

Voyages

Seven Years, 17 Countries, One Planet: The Cassini-Huygens Public Engagement Program

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Alice Wessen, Jet Propulsion Laboratory

*"For everyone . . . must see that astronomy compels
the soul to look upwards and leads us from this
world to another."*

—Plato (427–347 B.C.)

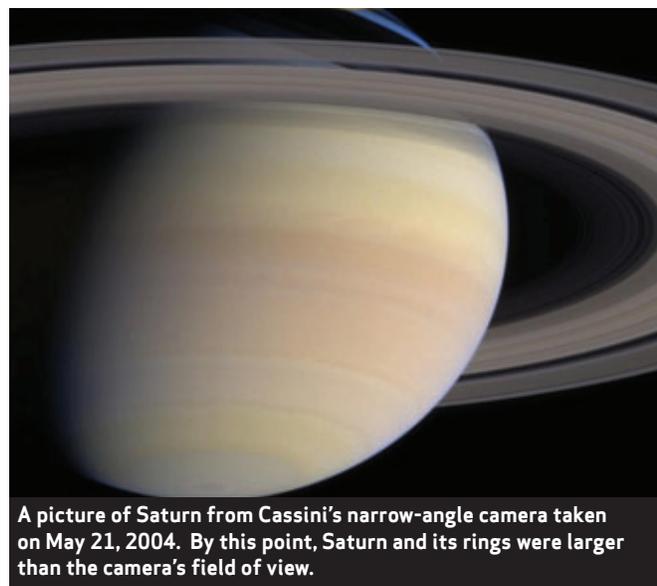
Our study of Saturn is an international endeavor. Seventeen countries are participating in the Cassini-Huygens mission of discovery. Taking 7 years to reach Saturn, the 4-year orbital tour is one of the most complicated planetary exploration missions ever undertaken and we anticipate that there will be many surprises. The spacecraft will carry out an extensive study of the planet's atmosphere, magnetic field, and rings; the satellite Titan; and a number of the smaller icy moons. Titan, Saturn's largest satellite, is the target of the Huygens instrument probe, which will be released from Cassini in late December.

A primitive telescope and a fascination with stargazing spurred the curiosity of the namesake for the Cassini-Huygens mission—Jean-Dominique Cassini (1625–1712). Mentoring and tutelage from the scientists of his day provided the foundation for Cassini's interest in the heavens. Today, the beauty of Saturn and the mystery of Titan create a universal language of "wow." The Cassini-Huygens Education and Public Outreach (E/PO) team seeks to inspire the public and future stargazers with a variety of programs.

For the Classroom

With Cassini-Huygens' E/PO program, the journey to Saturn starts in the classroom for our Nation's youngest learners with the Cassini-Huygens K–4 literacy program (<http://saturn.jpl.nasa.gov/education/edu-k4.cfm>).

Because literacy is critical in the early stages of learning and academic achievement, the Cassini-



A picture of Saturn from Cassini's narrow-angle camera taken on May 21, 2004. By this point, Saturn and its rings were larger than the camera's field of view.

Huygens E/PO team is using the science and technology of the Cassini-Huygens mission to enhance the teaching of science for young learners by using a language arts format. All materials are aligned with national science education standards and the National Council of Teachers of English (NCTE) English Language Arts standards.

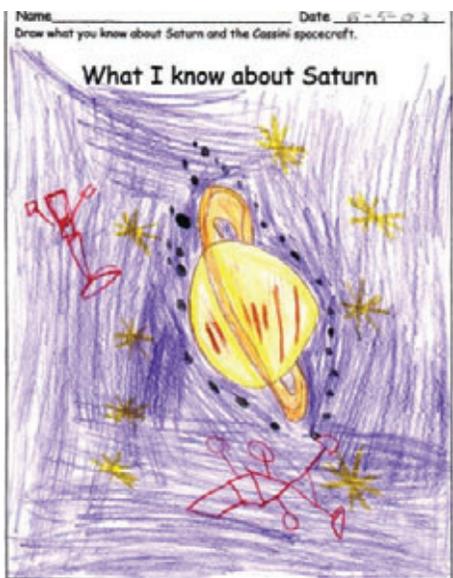
Tested in underserved elementary classrooms in the Oakland, CA, area, pre- and post-tests of children's work show exciting implications for reaching children from a variety of backgrounds. Even very young learners show significant gains in learning the materials.

In addition, 400 educators who visited the Cassini-Huygens booth at the 2004 International Reading Association conference praised the writers who created the curricular materials of the project: the National/Bay Area Writing Project, Fostering Reading Through Science and Technology (Project FIRST), and the Caltech Precollege Science Initiative (CAPSI). Educators who reviewed the materials felt that elemen-



I No That The earth
 We live on. I No That
 Saturn must be hateful!

1. Pre-Test, Second-Grade Student



Post-Test, Second Grader

What I know about Saturn
 By _____
 I know that Saturn
 has a cassini Division.
 and it has counter rings
 since Saturn has white
 spot and other stars.
 It has 30 moons. Is you look
 down at Saturn in space you
 it was like silver then
 a big moon has come
 Titan Saturns bigger
 than Earth. 2 moon
 are on Saturns rings.

What I know about Saturn
 By _____
 Saturns middle is faster
 than its top and bottom.
 Saturn has more than
 one ring. Saturn
 has 30 moons and
 around Saturn it has
 a lot of gases.

