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Robots That Swim, Drive And Play Soccer; Virtual Humans And Real Storm Chasers Are Part Of The Action At Science And Engineering Festival

April 27, 2012

NSF invites journalists to "Sneak Peek Friday" on April 27 to preview festival to be held in Washington, D.C.'s Convention Center this weekend

The National Science Foundation (NSF) will showcase a broad range of NSF-funded projects at this year's USA Science & Engineering Festival at the Washington Convention Center this weekend. The 16 projects exhibited reflect the diverse research NSF supports across all fields of science and engineering, and provides a glimpse of the knowledge, innovation and educational resources that result from investment in fundamental research. Adults and children alike should enjoy opportunities to experience science and engineering up-close and hands-on.

Members of the media are invited to attend Sneak Peek Friday, a special preview on April 27 from 10 a.m. to 3 p.m., before the festival opens to the general public. The festival will be open on Saturday, April 28 from 10 a.m. to 6 p.m., and Sunday, April 29, from 10 a.m. to 4 p.m.

NSF will staff its own booth where multimedia materials will be available and researchers will be on hand to discuss their work. All NSF exhibits are in Section 904 (near the Hall C entrance) of the Convention Center. See the festival schedule and map for more detail.

Summaries of the NSF exhibits appear below:
What: USA Science and Engineering Festival

When: Media preview Friday, April 27, 10 a.m. to 3 p.m.
Festival continues Saturday 10 a.m. to 6 p.m. and Sunday 10 a.m. to 4 p.m.

Where: Walter E. Washington Convention Center,
801 Mt Vernon Pl., N.W., Washington, D.C.

SpelBots: African American Women Showcasing Humanoid Robotics Research

Festival guests can visit the SpelBots, the first all-female African-American Roboteam, and participate in an interactive presentation of humanoid robotics, including a robot dance contest with audience participants. The SpelBots will show live demonstrations and videos, and hold question-and-answer sessions with the audience using two-legged, humanoid robots. Learn about present and future RoboCup international soccer competitions and undergraduate research in robotics.

Robot Enhanced Mobility: The Capacity for Your Infants to Learn Real World Navigation

Principal Investigator Cole Galloway and his team will show off several different robotic devices they have developed to enable pre-locomotor or motor-delayed children to "drive" around their environments. Amazingly, children learn to use them rapidly, and the devices seem to enhance perceptual and cognitive development. Visitors to the exhibit may also take them for a spin, as well as use joysticks for body movement.

Make Your Own Earthquake

Haiti, Japan, New Zealand. In recent years, catastrophic natural disasters have occurred around the world. Researchers are hard at work in attempts to mitigate the damage these unexpected events inflict on societies. At this exhibit brought to the festival by NEES, the Network for Earthquake Engineering Simulation, visitors will learn more about seismic waves. All are invited to jump up and down to create, see, even take home printouts of their seismic waves. For more information about NEES, see a webcast about a shake table test on April 11 in California to evaluate the endurance of buildings and structures in the face of earthquakes.

Virtual Human Museum Guides

At this exhibit, visitors will interact with Ada and Grace, two virtual museum guides, who will greet them and converse with them in natural spoken language, answering questions about museum exhibits, computer science, and other science, technology, engineering and mathematics (STEM) topics. Guests will have an opportunity to program a portable iRobot using basic principles of computer programming, and visualize the science behind these complex systems, through real-time illustrations of how the natural language processing underlying the interaction occurs.

Storm Chasers – Doppler on Wheels

Adults and children alike can sit at the controls of a Doppler on Wheels (DOW), the mobile weather radar facility that NSF-funded scientists use to gather up-close data on tornadoes, hurricanes, wild fires, winter storms and other severe weather events. If weather permits during the exhibit, scientists may operate the radar and have real time storm data available. Hands-on activities will also include models of tornadoes, microbursts and experiments with air pressure.

Design Squad Nation

Festival attendees can pay a visit to Design Squad, in order to design and build a shock-absorbing system that will protect two astronauts during their landing on the moon. This will not be easy, as slowing down and gently landing a spacecraft after it hurled through outer space as quickly as 18,000 miles per hour is tricky. And the stakes will be high: no crash-test dummies inside, just real astronauts.

Discovering Panama Fossils

Visitors will have the opportunity to view 15-to-20-million-year-old fossil deposits from Panama–new specimens of extinct rhinoceroses, bear dogs, camels, horses, and the giant shark, Megalodon–that all lived in Panama during the Miocene, some 20 million years ago. They may interact via a live video feed with researchers and students at a fossil dig in the Panama Canal to see and ask questions about their findings.

