

**Testimony**  
**Dr. Ford W. Bell, President of the American Association of Museums,**  
**to the House Appropriations Subcommittee on Commerce, Justice, Science,**  
**and Related Agencies**  
**April 2, 2009**

The American Association of Museums (AAM) appreciates the opportunity to testify today in support of the programs funded by the Commerce, Justice, and Science Subcommittee on Appropriations, and in particular in support of three areas of interest to museums: at least \$71 million for the National Science Foundation's (NSF) Informal Science Education (ISE) program, at least \$10 million for the National Aeronautics and Space Administration's (NASA) Informal Science Education Program and NASA grants for science museums and planetariums, and at least \$40 million for the National Oceanic and Atmospheric Administration's (NOAA) Education Program and grants to aquariums.

The American Association of Museums represents the full range of our nation's museums – including aquariums, arboretums, archaeological museums, art museums, botanical gardens, children's museums, culturally specific museums, historic sites, history museums, maritime museums, military museums, natural history museums, nature centers, planetariums, presidential libraries, science and technology centers, zoological parks, and other specialty museums – along with professional staff and volunteers who work for and with museums. AAM currently represents approximately 17,000 individual museum professionals and volunteers, 3,000 institutions, and 300 corporations. Our membership is as diverse as the collections contained in the museums we represent. As a result of the diversity of our field, funding for museums can be found among several federal agencies.

Today, I am proud to submit this testimony on behalf of several other national museum service organizations – including the Association of Science-Technology Centers and the Association of Children's Museums – that join the American Association of Museums in representing many of these informal education institutions where science, technology, engineering, and mathematics (STEM) education is brought to life through activities and experiences that build a lifetime of interest and enthusiasm for the sciences.

One of our greatest challenges as a society today is determining how to engage the next generation in the sciences. I offer museums as one the very best places for this to happen. Take the example of Dr. Michael Barratt.

As a child, Dr. Barratt frequently visited the Oregon Museum of Science and Industry (OMSI) where his mother worked as a volunteer. Barratt attended OMSI classes and built his first telescope with the help of a former OMSI planetarium director. Today, he is a NASA astronaut. Dr. Barratt recently embarked on his first space mission as flight engineer for the International Space Station's Expedition 19 from Baikonur, Kazakhstan, Russia, and joins the International Space Station crew until October. Dr. Barratt is so committed to OMSI that he arranged to take a special wide-angle digital camera with him, so he can send back images of his journey. These images will be shown as part of OMSI's Starry Nights Live planetarium presentations, and at other museums around the country.

Dr. Barratt's experiences with his local science center are supported by a recently-released National Research Council (NRC) report on learning in informal settings. According to the NRC, "tens of millions of Americans, young and old, choose to learn about science in informal ways – by visiting museums and aquariums, attending after-school programs, pursuing personal hobbies, and watching TV documentaries, for example. There is abundant evidence that these programs and settings, and even everyday experiences such as a walk in the park, contribute to people's knowledge and interest in science."

Philip Bell, co-chair of the committee that wrote the report and associate professor of learning sciences at the University of Washington, Seattle, stated that, "Learning is broader than schooling, and informal science environments and experiences play a crucial role. These experiences can kick-start and sustain long-term interests that involve sophisticated learning. Think of the child who sees dinosaur skeletons for the first time on a family trip to a natural history museum, and then goes on to buy dinosaur models and books, do Web searches about dinosaurs, write school reports on the subject, and on and on."

In addition to finding that informal learning experiences can significantly improve outcomes for individuals from groups that are historically underrepresented in science, the report also points to evidence that participation in informal science learning (such as volunteering in the collection of scientific data) can promote informed civic engagement on science-related issues such as local environmental concerns.

