants and a few have received multiple awards.

Space Explorers, Inc., DePere, Wisconsin, and the Virginia Space Grant Consortium, Hampton, Virginia, manage the Solar System Educators Institute program for JPL. Participating missions currently include -

- Cassini mission to Saturn,
- Stardust and Deep Impact comet missions,
- Galileo mission to Jupiter,
- Mars Exploration Program,
- Outer Planets/Solar Probe Program and
- the Deep Space Network of ground- based antennas that communicate with spacecraft

See the website for more information about the Solar System Educators program - http://www.ssep.org/

## SCIENTISTS IN EDUCATION AND PUBLIC OUTREACH

*This profile is based on excerpts of an interview of Dr. Janet Luhmann about her involvement in Education and Public Outreach (E/PO), specifically her participation in the total solar eclipse webcasts produced by NASA's Sun-Earth Connection Education Forum (SECEF) and the Live@The Exploratorium program. Cherilynn Morrow of the Space Science Institute (SSI), Boulder, CO designed the interview questionnaire. Christy Edwards, also of SSI conducted and edited the interview .*

*UCB/SSL researcher Dr. Janet Luhmann describes the impact of our Sun's activity on the Earth. Dr. Phil Scherrer from Stanford University's Solar Oscillations Investigation Group looks on.*

**Current Professional position:**

I'm a Senior Fellow researcher at the Space Sciences Laboratory (SSL) at the University of California Berkeley (UCB), and I work in a space physics group. I lead investigations, edit a scientific journal and manage a small research group.

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

I participated in a solar eclipse event at the Exploratorium in San Francisco. My role was to interact with the large group of people who had gathered to watch the eclipse that was being webcast from Aruba on February 26, 1998. I worked with an emcee and another solar scientist (Dr. Phil Scherrer) from Stanford. We spent the day answering questions on the eclipse, and on related visuals we had each sent in advance.

**How she got involved in the webcast:**

The key was having the opportunity presented to me through SECEF. In making the connection between me and the Exploratorium, they provided a framework which I could not possibly have created on my own, simply for lack of time and knowledge. Having that framework, and being approached by SECEF people asking, "Would you do this?" "Would you help us?" provided the encouragement and incentive.

**Comments on her time commitment:**

My time commitment is pretty modest. The Sun Earth connection Forum (SECEF) sets up the framework for my E/PO interactions, and my preparation is basically my career, almost all I have to do is appear for the event. There may be brief periods of intense activity, an occasional day's commitment, but I find it to be a very efficient and effective process.

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

Aside from the challenge of finding the time to do it, there's also the matter of communicating the material in an understandable way. Doing E/PO without a large investment of time sometimes requires going into it without having passed it by educators or youngsters who might be able to tell me if it's the kind of thing that would work or not. Often I have to play it as I go, and hope that the real-time feedback keeps the exchange understandable and interesting.

**What she got out of her participation:**

It's a very good feeling to see young people engaged in what I'm saying. Though E/PO activities generally don't include any extra financial compensation, they are an important way of sharing my knowledge and my excitement with those who ultimately support my research. I'm able to give something back in other ways besides the writing of journal articles, and adding to encyclopedias. I'm really touching people in every

walk of life. In addition, I got to watch the live video of the eclipse along with everybody at the Exploratorium.

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

If scientists make the right connection, they can do something important and valuable without a huge investment of time. With SECEF, we have the contacts and capabilities to make connections with the education world as we've never had before. I find that it's possible to invest 10% of my time and get a lot out of that 10%. Although we already often feel over-subscribed, and E/PO seems like "yet another thing to do," much can be done with good arrangements by those who know the E/PO business. It's a good investment in the future to get involved in E/PO, even at the 10% or less level. I hope more people will look into contacting NASA's E/PO Support Network of Forums and Brokers to see how they can work together with whatever commitment constraints they have.

A hundred or more of your scientific colleagues have been involved in a many ways in all phases of these exhibit projects, including design, development, and dissemination. Their E/PO participation represents a wide variety of time commitments and talents, and many of the vital E/PO roles do not require being especially good at public speaking. Most of these scientists have contributed to exhibit concept plans or reviewed exhibit text for science accuracy and currency. Some have provided physical objects for display (e.g. rock samples, spacecraft models). Many others have provided access to and processing of data for exhibit murals, interactives, and video presentations. Scientists all over the country have given, and will give, public talks or teacher workshop presentations by video, web, or in person to support the exhibit's dissemination. Science centers are hungry for greater connectivity with scientists, and there are a great many ways you can be a valuable resource.