2. Post-Test, Second-Grade Student

tary teachers without a strong science background would be more comfortable presenting a language arts unit with science as the content.

The Cassini-Huygens Mission Literacy Program is now on MERLOT as a distinguished, high-quality source of learning material. MERLOT (<http://www.merlot.org>) is an online community of faculty who are collaborating to increase the quantity of Web-based, interactive teaching and learning materials.

Materials and Programs for the Museum and Planetarium Community

In the months leading up to Cassini-Huygens' Saturn Orbit Insertion (SOI), planetariums, Solar System Ambassadors, schools, and more were playing the award-winning planetarium show "Ring World." The flavor of the events reflects the diversity of the countries involved. Today, an enthusiastic and active network of astronomers, educators, museums, and planetaria have joined together to share Saturn with the public. Members of the Cassini-Huygens Saturn Observation Campaign

(SOC) lead at least three to five observation events yearly. SOC members have participated in online training and program activity reviews conducted by NASA's Jet Propulsion Laboratory. A section of the Cassini-Huygens Web site is dedicated to resources, event announcements, observation techniques, and educational material related to planetary observation. Handouts for events are also available for downloading from the Web site. SOC members have year-round support via e-mail and the World Wide Web, and they are able to download and print materials from the Internet. They report to Cassini-Huygens outreach regarding the number and demographics of event attendees, but, more importantly, they share their stories, their personal pictures, and drawings from the public.

Today, there are 326 active organizations in the SOC, with 100 in 39 foreign countries and 226 in 42 States throughout the United States. Cassini-Huygens E/PO continues to welcome future SOC members. Applications for membership can be found at <http://soc.jpl.nasa.gov/index.cfm>.

Events by SOC members for the SOI were held on June 30 around the world, from Campos dos Goytacazes, Brazil, to Maastricht, Netherlands, and throughout the United States. The Cockermouth Astronomy Club held a Saturn Day at the Rum Storey in Whitehaven, England. Events were held by the Sirius Stargazers in Sterling State Park, MI, and the Brownsville, TX, Public Library. An estimated 17,000 watched "Ring World" in Valencia, Spain, while "down under" the girls of the State Guide Camp at Redland Bay in Queensland, Australia, held several star parties. All joined together to gaze at one particular ringed planet.

While SOI heralded the official start of Cassini-Huygens' 4-year orbital tour, we expect the mission to unveil many secrets over the years. Cassini-Huygens E/PO will share those discoveries with the public and the museum community through the museum alliance started by Mars Public Engagement. Teleconferences with mission personnel and scientists help interpret the science of the mission, while the museum community helps interpret the data for local communities. The data from all 12 instruments and the wealth of images (500 plus daily) will be posted to the mission Web site at <http://saturn.jpl.nasa.gov> for museums and the world to view. Animation and images are mailed out to the museum community for it to produce its own local programming.

The mission Web site supports multiple audiences, including those who want to know "where is Cassini now?" (<http://saturn.jpl.nasa.gov/opera>

tions/present-position.cfm). “Where is Cassini now?” is updated continuously by mission planners and is one of the most trafficked sections of the Web site.

Other popular sections include a frequently asked questions site, a kids’ site with Saturn fun facts that is also featured on the NASA Portal <http://saturn.jpl.nasa.gov/kids/index.cfm>, a moon count section, and e-postcards from Saturn.

From the classroom to the solar system, wherever imagination soars, the Cassini-Huygens Education and Public Outreach program seeks to inspire the next generation of explorers.

“Imagination is more important than knowledge. Knowledge is limited, imagination encircles the world.”
—Albert Einstein (1879–1955)

UPDATES

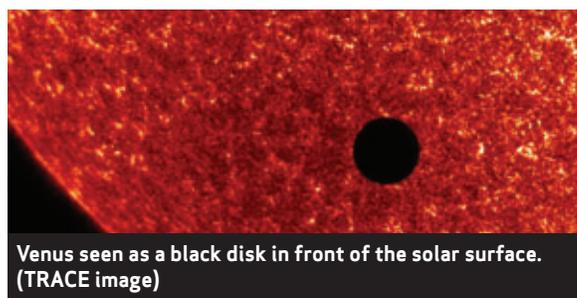
The Venus Transit

NASA’s Sun-Earth Connection Education Forum (SECEF)

The historic transit of Venus across the Sun took place on June 8, and it was a major success in terms of both its formal and informal education impact. On the Internet, the NASA Portal and SECEF Web sites received over 40 million hits during the 40-hour period around the transit time. Over 1,000 news media interviews and related stories were filed with all of the major newspaper, TV, and radio outlets. The NASA-Exploratorium Webcast from Athens, Greece, was graced by good weather, and its program was heavily viewed by Web visitors and employed by over 100 museums across the country as



Venus seen as a black disk in the solar corona. (SOHO image)



Venus seen as a black disk in front of the solar surface. (TRACE image)

part of their transit activities. It also was carried live by NASA TV and the Discovery Channel. Over 100 amateur astronomers registered with the Astronomical League to participate in an SECEF-partnered observing certificate program to determine the astronomical unit. Similar activities have been developed and are now available to teachers and students. Spectacular images from the TRACE satellite showed the transit in its entirety, while the SOHO satellite also showed the approach, near transit, and recession of Venus (see photos). The data will be packaged so that museums, planetaria, and schools can continue to use it for educational purposes in the months and years to come.

