

# Los Alamos National Laboratory Captures Five 'Research and Development 100' Awards

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***Plasma-Torch Production of Spherical Boron Nitride Particles, 10-Gigabit Ethernet, Confocal X-Ray Fluorescence Microscope, Clustermatic and mpiBLAST are the five Los Alamos National Laboratory technologies receiving Research and Development 100 awards this year.***

Scientists at the University of California's Los Alamos National Laboratory have captured five of Research and Development Magazine's 2004 Research and Development 100 Awards. The latest winners bring the Laboratory's total to 83 awards over the past 17 years. The projects recognized this year span a diverse range of scientific and technical areas - from innovative imaging techniques and advances in computing to revolutionary new materials. This year, Los Alamos was tied with its sister laboratory, Lawrence Livermore National Laboratory, for the largest number of awards received by a Department of Energy laboratory.

In recognizing the achievement, Laboratory Director G. Peter Nanos noted, "these awards demonstrate once again that Los Alamos is home to innovation and great science. I am extremely proud of each of our award recipients."

The R&D 100 awards program is designed to honor significant commercial promise in products, materials or processes developed by the international research and development community. Each year, R&D Magazine recognizes the world's top 100 scientific and technological advances with awards for innovations showing the most significant commercial potential. The five Los Alamos National Laboratory technologies receiving R&D 100 awards this year are:

## **10-Gigabit Ethernet**

The 10-Gigabit Ethernet is a network card developed by the Laboratory and Intel Corporation that delivers information electronically at speeds 148,000 times faster than a modem connection and more than 23,000 times faster than a DSL connection. This innovation has the potential to vastly increase the speed of electronic transmissions and data transactions, such as those that take place in commerce, banking, medicine, scientific modeling and simulation and even the Internet.

## **Confocal X-Ray Fluorescence Microscope**

The Confocal X-Ray Fluorescence Microscope is an analysis instrument capable of doing elemental depth profiles and three-dimensional elemental images of material composition. The microscope uses x-ray fluorescence to nondestructively measure concentrations of elements within a small area. The instrument could be used for crime scene evidence analysis, and the in situ analysis of fine-art paintings.

## **Clustermatic**

Clustermatic is a revolutionary software suite for managing, monitoring, administering and operating clusters on network-connected computers running as a high-performance system. Clustermatic increases reliability and efficiency, decreases node autonomy, simplifies computer programming, reduces administration costs, and minimizes a user's reliance on unpredictable software, enabling commodity-based cluster networks to compete with the higher-cost supercomputers.

## **mpiBLAST**

mpiBLAST is an open-source enhancement of BLAST, an open-source software package distributed by the National Center for Biotechnology Information that has become the ubiquitous genomic-sequencing tool in molecular biology.

mpiBLAST reduces the search time of a genomic sequence from nearly 1,346 minutes (or 22.4 hours) to less than seven minutes. Such substantial time reductions could decrease costs in the field of genomic sequencing.

Source: [Los Alamos National Laboratory](#)

### **Plasma-Torch Production of Spherical Boron Nitride Particles**

Crystalline boron nitride has the highest thermal conductivity of any ceramic. As the name implies, the plasma-torch production of spherical boron nitride particles technology is an innovative method for producing particles that can be used as filler in integrated circuit packages, enabling electronic devices to run cooler and faster. The method is useful for producing a variety of materials beyond spherical crystalline boron nitride, including carbon nanotube threads with high strength-to-weight ratio for ropes, metallic and carbon-coated nanoparticles for fast burning fuel components, and even oxide nanoparticles, that might be used for a next-generation class of armor.

Over the past 17 years, the R&D 100 awards have become just one measure of Los Alamos' technical contributions to society. Technologies from the Laboratory are nominated in open competition and judged by technical experts selected by the Illinois-based R&D Magazine. The awards are officially made in October. Images of the winners and winning technologies are available to the news media.

Los Alamos National Laboratory is operated by the University of California for the National Nuclear Security Administration (NNSA) of the U.S. Department of Energy and works in partnership with NNSA's Sandia and Lawrence Livermore national laboratories to support NNSA in its mission.

Los Alamos enhances global security by ensuring safety and confidence in the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction and improving the environmental and nuclear materials legacy of the cold war. Los Alamos' capabilities assist the nation in addressing energy, environment, infrastructure and biological security problems.

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