## Tips for Space Scientists in Education and Public Outreach

*Cherilynn A. Morrow (camorrow@colorado.edu)*

As a space scientist, you work very hard, very passionately, and are generally so oversubscribed that asking you for additional time and effort to contribute to K-12 education or public outreach is asking a lot. Nonetheless, as a scientist you are an essential contributor to the successful E/PO efforts needed to raise appreciation and understanding of science in our society.

One example of a satisfying and valuable way to contribute to E/PO is with traveling exhibit projects. Consider the scores of scientists all over the nation who have already quietly played key roles in the success of three major space science travelling exhibits: 1) Hubble Space Telescope: New Views of the Universe; 2) MarsQuest; and 3) the Space Weather Center (*for details see issue 1 of the Voyages newsletter*). These exhibits all began their extensive tours in the past year. Collectively, they are bringing some of the newest results of space science to tens of millions of students, teachers, and other citizens. The educator workshops and websites associated with these exhibits will extend this reach even further.

## Future Venues for Space Science Exhibits

*Hubble Space Telescope - New Views of the Universe*

June 2 - August 26
North Carolina Museum of Natural Sciences
Raleigh, NC

June 2 -August 12
Chabot Space and Science Center,
Oakland, CA

October 6 - January 2
Kennedy Space Center, FL (pending)

*MarsQuest*

June 1 - August 31, 2001
Tucson Children's Museum, Tucson, AZ

October 1 - December 31, 2001
Catawba Science Center, Hickory, NC

*Space Weather*

June 1 - August.1,2001
Lawrence Hall of Science, Berkeley, CA

October 1 -December 1, 2001
Adler Planetarium, Chicago, IL

# On the Horizon

### A Web-based "Watering Hole" for Informal Science Educators

*SEU Forum*

Museum and planetarium professionals will soon have a new way to access space science resources for their projects and programs. The OSS Education Support Network has been working with the informal education community to develop a web portal to information of particular interest to science museums and planetariums. The site, which will be released shortly, will contain three main sections. "Space Science Resources" will direct users to the current OSS Resource Directory as well as to an annotated list of Exhibits, Programs, Visual and Human resources. "Project Sharing" is an ongoing communication tool and updateable bulletin board for Space Science Informal Education projects that are in the works. "Best Practices" is an area for promoting high quality informal space science education programs and products. It will document lessons learned, provide access to evaluation data, and present recommendations from the informal education community.

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### ACSSE CyberSpace Learning Center Opening September 2001

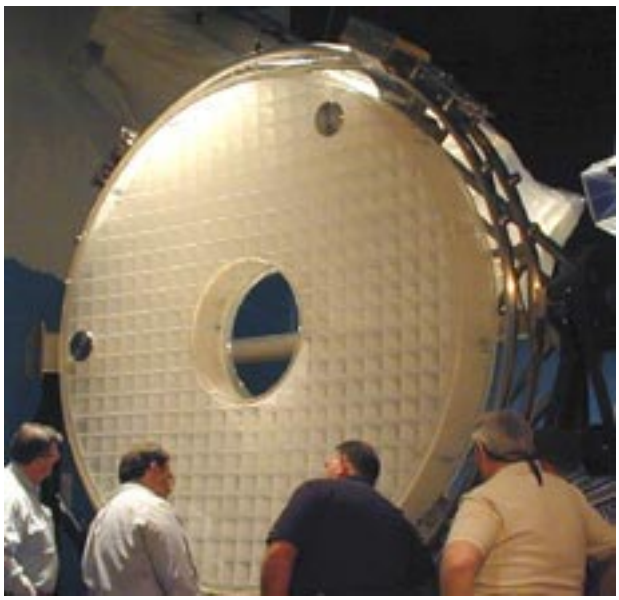
A new CyberSpace Learning Center will soon open at the Adler Planetarium & Astronomy Museum. The Center will host an all-electronic exhibit gallery, an interactive distance-learning video studio, computer classroom, and a programmable public exhibit space. This newly developed gallery, along with a new StarRider planetarium presentation, will become the primary resources to deliver educational programs for the 2001-2002 academic year to explore the theme of the Sun-Earth Connection.