Critical Zone Observatories

Scientists at natural watershed laboratories investigate processes that occur on Earth's surface. At this exhibit, visitors will learn how. They will engage in experiments and use scientific tools, such as temperature and humidity sensors with real-time monitoring capability; a leaf area index measuring device; a

meteorological and soil instrument array; and a stream table to display erosion. Critical zone observatories have many current applications: in maintaining healthy waterways, particularly after a hurricane, and clean soil.

What do Fossil Footprints Tell Us About Human Origins?

Children and adults alike will have the opportunity to touch and feel casts of real footprints and bones of our early ancestors and relatives. All may walk on a live pressure plate that will record each person's footprint and show how it is distinct from chimps and other primates. From there, visitors can learn what their footprints teach about gait and speed, and how scientists can use that information to look at our fossil ancestors and relatives.

BEACON Center for the Study of Evolution in Action

The BEACON Center for the Study of Evolution in Action is an NSF Science and Technology Center founded with the mission of illuminating and harnessing the power of evolution in action to advance science and technology and benefit society. At this exhibit, visitors can observe evolution in action with COTS Bots–Commercial Off The Shelf robots, which rely on cell phones and netbooks to supply enough computing power and features to model complex behaviors (like foraging and cooperating) and to support on-line evolution and learning. Kids (and adults) can play the Ladybug and Aphid game, and try to evolve an entirely new population of aphids that can evade the ladybug. All will see how genetic and evolutionary feature extraction can be used in facial recognition.

Learning Without Limits

Here, members of the public will imagine that they can experience the lives of engineers and scientists as they help solve the key problems of modern life–from saving energy to saving lives–by adding a very low-cost, easy- to-use tool to their laptops. This exhibit will show the Mobile Studio and other similar hardware that can provide anyone with a computer with a fully portable electronics laboratory that can be used in essentially all hands-on STEM educational experiences in school, at home, in the field or any place the curiosity bug bites. With these tools, a student can investigate, for example, how a smart system can sense our environment, make a decision on how to improve it, and actuate a device that enhances quality of life.

Mobile Apps for Robotics

Visitors will learn about advances in human-robot interaction technology through engaging and educational projects, such as mobile robots, a robotic manipulator, a smart home, and laboratory automation testbeds. They will experience innovative uses of pervasive communication and computing devices, such as iPhone and iPad, to intuitively interact with physical objects by exploiting on-board sensors, rich graphics, touch, gesture, and sound recognition capabilities of iPhone and iPad. Human-robot interaction will feature a robotic manipulator following movements of a human-operator wearing a smart jacket.

Robotic Fish Patrolling Waters

This exhibit features realistic-looking robotic fish swimming in a fish tank that visitors can control. This isn't an animation. Participants will learn how autonomous robotic fish are being used to monitor aquatic environments, including oil spills in the Gulf and harmful algal blooms in lakes.

MagLev Transportation: Superconductivity in Action

Superconductivity's promise is hard to explain but easy to demonstrate. The MagLev train, supercooled with liquid nitrogen and gliding silently a half-centimeter above the track, simply illustrates the possible

application of a phenomenon that's still largely the playground–and headache–of basic researchers. Visitors will see firsthand that fascinating alternatives to fossil fuels are on the way, plus they'll come away with an understanding of the Meissner effect involving an active exclusion of a magnetic field.

Presidential Awards for Excellence in Math and Science Teaching (PAEMST)

Great teachers can be nominated here to join this prestigious network of professionals. PAEMST is the nation's highest honor for teachers of mathematics and science. Awardees serve as models for their colleagues, inspiration to their communities, and leaders in the improvement of mathematics and science education. Since 1983, more than 4,100 teachers have been recognized for their contributions in the classroom and to their profession.

To speak with exhibitors about their work, journalists are encouraged to contact NSF's Lisa-Joy Zgorski who can help arrange onsite interviews, lisajoy@nsf.gov, 202-285-7396.

During Sneak Peak Friday and throughout the weekend's festivities, @NSF will tweet stories and pictures in real time of children and adults interacting and learning. For more, up-to-the-minute information, follow the official event hashtag #SciFEST.

For more information on the festival's 2,000 hands on science and engineering activities, 100 stage shows and featured authors in advance, visit the Science Festival website. There's even an App for that that may be downloaded.

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On the Net:

- NSF