

LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: Aug. 10-17, 2009.

Nanowires that act like cells



An artist's representation of a nanobioelectronic device incorporating alamethicin biological pore. Image by Scott Dougherty/LLNL

Laboratory researchers have devised a versatile hybrid platform that uses lipid-coated nanowires to build prototype bionanoelectronic devices.

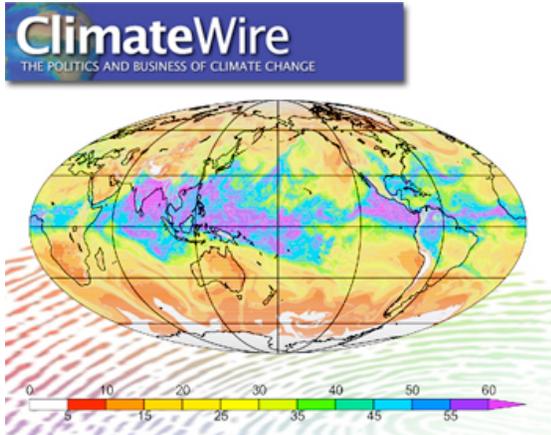
These sealed silicon-nanowire transistors in a membrane are similar to those that surround biological cells. These devices, which operate similarly to nerve cells, might be used to make better interfaces for prosthetic limbs and cochlear implants as well as biosensors for medical diagnostics.

While modern communication devices rely on electric fields and currents to carry the flow of information, biological systems are much more complex. They use an arsenal of membrane receptors, channels and pumps to control signal transduction that is unmatched by even the most powerful computers. For example, conversion of sound waves into nerve impulses is a very complicated process, yet the human ear has no trouble performing it.

LLNL chemist Aleksandr Noy gave silicon nanowires a cell membrane in the hopes of making better bioelectronics.

To read more, go to <http://www.technologyreview.com/computing/23157/>

The fairest way to gauge a climate model



Total amount of atmospheric water vapor over the oceans on July 4, 2009.

When it comes to using climate models to assess the causes of the increased amount of moisture in the atmosphere, it doesn't much matter if one model is better than the other.

They all come to the same conclusion: Humans are warming the planet, and this warming is increasing the amount of water vapor in the atmosphere.

The pattern was evident even in the crudest of the 22 computer models the study's authors examined, a finding that could play into an ongoing debate about whether to attempt to rank the models by quality in order to improve projections of future climate change.

"Is it a model democracy --- one model, one vote?" said lead author Benjamin Santer, an atmospheric scientist at the Laboratory, whose work was published online this week by *Proceedings of the National Academy of Sciences*. "Or is a meritocracy, where we pay more attention to models that demonstrably do a better job?"

That's a question Santer said will weigh heavily on scientists now beginning work on the next report of the Intergovernmental Panel on Climate Change, due in 2014.

To read more, go to https://publicaffairs.llnl.gov/news/lab_report/2009/aug/ClimateWire.pdf

Lab earns four technology transfer awards



GeMini, a portable gamma-ray spectrometer.

Laboratory researchers and business development executives have garnered four technology transfer awards in the Federal Laboratory Consortium's Far West Region competition.

Lab scientists and engineers, in tandem with Industrial Partnerships Office (IPO) employees, captured two outstanding partnership awards and two outstanding technology development honors.

One of the Laboratory's two outstanding partnership awards went to a team of LLNL scientists and engineers that has developed GeMini, a portable gamma-ray spectrometer based on germanium technology.

The second LLNL outstanding partnership award was received for the large area imager, a radiation detection technology that assists in locating illegal nuclear materials.

One of LLNL's two Far West Region awards for outstanding technology development was received for the Advanced Vision Systems for Minimally-Invasive Surgeries project.

The Laboratory's other award for outstanding technology development was garnered by LLNL researchers who have been developing carbon nanotubes for water desalination and filtration.

For more, go to https://newsline.llnl.gov/_rev02/articles/2009/aug/08.14.09-flc.php

LLNL and Sandia soon to share some operational functions



Lawrence Livermore and Sandia/California will soon begin sharing some operational functions, as part of the National Nuclear Security Administration's Complex Transformation.

"Complex Transformation" refers to NNSA's vision for a smaller, safer, more secure nuclear weapons complex to achieve consolidation and operations efficiency. Often described as "one site, two labs," the Livermore/Sandia effort identified business synergies in areas of facility use, property and other business functions.

Following the NNSA request, the two labs created a project team to analyze a variety of operational and infrastructure activities for potential joint operations. In keeping with NNSA's goals, each lab will retain its own programmatic missions and maintain clear and distinct corporate identities.

"This effort will increase operational efficiencies between our two labs," said Steve Liedle, the Lab's deputy director.

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Photo of the week



Summertime and the living is busy: Undergraduate, graduate and postdoctoral students show off their summer intern projects during the Summer Student Poster Symposium. Employees from throughout the Lab came to view the more than 80 posters and meet the students. The popular annual event showcases the research of the Lab's summer students.

LLNL is managed by Lawrence Livermore National Security, LLC, for the U.S. Department of Energy's National Nuclear Security Administration.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail <mailto:labreport@llnl.gov>.

The Livermore Lab Report archive is available at:
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