Ambassadors Support Space Day Kickoff Activities

Kay Ferrari, Jet Propulsion Laboratory



Solar System Ambassador Ian Hewitt from North Carolina staffing MER landing.

Six Solar System Ambassadors from Maryland, Virginia, North Carolina, and Kentucky, along with two friends and a Cassini SOC member, joined Sheri Klug and Kay Ferrari on May 6 for the National Space Day Kickoff held at the new Stephen F. Udvar-Hazy Center near Dulles Airport.

Following the opening ceremony, these volunteers staffed booths sponsored by three missions that offered hands-on activities for the approximately 1,500 sixth-grade students in attendance from schools in Virginia and Maryland.

The Mars booth featured three activities designed to engage students in scientific inquiry. One group determined the landing site of the Spirit rover using photographs taken by the lander as it descended to the Martian surface. A second group analyzed images taken

by the **Mars Odyssey**. At the same time, a third group investigated “Mystery Planet” crystal samples, posted its discoveries on a board, and was asked to name the planet from which the samples came.

Next door in the **Deep Impact** booth, students learned how the “impactor” on this spacecraft will blast open a football-field-sized crater in comet Tempel 1 in order to study the interior of that body. They also cut out and assembled paper impactor models.

In the third booth, sponsored by the **Cassini-Huygens** mission, students used a desk chair and styrofoam balls to demonstrate the synchronous rotation of Saturn’s moons around the planet.

This year marks the first time the Space Day Foundation has invited local-area students to attend the kickoff and participate in a day of activities.

Support Network Members Attend the Council for Exceptional Children 2004 Convention and Expo

*Dr. Cassandra Runyon, South East Regional
Clearing House (SERCH)*

*“NASA is the best thing to ever happen to my students—
they came alive when we started working with your
materials!”*

—Special Education Teacher, Louisiana

*“Thank you for your materials and what you are doing.
NASA and space science lights a fire in my students and
creates a desire for them to learn more.”*

—Special Education Teacher, Florida

Members from the space science education Support Network attended the Council for Exceptional Children (CEC) 2004 Convention and Expo in New Orleans, LA, April 14–17, 2004. CEC is the largest international professional organization dedicated to improving education outcomes for individuals with exceptionalities, students with disabilities, and/or the gifted. Attendance at this year’s convention and expo was over 6,300 and included special and general education teachers, administrators, principals, and special education directors. We had the pleasure of meeting and talking with the Director of CEC, the Director of the National Center for Disability Services, and representatives from many school districts from across the country, including several

from predominately Native American- and Hispanic-serving school districts.

CEC advocates for newly and historically underserved individuals with exceptionalities and appropriate governmental policies, sets professional standards, provides continual professional development, and helps professionals obtain conditions and resources necessary for effective professional practice.

Personnel from the SERCH Broker/Facilitator and the Origins Education Forum presented a poster session on “Exceptional Space Science Materials for Exceptional Children” as part of the CEC Convention and Expo. Through this session they were able to speak intimately about what SERCH and the space science education Support Network have been doing to make their educational products more accessible. Several demonstrations and a variety of materials were shared with those visiting the poster session. All of our materials went in a flash! *A huge thank you* to all who sent materials and helped to support this meeting with us!

Plans are already underway for next year’s conference in Baltimore, April 6–9, 2005. To join the SERCH, Sun-Earth Connection, and Origins education forums in the fun, contact Kathryn Guimond at serch@cofc.edu.

AWARD

Sun-Earth Media Viewer Wins Prestigious Pirelli International Award

Karin Hawck (SECEF) and Jim Spadaccini (Ideum)

On May 27, Elaine Lewis, of NASA’s Sun-Earth Connection Education Forum (SECEF), found herself in Rome’s historic Temple of Hadrian to receive the Pirelli *International Award* on behalf of her SECEF team and its



partner, Ideum. SECEF's Sun-Earth Viewer (<http://ds9.ssl.berkeley.edu/viewer/flash/flash.html>)—a multimedia lesson on the interaction between the Sun and Earth—was honored with a €15,000 Pirelli *International Award* for “Best Environmental Multimedia Project” (<http://www.pirelliaward.com>).

The Pirelli *International Award* is open to all Internet users worldwide, for the best multimedia works which contribute to the dissemination of scientific and technological culture through the Internet. The award is presented every year to works oriented toward education, the environment, or the latest information and communication technologies. It aims to promote the spread of scientific culture by merging the values of culture with the passion for new technologies.

The Sun-Earth Media Viewer is a Flash-based interactive toolkit built to support NASA's/SECEF's major public outreach initiatives. The viewer allows users to watch real-time NASA satellite images of the Sun and Earth. A thumbnail viewer lets them explore and compare solar and terrestrial data from a variety of NASA missions and ground-based observatories. In addition, the viewer contains video interviews with scientists and other experts. Computer-generated visualizations and additional NASA footage are also available.

SECEF and Ideum were tremendously honored by the international acknowledgment of their educational outreach work.

NEW EXHIBIT

NASA Mission Contributes Sun Station to Planet Walk

Barbara Lambert, Goddard Space Flight Center

NASA Goddard Space Flight Center (GSFC) in Greenbelt, MD, has joined with the Friends of Anne Arundel County Trails to create a project that will enable visitors to stroll, bike, or skate through the solar system. The two groups will work together in a partnership to complete the Friends Planet Walk, a 4.6-mile linear exhibit of our solar system that is being developed along the B&A Trail in Maryland.

