LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, June 18-22, 2012

The Washington Post

ON TOP WITH THE FLOPS

The 96 racks of the Sequoia system, the world's current fastest supercomputer.

Photo by Jacqueline Mcbride.

The United States is back at it. It owns the world's fastest supercomputer: IBM's "Sequoia," located at Lawrence Livermore.

At 16.32 petaflops, Sequoia's processing power in one hour is equivalent to what it would take 6.7 billion people (slightly less than every person on the planet) 320 years to calculate using calculators.

This is the first time since 2009 that the United States has been able to claim the fastest supercomputer in the world.

The Top 500 list of the world's fastest supercomputers is released every six months and the latest list was released Monday at the 2012 International Supercomputer Conference in Hamburg, Germany.

To read more, go to the *Washington Post*.

TIME WHAT MAKES YOU SO SUPER?

The Sequoia system

Sequoia runs on 1.6 million processor cores. It can reach speeds of up to 20 petaflops (a petaflop, by the way, equals 10^{15} operations per second), which means that Sequoia can perform 20 x 10^{15} operations every second.

And that's what makes it so super, according to Mike McCoy, program director for advanced simulation and computing at Lawrence Livermore .

The whole machine requires 3,000 gallons of water per minute to cool it down. As you might imagine, it takes a lot of energy to keep this machine going, using 6 or 7 megawatts on average with peak usage approaching 9 1/2 megawatts. (One megawatt equals 1 million watts.)

To read more, go to *Time Magazine*.

2012 R&D 100 50th ANNIVERSARY BREAK ON THROUGH

Natalia Zaitseva, an LLNL materials scientist, leads a team of Livermore researchers that has developed the first plastic material capable of efficiently distinguishing neutrons from gamma rays, something not thought possible for the past five decades or so. *Photo by Jacqueline McBride.*

Laboratory researchers have won five awards for their efforts in developing breakthrough technologies with commercial potential.

R&D Magazine announced the winners of its annual R&D 100 Awards, sometimes called the "Oscars of Invention," on Wednesday. The awards will be presented Nov. 1 during a black-tie dinner at the SeaWorld Conference Center in Orlando, Fla.

The Laboratory served as the principal developer in four of the awards, while the fifth award was a joint submission. This year's awards bring the Lab's total to 142 since it began competing in 1978.

The winners include: High Velocity Laser Accelerated Deposition; LEOPARD -- or Laser Energy Optimization by Precision Adjustments to the Radiant Distribution; plastic scintillators for neutron and gamma ray detection; Snowflake Power Divertor for nuclear fusion reactors; and Multiplexed Photonic Doppler Velocimeter.

To read more, go to *R&D Magazine*.

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GROWTH SPURT

The periodic table of elements that you may have memorized as a child is expanding.

Flerovium (atomic symbol Fl) with an atomic number of 114 and an atomic weight of 289 and Livermorium (atomic symbol Lv) with an atomic number of 116 and an atomic weight of 293, have recently been added to the periodic table.

The addition of flerovium and livermorium brings the total to 118 elements listed on the periodic table. But not all of these elements have been proven to exist with the rigor that the scientific process demands.

The International Union of Pure and Applied Chemistry reviews and confirms the reported discovery of new elements, then approves the proposed names for new elements. The confirmation and approval process usually entails a few years of repeated experimentation in independent laboratories to verify the results of the discovery of a new element. As of May 31, the IUPAC has confirmed and approved the names for 114 elements. Scientists have reported discoveries for other elements, but these results have not yet been confirmed.

To read more, go to *EarthSky*.

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