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Harnessing Thought to Defeat Paralysis

5 Things We Learned From PM's Breakthrough Innovators

October 4, 2012 at 3:07:00 PM by Miriam Kramer | Comments



Left to right: PM Breakthrough innovators William B. Carter of HRL Laboratories, Bruce Goodwin of Lawrence Livermore National Lab, Pain Free Socket inventor Katherine Bomkamp, Donnie Wilson of Elastec/American Marine, and Jesse Harrington Au from Autodesk.

1. Sequoia, the world's fastest supercomputer, is about to start mimicking the human heart.

Sequoia, the 20 petaflop computer housed at Lawrence Livermore National Laboratory, is about to begin a new project, according to panelist and lab researcher Bruce Goodwin. Soon, instead of simulating nuclear weapon scenarios, the fastest computer in the world will start modeling the complex electrical signals that drive the human heart. This kind of computer-based replication will allow researchers to see how the heart could respond to certain medical treatments and even drugs, Goodwin says. While drug testing could take years to complete, accurate modeling of the system could mean less time spent looking into ultimately ineffectual treatments.

2. 3D printing is leading young people into science and engineering.

Jesse Harrington—a maker advocate at Autodesk—has seen a new trend in the past two years. When he first started out as a 3D printer and maker, the field was filled with people like him—men in their mid-twenties or early thirties—and their interest in at-home manufacturing was mostly underground. Today, the field is more diverse. Students in junior high and high school are getting the "technology in their hands" at a much earlier age. "I wonder what they'll do when they get to university," Harrington says.

The field as a whole is growing as well. Attendance at [Maker Faire in New York City](#) this year was up 300 percent from 2011, he says.

3. New composite metals could mean lighter, more efficient airplanes.

The main problem with light, composite metals has been strength. As companies make lighter, more durable metals, the weight they can bear tends to decrease. But now, a new ultralight composite might help inspire a host of lighter airplanes and cars without sacrificing strength.

At about 100 times lighter than Styrofoam, the ultralight lattice material developed by panelist Bill Carter's company, HRL Laboratories, could replace many non-weight bearing parts of various machines to create a lighter—and therefore more efficient—vehicle.

4. No more phantom pain.

Phantom pain affects nearly 80 percent of amputees around the world today. Most treatments involve barbiturates or anti-psychosis medication, but those can have side effects and tend to be habit-forming. The Pain Free Socket, an invention by 20-year-old panelist Katherine Bomkamp, is intend to help those amputees so they don't have to fight phantom pain any longer.

The Pain Free Socket is a wireless device that uses targeted heat to relieve the pain associated with a missing limb. Although other organizations have used electrodes to target this kind of pain, Bomkamp's is the first device that is entirely wireless.

5. Skimming the surface.

A new fleet of highly efficient oil skimmers funded initially by Google might be entering the water soon. Panelist Donnie Wilson, with Elastec/American Marine, created a skimmer that removes oil from the water with 90 percent efficiency, a much higher rate than any other skimmer on the market.

Where do you test an oil skimmer? Wilson says the world's largest simulator is found in New Jersey. It costs about \$8000 per day to use it.

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