Each of the stations is unique in shape, size, and concept and will contain a full complement of educational displays relevant to and centering around a one-of-a-kind art sculpture for that planet.

The stainless steel sculpture for the Sun Station was installed in May and rises 24 feet in the air. It is topped by a

10-foot sphere comprised of 9 stainless steel circles and 48 large acrylic prisms. Included in the landscaping surrounding the site will be educational graphics and text about the Sun. The exhibit will be accessible to those with disabilities, and a companion Web site will provide lesson plans, activities, and information for educators and the public.

NASA's Solar Dynamics Observatory Project (SDO), a mission in the Living With A Star program (LWS) at GSFC, was responsible for creating the educational content and graphics for the signage that will be installed at the Sun Station this summer. The panel design and processes developed by the SDO staff will serve as the template for all the stations in this incredible exhibit.

EDUCATION PRODUCTS

Hubble Meets the Giant Screen

John Stoke, Space Telescope Science Institute (STScI)

After upgrades in 2002, the Hubble Space Telescope (HST) began to deliver images of such immensity that it seemed time for HST to meet the biggest of screens—IMAX!

Conventional production in this enormous movie format costs hundreds of thousands of dollars per minute—much more than we had to spend. So we opted for the unconventional, producing entirely in-house the “pilot” episode of what we hope will become a series of computer-rendered, trailer-length explorations of the universe as seen by HST. With the generous support of IMAX Corporation (who donated lab services and materials), *Hubble: Galaxies Across Space and Time* was born. The three-minute film features a fantastic simulated flight through a field of galaxies photographed by HST and placed in 3-D perspective.

The film was shown at the Large Format Cinema Association (LFCA) Film Festival in April 2004, where it was voted “Best Short Feature.”

Many theaters have expressed interest in showing the film as a bonus before their main feature. It is available



Installation of the Sun Station sculpture on the B&A Trail in Maryland.



A frame from STScI's IMAX film *Hubble: Galaxies Across Space and Time* fills the seven-story IMAX screen. Each frame was digitally rendered at 5.5K x 4K pixel resolution and imaged to 70-mm film that runs through the projector at nearly 4 feet per second.

for booking at no cost (see <http://hubblesource.stsci.edu/exhibits/largefilm/>, where a small QuickTime clip of the film can be previewed). Currently it is running at the Maryland Science Center in Baltimore, the Reuben Fleet Science Center in San Diego, and the New Detroit Science Center. Additional bookings are in the works. Audience reaction has been positive; a console operator in San Diego reports: "The public is responding well to the Hubble footage. Their mouths are hanging open."

New Solar Science Classroom Supplement Kit

Dr. Steele Hill and Dennis Christopher, Goddard Space Flight Center

The Solar and Heliospheric Observatory (SOHO) Education and Public Outreach (E/PO) program has entered into a venture with Ward's Natural Science to produce a series of hands-on classroom supplement kits that tie to the theme of space weather. Dennis Christopher and Steele Hill approached Ward's, the largest distributor of school kits in the world, at the National Science Teachers Association (NSTA) meeting and found an immediate interest on the company's part. This effort will make the kits available to teachers on a national scale. Topics for the kits will include magnetism, the scale of Earth and the Sun, and how space weather relates to everyday life. These kits will be generic enough for any solar mission to adapt them to its E/PO needs. They also will be so user friendly that any teacher, E/PO specialist, or scientist could pick them up and use them in a classroom with minimal preparation.

The kits will be developed as a series of stand-alone curriculum supplements, tied to science topics as identified

by solar researchers, that are correlated to national science standards and enhanced by high-resolution graphics. Each topic will include one or two hands-on activities with a teacher's guide and all the materials needed. Each topic's activity will be associated with a CD presentation that will include movies and graphics that tie the activity to real data taken from several spacecraft.

Each topic could stand alone (i.e., if a teacher was working on a unit dealing with scale and distance, he/she could pull this topic and use it in the lesson). Using this approach gives the kits more flexibility inside current curriculum. The teachers can approach the kits as a unit, working from sunspots to solar storms to human impact, or use each topic as a separate lesson within their curriculum.

Ward's hopes to have the first set of topics available for its December catalog, with additional topics to be added as they are completed. When all of the topics are complete, an entire kit will be available at a discounted price. We expect to receive a number of kits that we can distribute to the Aerospace Education Specialist Program (AESP), Sun-Earth Connection Education Forum (SECEF), and mission E/PO staff.

The Space Place Rolls Out New Web Design

Diane K. Fisher, Jet Propulsion Laboratory

The Space Place (<http://spaceplace.nasa.gov>), NASA's award-winning Web site for kids, has a whole new look and feel. The site targets elementary school children, their parents, and teachers. The compelling new design of the Web site makes it even easier for kids to find their favorite features, which include games, projects, animations, and fun facts about space and Earth science and technology.



The Space Place Web site is part of a multifaceted NASA outreach program that creates unique educational products in a variety of media and distributes them via a highly leveraged and diverse network of partnerships. The New Millennium Program launched the Space Place effort in 1998 and now invites all NASA missions and enterprises to participate.

EDUCATION PROGRAMS

NASA Ames Robotics Team Upholds Ideals of NASA and FIRST

Jonas Dino, NASA Ames Research Center

Mention that you are involved in a robotics competition and most people will conjure up visions of metal-to-metal destruction, but the NASA Ames Robotic Team, Moffett Field, CA, is starting to change that perception.

