

## Tactile & Technology Focus Group (TTFG)



### ORGANIZERS:

DePaul Space Science Center for Education and Outreach, Origins Education Forum & Southeast Regional Clearinghouse (SERCH)

### INSIDE THIS ISSUE:

#### Models of Mars

#### Building a National Center for Blind Youth in Science

#### WEB ACCESSIBILITY—Input Requested

#### ABOUT TTFG



### UPCOMING...

#### Exceptional Space & Earth Science for Exceptional Students V

July 24-28, 2005  
Huntsville, AL

Based on attendance of TTFG members—a short TTFG meeting will be held at ENWS V.

### Models of Mars

By: John Keller

A team at Goddard Space Flight Center, consisting of Herb Frey, John Keller, Jim Roark, Susan Sakimoto (now at the University of Notre Dame), and Stephanie Stockman, has been building 3-dimensional solid models of Mars and Earth topography in order to illustrate differences and similarities in large and small scale geological features of the terrestrial planets. In one example, a model of the Hawaiian Island volcano chain is compared to Olympus Mons, the largest volcano on Mars as well as the Solar System. At 26 km high and 600 km in diameter Olympus Mons dwarfs that of Mauna Loa the largest volcano on Earth which is less than 9 km tall measured from the ocean floor. Other topics represented by the models, include craters, rifts, and polar ice caps. The topographic models are visually and tactilely appealing and instantly engage those who handle them, thus providing an opportunity for further discussion of the science behind the geological features represented by the models. As an additional aid, the Goddard researchers prepare education material appropriate for elementary and middle school students that introduces concepts such as scale and stretch and also include suggested classroom activities that are aligned with the National Science Standards and Benchmarks.

In addition to the geology, discussion of the models often centers on how the data for building the models were derived and how the models are made. In the first case, Mars global topography was collected using the Mars Orbiter Laser Altimeter (MOLA) on the Mars Orbiter spacecraft. MOLA was an instrument developed at Goddard's Laboratory for Terrestrial Physics. The instrument fires a laser from the orbiting spacecraft and records the time for the reflection of the light to return from the surface. This time is directly related to the distance from the spacecraft and with this measurement and knowledge of the speed of light a very precise measurement of the altitude of the laser spot can be made. The Earth data, although collected and merged by the U. S. Geological Survey, come from a number sources, some aircraft or satellite based laser altimetry, while the bathymetry (below the ocean) may come from ocean crossing ships.

The models are created using a rapid prototyping instrument. This is a machine that builds models layer by layer by extruding melted plastic through a small hole mounted on a head that rasters back and forth. The rapid prototyper is digitally controlled using the altimetry data that has been converted into a format that the machine can accept. Once the models have been created, they can be used to make molds for mass production, making them widely accessible for relatively low cost.

The Goddard models have been displayed at the National Federation for the Blind yearly conventions and are also included in the Smithsonian Institute's National Air and Space Museum's Discovery Stations. These are a series of portable centers which encourage informal learning through active looking, discussion, and hands-on activities related to aviation, space exploration, astronomy, and planetary geology themes in the Museum.

## **Building A National Center for Blind Youth in Science: NFB Jernigan Institute Imagines a Future Full of Opportunity**

**By: Mark A. Riccobono**

It was a warm day in August. I stood outside listening to the wind and the distant sound of the ocean. Wallops Island was quiet except for the periodic reports from members of the 2004 Rocket On! Team. The world was watching over the Internet, and we were all wondering if the dream would come true--would twelve blind youth, waiting patiently in a blockhouse two hundred yards away, be the first students to launch a half-scale patriot rocket with a hybrid motor from the Wallops Flight Facility?

It began in the summer of 2003, when Dr. Marc Maurer, President of the National Federation of the Blind, proposed a vision for blind youth. In an address to the annual convention of the Federation, Dr. Maurer talked about a science camp for blind youth being one of the first projects of the newly established NFB Jernigan Institute, a research and training center that would open adjacent to the NFB headquarters on January 30, 2004.

The notion of a science camp bloomed into the NFB Science Academy, which would include two sessions, one for middle school age and another for high school age blind youth. In planning for the Science Academy, a program that would shatter all misconceptions about the blind in science, a broader mission began to develop--the establishment of the National Center for Blind Youth in Science (NCBYS).

The mission of NFB's National Center for Blind Youth in Science is to drive innovation in education and employment related to the blind in science, technology, engineering, and math (STEM) subjects and careers by serving as a national clearinghouse of resources and expertise related to nonvisual scientific exploration.

