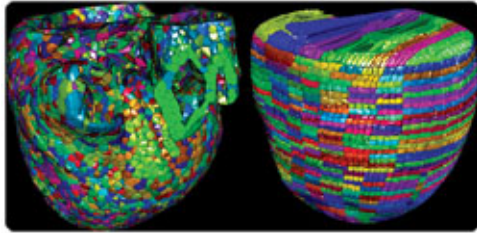


LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Jan. 14-18, 2013.



LAB RESEARCH AT HEART



The Cardioid code, developed by a team of Livermore and IBM scientists, divides the heart into a large number of manageable pieces, or subdomains.

New research by Lawrence Livermore and IBM may one day revolutionize the way drugs are created to treat heart disease.

Using Sequoia, one of the world's fastest and largest supercomputers housed at the Laboratory, the team created a program that mimics a beating human heart down to the cellular level.

"It's breathtaking to watch the computer model a heart beating," said Fred Streit, the director of the LLNL's High Performance Computing Innovation Center.

Streit said the computer can model the total number of cells in the heart. Eventually the cell-to-cell modeling will link to research on heart contractions.

To hear more, go to [KGO Radio](#).

FINANCIAL TIMES MORE GAS WON'T CHANGE CLIMATE



Shale rock can be used to extract gas.

Shale gas could be a solution to many of the United States' energy problems, but when it comes to reversing the effects of climate change, it doesn't play a large role.

Julio Friedmann, chief energy technologist of Lawrence Livermore National Laboratory, recently opined on the role of shale gas and climate change.

"This paradox rests mainly on the unlocking of abundant natural gas using hydraulic fracturing, or 'fracking,' in Pennsylvania's Marcellus Shale rock formation and elsewhere," Friedmann writes. "America's sudden unconventional gas boom means it is using more gas and less coal. Gas emits only half as much carbon dioxide as coal."

However, the mathematics of greenhouse gas accumulation remains the same, the writer goes on. Because carbon lingers in the atmosphere for centuries, even emitting less of it annually means it still is piling up too much.

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

San Francisco Chronicle **CUT IT OUT**



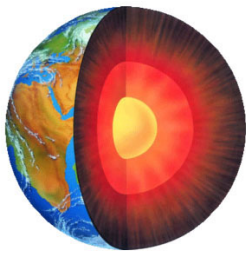
Without drastic changes to global energy systems, studies show that rising fossil fuel emissions could push global temperatures up as much as 3 degrees Celsius by 2050 and 6 degrees Celsius by 2100, unleashing a series of dangerous ecological consequences.

What this means is that scientists worldwide need to dive into a world of feasible alternative energy research if they expect the world to look the same today as it does for their grandchildren.

Researchers are investigating an array of possibilities, from sucking carbon out of the atmosphere to increasing the reflectivity of clouds. But even those exploring such options say the only way to address the full scale of global warming is to attack the root cause: cutting greenhouse gas emissions as much and as quickly as possible.

"The energy sources we use can't be fossil fuels," said Jane Long, former associate director for energy and environment at Lawrence Livermore National Laboratory. "It's just that simple and just that hard."

To read more, go to [The San Francisco Chronicle](#).



An artist's concept of Earth's inner and outer core.

The Earth's core formed under more oxidizing conditions than previously believed, according to a new study by Lawrence Livermore scientists.

LLNL geophysicist Rick Ryerson and an international team of colleagues made the discovery following a series of laser-heated diamond anvil cell experiments at high pressure (350,000 to 700,000 atmospheres) and temperatures (5,120 to 7,460 degrees Fahrenheit).

Through their experiments, Ryerson's team was able to demonstrate that the depletion of iron-loving or "siderophile" elements could be produced by core formation under more oxidizing conditions than past predictions had reported. They discovered that planet accretion or growth under these conditions was similar in nature to that of most common meteorites.

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



California utilities will use the advanced technologies and expertise of Lawrence Livermore to improve the efficiency, security and safety of the state's utility systems under an agreement that will provide up to \$150 million in funding over five years.

The California Public Utilities Commission (CPUC) approved funding for a five-year research and development agreement between Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas and Electric Company and LLNL.

The collaborative project will tap LLNL's expertise to develop new tools and techniques to address challenges California faces as it implements its clean energy policy agenda.

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

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.

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