### Smithsonian's National Air and Space Museum Announces "Explore the Universe" Exhibition - Opening September 2001

The Smithsonian Institution's National Air and Space Museum (NASM) will open "Explore the Universe" in September. This permanent exhibition will present the major discoveries that have given us our current scientific view of the universe, illustrate how the universe is taking shape and probe the mysteries that remain.

Encompassing an unprecedented array of artifacts representing the state of the art over the past 400 years, the exhibition will lay out the world's astronomical progress within its historical and technological context. "Explore the Universe" will be made up of five major sections covering the evolution of man's tools for searching the heavens.

As part of NASA's contribution to this exhibit, NASA OSS arranged for the Hubble Space Telescope (HST) backup mirror to be turned over to the museum. The mirror was delivered in January. The mirror and other pieces of the HST hardware will be seen by millions of people each year when the exhibit opens.



*Hubble Space Telescope backup mirror arrives at the National Air and Space Museum.*
*(photo provided by D. DeVorkin - NASM)*

## OSS Education and Outreach Conference, September 12 – 14, 2001, in Chicago, Illinois.

*2nd Announcement*

Hosted by the DePaul University NASA Broker/Facilitators, the conference will be held at the Union League Club of Chicago. The purpose is to bring together members of the OSS Education and Outreach Community, NASA Education personnel, and others involved in science education and outreach to build community and provide opportunities for participants to engage in discussions around issues.

The conference will be a mixture of plenaries, panels, breakout sessions, poster sessions, and unstructured time. Four major sessions are planned - Science Education Research, Issues in Formal Science Education, Issues in Informal Science Education, and Scientists' Participation in E/PO. There will be a reception and dinner at the Adler Planetarium and Astronomy Museum on September 13. Participants will also have the opportunity to visit shows and exhibits. More information on the conference, including registration and accommodations, will be available in May 2001. Please direct inquiries to vsimek@wppost.depaul.edu.

## Exhibit of African-Americans in Space Science - Opening August 28th

*Ohio Aerospace Institute*

A new exhibit of *African Americans in Space Science* will debut at the national convention of the Association of African American Museums (AAAM) on August 28th at the Cleveland African American Museum (CAAM). The Ohio Aerospace Institute is developing this exhibit with funding from the IDEAS program and the Ohio Space Grant Consortium. The exhibit will profile about twenty African Americans currently involved in space science and is being facilitated by members of the Association of Black Physicists through their President Dr. Charles McGruder of Western Kentucky University.

One exhibit will be on permanent loan to the Cleveland African American Museum. A second exhibit will travel next year toAASM member sites and then will be available on request. A companion video is also in the works. For more information contact Larry Cooper at larrycooper@oai.org

## Eclipse '01 Event Heats Up – Increased Participation from Museums, Scientists

Sun-Earth Connection Education Forum (SECEF)

There's a lot going on as SECEF and partners prepare for the total solar eclipse on June 21, which will be webcast live from Zambia, Africa by the Exploratorium of San Francisco, CA. As of early April, 49 groups (museums, planetaria, schools) were officially registered to participate in the program by building their own public events around the live webcast. Ten of the groups are international—from Australia, Greece, India, Malaysia, Spain, Costa Rica, France, Tanzania, and Mexico. Close to twenty scientists have signed on to share their expertise with participating groups. See http://museumeclipse.org for information on how you can get involved. We are also delighted to have received official sponsorship from the National Society of Black Physicists (http://www.nsbp.org/), and the event will feature African American scientists as role models to engage and excite young people about space science and technology.

Eclipse Event 2001 will focus on themes of solar maximum, habitability of space, and living with the Sun, our nearest star. As part of the event, a 30-minute downlink from the International Space Station is planned, including a conversation with astronauts Jim Voss and Susan Helms of the Expedition Two crew.

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## FAST FACTS

There were nearly 100 E/PO efforts featured in several poster and oral sessions at the American Astronomical Society meeting in January 2001.

The NASA OSS Education Resource Directory has been searched nearly 300,000 times since going online in October 2000. Currently over 100 items are available for downloading.

http://teachspacescience.stsci.edu

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If you'd like to receive an electronic copy of future newsletters, contribute an article or have questions about getting involved with the NASA Office of Space Science Education and Public Outreach Program, please contact Larry Cooper, Editor. larrycooper@oai.org