

## LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, July 15-19, 2013.



### AGE OF ANCIENT TREES STUMPS SCIENTISTS



**Ancient trees found underwater may provide clues to climate change. Photo by Ben Raines/AL.com/AP**

An ancient grove of Cypress trees found 60 feet underwater may help scientists understand past climate change.

Sonar data was used to find 50 and 100 stumps, as well as an unknown number of logs. The trees are closely related to the modern-day Bald Cypress.

The forest itself has been dead at least 50,000 years, according to scientists at the Lawrence Livermore Laboratory, who dated samples from the trees by looking for carbon-14, a radioactive isotope that is found in every living organism but that steadily decays after the organism dies.

The scientists had expected to find the trees to be about 12,000 years old -- the age of the last big ice age, when sea levels were low. So they were surprised to find the trees had no carbon-14 at all, which puts them older than 50,000 years.

To read more, go to [The Christian Science Monitor](#).

# COMPUTERWORLD

## COMPETITIVE TO THE CORE



**LLNL's Fred Streitz and Doug East, in front of the Vulcan supercomputer. Photo by Laura Schulz and Meg Epperly/LLNL**

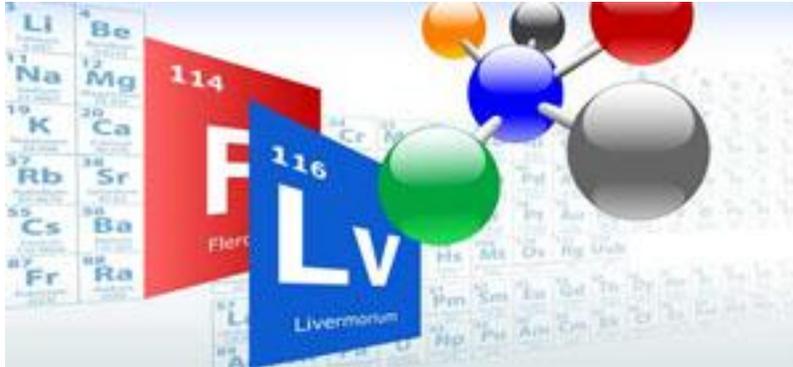
The federal government is making one of the most powerful supercomputers in its computing arsenal available to any U.S. businesses that can help make the country more competitive.

The system is the 5 petaflop Vulcan (one petaflop equals one quadrillion floating point operations per second), an IBM Blue Gene/Q system running at the Lawrence Livermore National Laboratory.

Vulcan, which has nearly 400,000 compute cores, is ranked as the eighth-fastest computer in the world, according to the latest Top 500 list.

To get time on this system, a business has to help achieve the government's mission.

To read more, go to [Computerworld](#).



Lawrence Livermore Laboratory employees and city officials recently celebrated the discovery of the two heaviest elements on the periodic table -- 114, flerovium, and 116, livermorium.

Director Parney Albright kicked off the celebration by lauding the collaboration between Lawrence Livermore scientists and researchers from the Flerov Institute in Dubna, Russia, who discovered six heavy elements, (113-118), including flerovium and livermorium.

Congressman Eric Swalwell presented a certificate of appreciation to the LLNL scientists responsible for discovering livermorium.

The official discovery of livermorium was recognized by International Union of Pure and Applied Physics UPAC on June 1, 2011, along with that of flerovium. The name livermorium and the symbol Lv were adopted on May 31, 2012 after an approval process by the IUPAC. The name recognizes the Lawrence Livermore National Laboratory, within the city of Livermore. The city in turn is named after the American rancher Robert Livermore, a naturalized Mexican citizen of English birth.

To read more, go to [Environmental News Network](#).



**LLNL physicist Maxim Umansky recently performed a physics analysis of an underwater survival story off the Nigerian coast. Umansky, an avid diver, is pictured off Key Largo, Fla.**

When Lawrence Livermore National Laboratory physicist Maxim Umansky flipped through the news, a startling underwater survival story caught his attention. In May, a boat cook survived a 60-hour underwater ordeal 100 feet below the surface after his tugboat sank near the Nigerian coast.

Harrison Okene's survival underwater while the rest of the crew perished was astounding. As described in the media, the man "survived, breathing inside a four-foot high bubble of air as it slowly shrank from the waters rising from the ceiling of the tiny toilet and adjoining bedroom."

What intrigued Umansky most was the physics behind it. Even though Okene's story is not related to Umansky's physics research in LLNL's Fusion Energy Sciences Program, he wanted to understand the science of this underwater survival, inspired by his interests in physics and scuba diving.

So the LLNL scientist, who joined the Lab in 2001 shortly after obtaining his graduate degree from the Massachusetts Institute of Technology, decided to analyze this physics problem in his spare time.

To read more, go to [Phys.org](https://www.phys.org).



**Recent Lawrence Livermore research shows that humans continue to produce neurons into old age. Image courtesy of National Institutes of Health.**

The best evidence so far for the lifelong production of new neurons in the brain comes from data based on nuclear fallout. The reassuring conclusion is that an average adult makes 1,400 new cells every day in the hippocampus, the brain region crucial for memory and learning.

Scientists at Lawrence Livermore National Lab and Sweden's Karolinska Institute used a form of carbon dating. Levels of the isotope carbon-14 in the atmosphere rose as a result of nuclear tests in 1945-63 then declined after they stopped. The amount of carbon-14 in a cell's DNA indicates its age.

The researchers analyzed the brains of 60 people who had died between the ages of 19 and 92. The results show that neurogenesis continues through adulthood at a rate that declines only modestly into old age.

Other recent research has undermined the old idea that we are born with a fixed number of neurons, which decline gradually through life without new ones growing to take their place. But this study, published in the journal *Cell*, provides the most direct estimate so far of neural replacement rates – an annual turnover of 1.75 percent.

To read more, go to the [Financial Times](#).