At the For the Inspiration and Recognition of Science and Technology (FIRST) Robotics 2004 National Championship in the Georgia Dome in Atlanta, the team didn't take first place, but they were awarded the highly coveted Chairman's Award and were inducted into the FIRST Hall of Fame.

The Chairman's Award recognizes a team's commitment to fellowship among people and the appreciation of science and technology. These ideals are why NASA has partnered with the FIRST organization, one of the many partnerships NASA has cultivated to "inspire the next generation of explorers."

"It has been an extremely rewarding year and a very proud moment for me when the NASA Ames Robotic Team was announced as the top robotics program in the Nation," said Steve Kyramarios, engineering mentor and NASA engineer. "This is just one of the many results of NASA's commitment to our youth and support of education."

To win the Chairman's Award, the NASA Ames Robotics Team #254, better known as the "Cheezy Poofs" after a snack food from the animated series *South Park*, not only were fierce competitors but also went out of their way to help others. During the competition, the team made over 400 repairs on about 200 robots using its mobile repair shop.

Other team activities included mentoring and raising money to send the "Space Girls" team from Castillero Middle School, San Jose, CA, to Atlanta and holding a pre-regional competition scrimmage at NASA Ames for

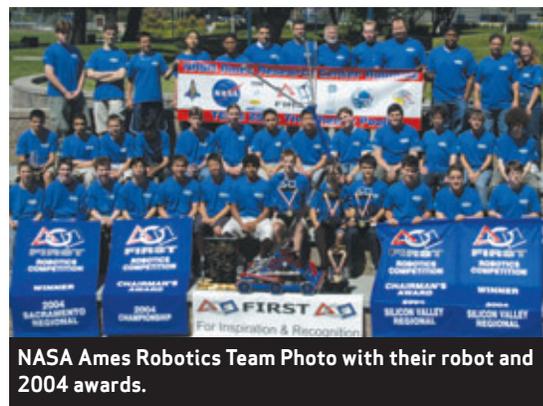
teams in the Bay Area to practice and work out the bugs in their robots.

The team has won many accolades and titles, but the true test of a program is how it has changed the lives of the people who have been involved in it.

"Working with NASA engineers has given me insights into the business world," said Chris Ishisoko, Cheezy Poof team president. "In addition, serving as team president has given me the opportunity to develop my leadership skills and learn what running a business can be like. I've learned to work with people, coordinate projects and delegate tasks, and manage financial resources and human capital."

"Ever since I was young, I always saw NASA scientists as some sort of mighty godlike figures on a higher plane that I could never attain," said Adrian Santos, team leader. "Working alongside some of these brilliant individuals on the NASA Ames Robotics Team has made me realize that with enough hard work and dedication, I could someday become a NASA engineer too."

How this program affects lives is why NASA, through the NASA Robotics Education Project, has helped FIRST expand from its original 28 teams to over 900 national and international teams with 26 regional competitions and a national championship. The NASA Office of Space Science funds the Robotics Education Project under the direction of David Lavery, program executive for Solar System Exploration.



NASA Ames Robotics Team Photo with their robot and 2004 awards.

Related Web sites:

NASA Ames Robotics: <http://team254.bcp.org/>

NASA Robotics Education Project: <http://robotics.nasa.gov>

FIRST: <http://www.usfirst.org>

Fisk University Off to a FASST Start

Arnold Burger, Fisk University

Fisk University is one of 16 institutions awarded 3-year funding from NASA's Minority University and College Education and Research Partnership Initiative in Space Science (MUCERPI) program. The MUCERPI pro-

gram is an initiative to actively engage minority institutions in developing substantial space science capabilities.

Through MUCERPI funding, and in close collaboration with Vanderbilt University, we have established the Fisk Astronomy and Space Science Training (FASST) program.



Thompson LeBlanc (right) with Dr. David James (left) in the control room of the SMARTS 1.5 meter telescope at the Cerro Tololo Inter-American Observatory (CTIO) in Chile. Thompson is a first-year master's student at Fisk, and the first student in the new Fisk-Vanderbilt master's-Ph.D. component of the FASST program. Thompson is conducting research on star formation under the direction of Dr. James and Dr. Keivan Stassun, both of whom hold joint appointments at Fisk and Vanderbilt Universities as part of the MUCERPI-funded FASST program.

The main objective of FASST is to increase the participation of underrepresented minorities pursuing careers in astronomy and other space-science-related disciplines. The program includes research, teaching, and outreach as its major components.

One of the key goals of the MUCERPI program is to build collaborations. Fisk has become one of the members of the Detectors Technical Working Group for the Energetic X-ray Timing Survey Telescope (EXIST). EXIST is a

mission concept under study as a Black Hole Finder Probe (BHFP), one of the three Einstein probe missions in the Beyond Einstein Program in the NASA Strategic Plan. Researchers at Fisk will investigate various concepts for efficient detectors to be used for imaging gamma-ray bursts (GRBs), the brightest sources of cosmic gamma rays in the observable universe.

FASST faculty will develop new curriculum that will result in three new courses in the Department of Physics at Fisk, which together will constitute a new concentration in astrophysics. FASST will award scholarships each year to meritorious undergraduates majoring in physics and related disciplines to carry out the concentration and to conduct supervised research. Graduate students also will participate through a new joint master's-Ph.D. program with Vanderbilt University.