We are proud to acknowledge several agencies under this Subcommittee's jurisdiction that help our nation's science museums, zoos, botanic gardens, technology centers, children's museums, and other institutions do exactly what that NRC report says they do: engage whole generations in STEM learning through interactive, educational – and yes, fun – programming:

- **The National Science Foundation (NSF)**, which was funded at \$6.065 billion in FY08 and \$6.5 billion in FY09. NSF's Informal Science Education and Math and Science Partnership programs and Biological Sciences and Geosciences directorates offer grants designed to carry out research and digitization; improve collections; and promote public engagement with, and understanding of, science, technology, engineering, and math. Museums are among those institutions who have been awarded highly-competitive NSF funds.
- **NASA Informal Science Education**, which was not funded in FY08 and received \$1 million in FY09. The Informal Science Education program provides stimulating experiences for science, technology, engineering and mathematics, or STEM, learning outside of formal classroom environments through media, exhibits, and community-based programming.
- **National Oceanic and Atmospheric Administration (NOAA) Education Program**, which was funded at \$34.06 million in FY08 and \$32.27 million in FY09. This program coordinates higher education activities aimed at strengthening candidates for a future, highly-trained, technologically capable NOAA workforce and seeks to promote environmental literacy in formal and informal education settings, including museums. NOAA also provides

“Competitive Education Grants” to aquariums accredited by the Association of Zoos and Aquariums.

I am pleased to report on some of the important programs and projects that have previously been supported by these agencies:

The Discovery Center Museum in Rockford, Illinois received an NSF grant to support its “Outreach to Space” program to teach kids about astronomy. Programs are held both at the museum and throughout this rural community at local fairs and festivals, where countless children are inspired to pursue science careers. Each family reached at a county fair or festival received a free pass to come to Discovery Center, which marks many families’ first visit to a museum. The museum’s after-school program provides hands-on science education and reaches 500 at-risk students each day. Participants in this program are performing better on standardized tests and have improved attendance.

The Cincinnati Museum Center was awarded a \$100,000 Major Research Instrumentation grant from the National Science Foundation to establish a fully functional molecular genetics laboratory through purchase of an automated DNA sequencer and other related instruments in 2008. In collaboration with the Cincinnati Zoo, Xavier University, and Thomas More College, the lab is now conducting research on a growing zoological frozen tissue collection at the museum using the latest molecular genetic tools. Local high school students are also participating in projects on genetics, biomedical research, and life sciences.

Also in Cincinnati, an NSF award supported the excavation and study of a unique fossil assemblage in Kentucky that documents part of the transition of vertebrate animals from an aquatic to a terrestrial mode of life, approximately 300 million years ago. The fossils, currently undergoing preparation and analysis, will ultimately form part of an exhibit focusing on the dynamic, changing nature of Earth and its environments.

The University of California, Santa Cruz worked with the Museum of Science & Industry in Tampa, Florida on an NSF-supported grant to maximize the effectiveness of informal learning in museums. As we in the museum field know, museums are an essential partner in education. According to a 2006 IMLS Study, *True Needs True Partners: Museums Serving Schools*, museums spend more than \$1 billion annually on educational programming and receive more than 90 million visits each year from students in school groups. Museums tailor educational programs in math, science, art, literacy, language arts, history, civics and government, economics and financial literacy, geography, and social studies, often in coordination with state and local curriculum standards.

The Nanoscale Informal Science Education Network – a network of professionals in science centers and research institutions that provide public education about science, engineering, and technology through exhibits, public events, and programs in more than 200 partner institutions across the country – is another project supported by NSF. I am proud to note that NSF itself holds this project up as a shining example of how to effectively disseminate research to a broad audience.

NASA funding enabled the Oregon Museum of Science and Industry to develop the award-winning distance learning program, Expedition Northwest, which reaches under-served rural communities in four western states through programs delivered by videoconferencing and Internet technologies. The classroom programs focus on understanding earth systems, from volcanoes to glaciers to weather patterns. Students use scientific instruments to collect and share data across the region. Teachers receive curriculum training in their home communities and trade tips and techniques through a weekly on-line support session facilitated by the museum. The program also enables OMSI to take a portable planetarium to schools in remote communities, providing the first immersive astronomy experience for many students. At night, the planetarium is taken to the local library so that the entire community can participate, and OMSI staff members provide telescopes for night sky viewing.

NOAA funding provides public education grants in conjunction with research grants. Working with researchers at Oregon State University, the Oregon Museum of Science and Industry developed interactive exhibitions to help the public understand satellite technology used for remote sensing. Visitors operate models of NSCAT and TOPEX satellites that map the oceans and detect the movement of El Nino events by sensing the deflection of the ocean surface caused by these currents. These exhibitions are touring museums across the nation.