The primary initiatives of the NCBYS as outlined in the strategic plan completed in December 2004 are:

- Establish a center of excellence for resources and information about how blind youth can best learn and understand scientific and mathematical concepts
- Promote opportunities for blind youth in science through demonstration projects, partnerships, and public education
- Provide technical support to projects working to improve materials and instruction for blind youth in science and math
- Provide a national mentoring program built on the foundations established by the blind professionals of the NFB Science and Engineering Division and highlight scientific achievements by blind individuals throughout history
- Establish partnerships to stimulate the enhancement and development of technologies/materials that will facilitate greater opportunities for the blind in science- and engineering-related fields
- Establish a compilation of research findings related to the involvement and achievement of the blind in STEM areas and provide researchers with guidance to ensure new projects are focused in priority areas that will contribute to the overall NCBYS mission

In bringing together the NCBYS, collaboration and partnership are important. This is where you come in. The work that you are doing to improve science resources and expand nonvisual access to materials needs to be preserved and disseminated through the Jernigan Institute. We want to help you by guiding your work through the experience of blind teachers and scientists, by helping you to reach blind children, their families, and their instructors, and by including your work in our national clearinghouse so that its contribution makes an even greater impact.

By building partnerships, cultivating best practices, and providing opportunities for blind youth to learn and work, the NFB Jernigan Institute will expand horizons for blind youth around the world. This summer, the NFB has again expanded its efforts. The NFB Science Academy will again be offering two sessions, one for middle school and another for high school students. The NFB has begun to contribute to this nation's scientific pipeline by establishing the Excellence through Challenging Exploration and Leadership (EXCEL) internship program in collaboration with NASA to provide six blind young adults entering their freshman or sophomore year in college with training and employment at a NASA center this summer. On the horizon is NFB's Web-based clearinghouse, which will provide the most comprehensive information about resources and opportunities accessible to blind youth. The "blind science" portal, as it has come to be known at the Jernigan Institute, will be the one-stop site for learning about how the blind perform scientific tasks and

## **Building A National Center for Blind Youth in Science**

**Continued from page 2.**

the source for up-to-date information that can be built upon to further develop a comprehensive knowledge base about the blind in science.

Additionally, the Jernigan Institute is partnering with a number of organizations to help develop meaningful materials and technologies that will expand opportunities. One example is the upcoming launch of the first fully accessible artificial intelligence chemistry tutor. By combining AI technology, outstanding teaching pedagogy, and the access technology expertise of the NFB, QUANTUM Simulations will soon make a dramatic impact on chemistry education for the blind, with other powerful tools soon to follow.

We invite you to become a part of this movement, the National Center for Blind Youth in Science. Your work can be more powerful when it is part of a coordinated effort and is more widely disseminated across the country. Whether it is directly through our Science Academy, by consulting with the NFB on product developments, or providing content and resources for the NCBYS Web portal, you can make a difference, and we welcome your partnership.

At 8:34 a.m. on that warm day in August (August 19, 2004), the countdown clock had reached zero, the time was right, everything was in place for an historical moment. As the sound of the NFB rocket shot overhead and into the eastern sky, I could not help thinking that this moment was a small step on a long journey that would change the future of the next generation of blind explorers. Through the Jernigan Institute, we are imagining and building that future. Come join with us on this journey; it will be one of the most rewarding missions of your life.

To learn more about the NCBYS or to discuss opportunities to participate in the movement and contribute to the knowledge base, you can contact Mark Riccobono at: [mriccobono@nfb.org](mailto:mriccobono@nfb.org)

## **WEB ACCESSIBILITY—Input Requested**

In 1998, Congress amended the Rehabilitation Act to require Federal agencies to make their electronic and information technology accessible to people with disabilities. Inaccessible technology interferes with an individual's ability to obtain and use information quickly and easily. Section 508 was enacted to eliminate barriers in information technology, to make available new opportunities for people with disabilities, and to encourage development of technologies that will help achieve these goals. Specifically, web accessibility involves preparing internet content to be usable by a wide and diverse number of users, including those with visual impairment, hearing impairment, learning difficulties, cognitive limitations, limited movement, speech difficulties, etc.

SERCH, with the help of TTFG and ENWS V "tiger team", will be discussing web accessibility issues in detail over the next few months to prepare SERCH in making a presentation at the upcoming Astronomical Society of the Pacific conference. As such, we have developed a document, targeted at webmasters, on web accessibility. We would appreciate your review and comments. The draft document may be found as an attachment in the Tactile and Technology Focus Group (TTFG) Newsletter: Volume 1, Issue 2 email sent on 7/20/2005. Please send all comments to Cynthia Atkinson [atkinsonc@cofc.edu](mailto:atkinsonc@cofc.edu) by September 01, 2005.

## ABOUT TTFG...

Due to the increased number of persons working specifically with space & Earth science content to develop tactile graphics and technology programs for persons who are blind/visually-impaired the Special Needs Resource Group (SNRG pronounced "synergy"), along with colleagues working in this particular field, created a focus subgroup named the *Tactile and Technology Focus Group (TTFG)*. By forming this group we hope to eliminate duplication of products, enhance the creation of new products and centralize products that are and will be created. It is our belief that by coalescing this highly innovative group and the products they create the group will provide a quality resource for educators of and to persons who are blind/visually-impaired.

As a first step, TTFG will release quarterly newsletters highlighting what members of the group are doing and developing for persons who are blind/visually-impaired. We hope you enjoy this newsletter and find it a useful resource.

**For more information on TTFG or to join contact us @:**

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