Mr. Thompson LeBlanc, a Fisk graduate student, is the first to enroll in the FASST program. He, together with his mentor, Dr. Keivan Stassun, Co-Director of FASST and a professor at Vanderbilt as well as an adjunct professor at Fisk, will perform observational astrophysics research using the SMARTS telescopes in Chile.

In close partnership with Vanderbilt's historic Dyer Observatory, the FASST program will organize training workshops for K-12 teachers, host educational events for the public, and sponsor other activities. These activities include the Fisk-Vanderbilt NASA Roadshow,

which brings the excitement of astronomy and space science to K-12 classrooms and community-based groups around Tennessee.

The program also will benefit from collaborations with astronomy and space science programs at Yale University, University of Wisconsin-Madison, Lawrence Livermore National Laboratory, NASA Marshall Space Flight Center, NASA Goddard Space Flight Center, Harvard University, and Washington University in St. Louis.

For more information about the FASST program, visit <http://www.physics.vanderbilt.edu/fasst/> or contact Arnold Burger, FASST Director, aburger@fisk.edu or Keivan Stassun, FASST Co-Director, keivan.stassun@vanderbilt.edu.

Community Takes a Journey Through the Universe

Jennifer King, Challenger Center for Space Science Education

Few people ever have the opportunity to venture beyond Earth's atmosphere to witness the wonders of our universe, much less the chance to share that kind of experience with friends and family. But what if we all could see cutting-edge research, talk to scientists, and, as families and communities, discover more about the world around us? For more than 4 years, Challenger Center's Journey through the Universe program has been doing just that—taking entire communities to the space frontier.

A recent Journey Week occurred in Dickinson, Iron, and Menominee Counties in Michigan's northern peninsula. Scientists and educators visited classrooms,



Dr. Brad Files uses a model to describe his work on the Space Shuttle at NASA Johnson Space Center.

Photo by Bill Bertoldi

trained teachers, and spoke to families across the community. The average reach for a Journey Week is 100 classroom presentations in 40 schools, reaching 5,000 students; 110 educators trained; and 2–3 Family Science Nights with 1,000 attendees.

“The program truly reflects the philosophy it takes a village to raise a child,” says Dr. Jeff Goldstein, the program’s director. “Educators are given the tools and training to bring the universe into the classroom. Parents and children learn together through evening programs. Thousands of students are visited by researchers who are passionate about what they do and are gifted at communicating that passion to audiences of all ages.”

This was Dickinson-Iron-Menominee’s first year, and the community was excited. “We’re just thrilled to be a part of this. Science is a critical field, both now and in the future,” said Deb Kroll, part of the local team and principal at Lincoln School in Menominee.

As one fourth-grade student put it, “Now just because of the facts I learned at the show I like science a lot more. [Before this program] I only thought about science as a subject in school that you had to get good grades in.”

If you would like your community to become part of the Journey through the Universe network, or to find out more, e-mail journey@challenger.org.

MIT/Chandra After-School Astronomy Project (ASAP)

Irene Porro and Charlotte Zeamer, MIT Center for Space Research

The MIT/Chandra ASAP is the result of a collaboration coordinated by the MIT Center for Space Research education and public outreach office and included the NASA-Smithsonian Structure and Evolution of the Universe Education Forum, the Timothy Smith Network (TSN), and the Boston 2:00-to-6:00 After-School Initiative. ASAP was designed to provide youth in out-of-school time programs with an opportunity to reinforce learning in space science through activities that also develop students’ computer skills. During nine after-school sessions held at two TSN centers, youth from the Boston Public Schools conducted their own explorations of the night sky. They did so using MicroObservatory, a network of educational telescopes that can be controlled over the Internet and that the Universe Education Forum made available to this program. Our students then compared their optical images with x-ray images taken with the Chandra x-ray satellite.



Irene Porro (first right) with ASAP students at the Roxbury Multi-Service Center (RMSC). Surrounded by the students are Adreenne Law Hampton (left), coordinator of the RMSC John D. O’Byrant Community Youth Center, one of the TSN centers, and Brenda Gadson, RMSC Executive Director (right).

They learned that the universe looks very different when seen through different “colors” of light and that only by bringing together the information revealed by visible and x-ray images can we start to understand some of the mysteries of our universe.

“Staying Cool”: A MESSENGER Workshop

Amy Wolfe, Challenger Center for Space Science Education

Members of the MESSENGER Education and Public Outreach (E/PO) team traveled to Cocoa Beach, FL, this May to participate in NASA’s Explorer Schools (NES) Student Symposium. The team members trained teachers on “Staying Cool,” a standards-based education unit for the MESSENGER spacecraft mission to Mercury. Teachers were thrilled to receive information on such comprehensive inquiry-based lessons for grades pre-K–12. MESSENGER E/PO team members also conducted several activities from “Staying Cool” with students.



Sean Solomon, MESSENGER PI, signs posters for NES students after his presentation at the NES Student Symposium in Cocoa Beach.

Students were excited to learn about this upcoming mission and to participate in hands-on activities, several of which took place outdoors. MESSENGER Principal Investigator (PI) Sean Solomon capped off the day of activities with a talk about the MESSENGER mission.

Even though the MESSENGER team members were there to inspire our future generation of space explorers, the students didn't fail to inspire the team in return.