NOAA also funded "Science on a Sphere," a large scale suspended globe that serves as a projection screen for dramatic display of global systems. NASA has now created two "spherical" movies for SOS, including "Frozen," which documents Earth's changing ice and snow cover as captured by NASA spacecraft. This 12-minute, narrated film, premiered at science centers and museums just last week (March 27). It is difficult for citizens to understand or imagine solutions to some of the most challenging and complex global issues without an understanding of the systems at work, and Science on a Sphere is a terrific tool, now on display at more than 30 locations – including science centers and other museums around the world.

The Children's Museum of Houston (CMH) has received two awards from the National Science Foundation to develop science-based traveling exhibits for children and their families. The "Magic School Bus Kicks Up A Storm" bilingual traveling exhibit, launched in 2003, was developed in partnership with Scholastic Entertainment, the National Weather Service Houston/Galveston and the American Meteorological Society Board on School and Popular Education. Visitors to the exhibit explore meteorological concepts and technologies using themes and characters from Scholastic Inc.'s popular book and television series, The Magic School Bus. Two copies of the exhibit have been touring to children's museums, science centers and other museums for six years, serving a total family and school group audience of more than 2.8 million. The k-5 students are learning about weather maps, charts, thermometers, anemometers and other tools. Half of the participants report that they find the subject of weather more exciting. The other half reported a better understanding of weather concepts.

Also in Houston, "Cyberchase: The Chase Is On! – Traveling Exhibit" was supported by an NSF grant. This program – a bilingual traveling exhibit, launched in 2006 – was developed by the Children's Museum of Houston in partnership with Thirteen/WNET New York. The exhibit builds mathematics understandings among children ages 5-10 using challenges and characters from WNET's popular television series, Cyberchase. Two copies of the exhibit have been

touring to children's museums, science centers, and other museums for three years, and the total projected attendance over the initial five year tour ending in 2011 is 1.5 million. This mathematics teaching tool sends the message: "Math is a way of thinking and everyone can be successful at it," as well as "We use math every day." Parents praise the exhibit for translating complicated math content into simple, fun exhibits.

Department of Justice funding supports The Brooklyn Children's Museum's innovative Museum Team after school program, helping at-risk kids from underserved communities across Brooklyn, including North Crown Heights, Bedford-Stuyvesant, East New York, Flatbush and Fort Green. Participants develop academic, leadership, and community service skills through hands-on activities in science, technology, culture, history and the arts. With a strong focus on employment and college preparation, the museum works closely with the New York City Summer Youth Employment Program and the Career Internship Network. Museums are ideal locations for high school students to participate in educational and community service programs. Indeed, all of the participants from the past five years who applied to college were accepted.

Finally, Members of the Subcommittee may be interested in the many museums that are addressing issues in communities, many of which fall into this Subcommittee's jurisdiction:

- For the last decade, the **Birmingham Museum of Art** has worked with both the Alabama Writers' Forum and the Chalkville campus of the Alabama Department of Youth Services. Through photography and creative writing, at-risk teenagers express themselves in a positive way as they explore the very difficult issues that brought them to be incarcerated. You may wonder how a troubled teen can be rehabilitated after a brush with the law, but programs like this make it clear that a creative outlet is critical for many of these kids to succeed in overcoming the fears and self-image issues that result from their being incarcerated.
- Museums are also leading the way in environmental education. The **Brooklyn Botanic Garden** hosts numerous environmental education programs, including a community composting effort, in cooperation with the New York City Department of Sanitation. The project offers workshops in English and Spanish and provides instruction on composting in neighborhoods, businesses, community gardens and other institutions.
- The **Long Island Children's Museum** in Garden City, New York has forged a unique partnership with the Nassau County Department of Health and Human Services and the Family Court System to offer services to those engaged with Child Protective Services, Preventative, Foster Care and Adoption Services and Family Court. The children's museum is now the site of a supervised visitation room which includes a large and colorful storytelling chair, art supplies, framed children's art, a bookshelf and interactive toys. This is just one more example of how museums can serve as critical community centers to help solve community problems.

We appreciate this opportunity to present these views to the Subcommittee, and urge the Subcommittee to fully fund these agencies and programs so we can continue to inspire young and old about science, technology, engineering, and mathematics.