NASA Science Camps for Blind Students

Bernhard Beck-Winchatz, DePaul University

This summer, a partnership between NASA and the National Federation of the Blind brought blind students from around the country to Baltimore to participate in two science camps entitled "Circle of Life" and "Rocket On!" The students had the opportunity to experience the excitement of NASA space exploration first hand by engaging in hands-on science activities and by interacting with blind and sighted NASA scientists and engineers. In addition to exposing the students to exciting scientific research, the camps also addressed the myth that science is too difficult and dangerous for people who are blind as well as provided students with the opportunity to learn about career paths at NASA. The first camp took place July 18–24 and was designed for blind 6th–8th graders who explored the Chesapeake Bay ecosystem and collected and analyzed weather and soil data. The second camp took place August 15–21 and was intended for high school students who designed, built, and launched a scientific payload from the Wallops Flight Facility. Both camps also included field trips to NASA Goddard Space Flight Center and regional science centers and museums.

Pacific Science Center "Origins" Training Workshop

Len Adams, Pacific Science Center and Carole Rest, Origins Education Forum

The Pacific Science Center (PSC), in collaboration with the Origins Education Forum, held a rewarding 3-day workshop May 12–14 at the Space Telescope Science Institute (STScI) in Baltimore to support the educational outreach program of the "Origins" television series on NOVA.

The television series, airing September 28 and 29 on PBS, will explore the origins of the universe, solar system, Earth, life on Earth, and the search for life elsewhere in the universe. Educational materials will build off and complement the interdisciplinary nature of the topics by focusing on the underlying question—what is the evidence for our present understanding of the subject?



Dennis Schatz of the Pacific Science Center demonstrates an activity using light to determine the temperature and composition of deep space objects.

Using materials provided by the PSC, 10 partner museums across the country serving diverse populations will conduct a variety of programming, including demonstrations, activities, 2-hour workshops, and community celebrations. The Origins Education Forum will furnish each museum with the hardware and software needed to support ViewSpace, a multimedia exhibit created by STScI's Informal Science team, including a new "Origins ViewSpace" segment developed to augment the series. The segment portrays the story of NASA's search for Earth-like planets.

The workshop was designed to provide hands-on training in the use of the PSC materials and ViewSpace, previews of the series, planning and networking opportunities, and exposure to current NASA research. Staff from the Mid-Atlantic Region Space Science Broker (MARSSB) attended the workshop to meet the museum staff and gather ideas for working with the informal science community on a regional basis. The Origins Education Forum and MARSSB, in collaboration with the space science education Support Network, are exploring ways to sustain the relationship with the partner museums beyond the airing of the NOVA series.

For more information on the "Origins" NOVA series, contact origins@stsci.edu.

Astronomy, Space Travel, and Literacy Workshop

Julie Lutz, Space Science Network Northwest

Space Science Network Northwest sponsored a 6-hour workshop on Astronomy, Space Travel, and Literacy at the University of Washington in Seattle on May 15, 2004. The workshop provided teachers of grades two through six with ideas and materials for incorporating space science into their literacy curricula. Emphasis was placed on the topics that appear in the *Essential Academic Learning Requirements* of Washington State. For elementary and early middle school these topics include Earth-Moon-Sun relationships (including sea-

sons), forces, and the nature of the solar system. Participants were introduced to NASA education resources such as **Reading, Writing and Rings, Imagine Mars**, and activities on rockets.

Workshop presenter Veronique Paquette, a second-grade teacher from Eastmont Elementary in central Washington, was honored as Washington State Teacher of the Year in 2003. The other presenter was Jack Horne, science coordinator for the North Central Educational Service District, which covers a large area of central Washington. The presenters emphasized the large gains that their English as a Second Language (ESL) students make in reading and writing when these students are allowed to read and write about science topics that are engaging.

Learning from the Frontier: Getting Planetary Data in the Hands of Educators Workshop

Stephanie Shipp, Lunar and Planetary Institute

Approximately 60 researchers, formal and informal education specialists, classroom educators, data archivists, and educational product developers came together in March in Houston, TX, to explore avenues for bringing data into the classroom. Participants spent the day discussing challenges facing educators who are working with planetary data. Presentations explored models for facilitating data access and use, examples of effective classroom use of data, availability of data to the educational community, and paths for accessing and using mission data. Panel discussions focused on the experiences of researchers, educators, and product developers in creating and implementing programs and on the challenges remaining for integrating planetary data into educational environments. One outcome of the workshop is a series of recommendations for the development and implementation of successful programs. These recommendations are available at http://www.lpi.usra.edu/education/score/planetary_data/. Interested individuals can access the agenda, participant list, and presentations and can learn more about examples of successful models of planetary data use and future workshops. The workshop was co-hosted by the South Central Organization of Researchers and Educators and the Solar System Exploration Education Forum, both part of NASA's space science education Support Network.

PROFILES OF SCIENTISTS IN EDUCATION AND PUBLIC RESEARCH



This profile is based on an interview with Dr. Marilyn Lindstrom conducted in May 2004 by Dr. Anita Krishnamurthi at NASA Headquarters. Dr. Lindstrom has received several awards and recognition for her E/PO efforts such as NASA Johnson Space Center's Certificate of Commendation (1993 and 1998) and the NASA Exceptional Service Medal (2000). Also in 2000, the National Science Foundation (NSF) named a ridge in Antarctica after her in recognition of her meteorite curation work, and the Smithsonian named asteroid 5281 Lindstrom.

What is your current professional position?

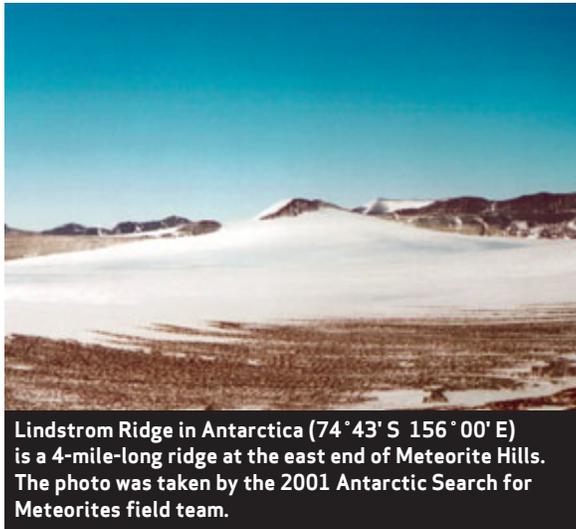
I am the Discipline Scientist for the Planetary Instrument Definition and Development Program at NASA Headquarters. This program funds research proposals for the initial instrument development for spacecraft exploring the solar system. I am also the Program Scientist for astromaterials curation and Solar System Exploration Education and Public Outreach (E/PO).

How did you get interested in E/PO?

I am a geochemist by training. Prior to coming to work at NASA HQ, I was a researcher and meteorite curator at the Johnson Space Center. While serving on the Federal Women's Committee (through the NASA EEO office), I realized that the best way to increase the number of women in science and engineering was to focus on middle school education. So, when asked, I took the opportunity to work with some teachers to develop a curriculum on Earth science for middle school. I was then asked to provide some curriculum to go along with the meteorite sample disks that were loaned to schools. I worked with one scientist-educator colleague, half a dozen teachers, and other scientists as needed. My efforts in E/PO kept intensifying after that, and, as my involvement in E/PO efforts increased, I cut back on my research.

What were the biggest challenges to your involvement in E/PO?

Funding to do E/PO was an issue when I was a research scientist; I was always piecing funds together to do projects. I also had to learn when to say no and realize that I



Lindstrom Ridge in Antarctica (74° 43' S 156° 00' E) is a 4-mile-long ridge at the east end of Meteorite Hills. The photo was taken by the 2001 Antarctic Search for Meteorites field team.

could only do so much. Once you get interested in doing E/PO, you don't watch the clock because you have so much enthusiasm for it. During this period, I was also the main caretaker of the Mars meteorite found in Antarctica that was thought to contain evidence of life, so that was an extraordinarily busy period. It was sometimes hard on my family, especially my children, because E/PO and curation travel took me away from them on many occasions.

What have you gotten out of your involvement in E/PO?

Working with teachers and their response to our efforts has been the most rewarding thing for me personally and has given me a great appreciation for the value of partnerships with the education community. It also has been gratifying to see my colleagues get enthused about doing E/PO after working with me on projects. I greatly enjoyed my meteorite curation job, and this, combined with my involvement in E/PO, gave me a more "global" perspective of science.

Any words of wisdom to pass on to other scientists about E/PO?

My advice is—do it! Choose the way you want to get involved and put in as much time as you can afford. Test the waters to see how wonderfully rewarding it can be. Another point I want to make is that it is possible to "cross over" into E/PO from research, and equally importantly, you can also cross back. I started my career as a pure researcher, but I started spending more time on E/PO efforts and eventually was doing E/PO full time. But I missed the science, and so I have made a transition back to being involved in science again with E/PO on the side.

ON THE HORIZON

Swift E/PO: The Swift Launch Teachers Workshop

Dr. Philip Plait, Dr. Lynn Cominsky, and Sarah Silva, NASA Education and Public Outreach Group at Sonoma State University

The NASA E/PO Group at Sonoma State University (SSU) will hold a workshop for educators timed to coincide with the launch of the Swift mission in October 2004. The workshop will be held at the Florida Association of Science Teachers meeting in Orlando, FL, and will be sponsored by the Swift Educator Ambassadors (EAs) program. Educators participating in the workshop will learn about the Swift mission and its primary science targets—gamma-ray bursts (GRBs). They will perform formal educational activities (grades 7–12) based on GRBs for use in the classroom. If the launch schedule permits, as a final treat the teachers will watch the Swift launch from a remote location with the EAs and members of the SSU E/PO group!

For more information, please visit <http://epo.sonoma.edu/ambassadors>

Special Invitation to an NSTA Regional Convention

Julie Lutz, University of Washington

Julie Lutz, Director of Space Science Network Northwest, would like to draw your attention to the NSTA Regional Convention in Seattle on November 18–20, 2004. Julie is Convention Chair for the meeting and has made sure that lots of NASA space science is on the program. James Rice of Arizona State University will be giving a keynote speech on the Mars Exploration Rovers. The Solar System Exploration and Origins education forums will be giving short courses, and many 1-hour presentations by education and public outreach personnel from space science missions are scheduled. View the program and register for the meeting online at <http://www.nsta.org>.

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 space science E/PO program, contact Anita Krishnamurthi, Editor, at Anita.Krishnamurthi@nasa.gov. Prior issues of *Voyages* are online at <http://spacescience.nasa.gov/education/news>.