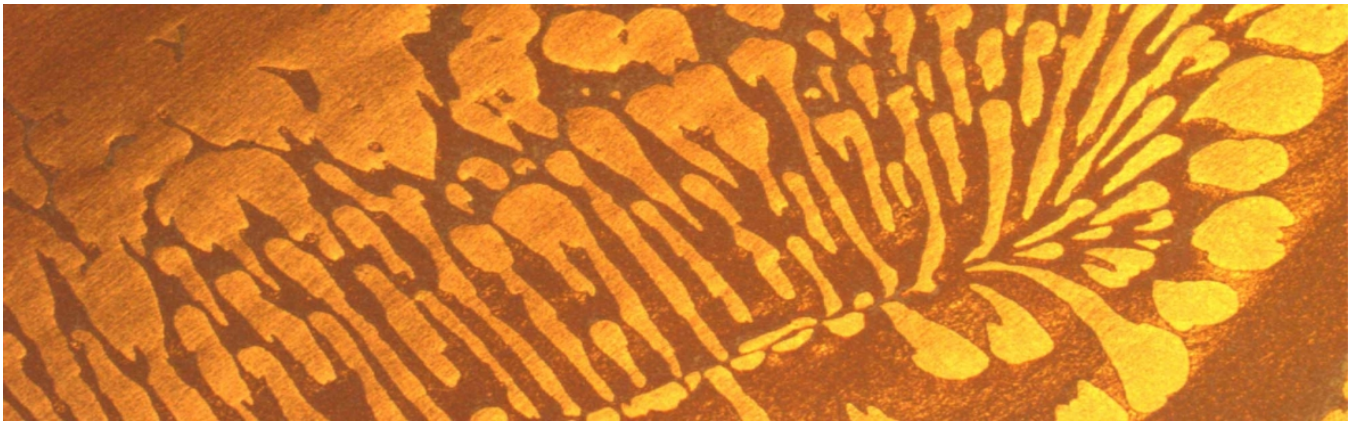
U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

3 September 2019

*Comm*unique provides a review of recent Office of Science Communications and Public Affairs work, including feature stories, science highlights, social media posts, and more. This is only a sample of our recent work promoting research done at universities, national labs, and user facilities throughout the country.
Please note that some links may expire after time.



No Limits for Light or Science

Seeking the shade of the palm, date, and tamarisk trees at the Furnace Creek Golf Course, it's impossible to miss the Panamint Mountains towering over the nation's lowest, hottest, and driest golf course. On the other hand, it's easy to miss the 5,740 solar panels tucked among the greenways, although a few stray shots have hit the panels. Gathering up the intense sunlight of Death Valley, the solar farm provides a third of the electricity used at the adjacent resort. The solar panels tilt to follow the sun through the day, making them more efficient. But even with numerous sunny days, materials limit solar panel efficiency. Today's panels convert just about 30 percent of the light they gather into electricity.

Re-imagining materials for solar panels and so much more demands curious people who care about big problems. That's the team at the Photonics at the Thermodynamic Limits Center, an Energy Frontier Research Center funded by the Department of Energy's Office of Science.

Click here to read more about curiosity-driven science at PTL.

NEWS CENTER

The Office of Science posted 184 news pieces between 7/22/2019 and 8/30/2019, including 87 university articles and 85 pieces from the labs and user facilities.

In a study that both predicted heat wave occurrences between now and 2050 and assessed the effectiveness of "cool" roof technology, researchers at Berkeley Lab have found that if every building in California sported cool roofs by 2050, these roofs would help contribute to protecting urbanites from the consequences of dangerous heatwaves like those seen in Japan, France, and on the U.S. East Coast this year.

Northwestern University's Stuart Stock is using high-resolution, 3D X-ray imaging on shark vertebrae to better understand bone formation and strength. In understanding the development of sharks' spines, Stock hopes to shed light on the functionality of human bones and cartilage, gaining insight that could help humans with degenerative bone disease.

Using supercomputers at Argonne National Lab, researchers are working to develop a microscopy technique for predicting and quantifying the risk of cancer in humans at extremely early stages. By running a simulation tool on the Mira system, the team hopes to move static analysis of cellular images to a dynamic process, substantially improving the sensitivity and selectivity of the technique.

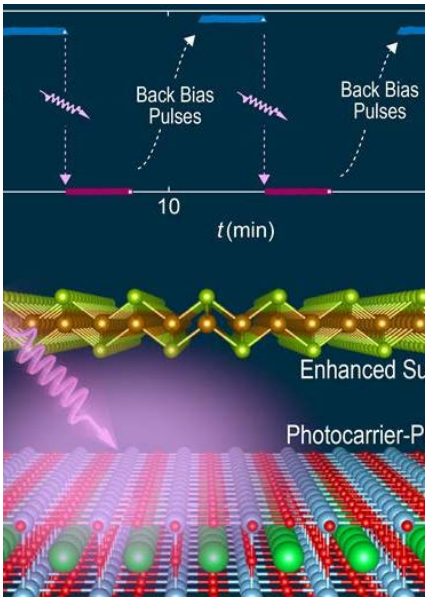
Sodium-ion batteries have been proposed as a replacement for the lithium-ion batteries that power cell phones, laptops, and electric cars, but these replacements have shorter lifetimes than their lithium counterparts. Researchers from UC Santa Barbara have found that the presence of hydrogen, which causes the battery electrodes to degrade, may be the reason for this loss of capacity. Because this detrimental effect has been observed, now measures can be taken during battery production to suppress the incorporation of hydrogen, improving performance.

Headed by Berkeley Lab, in partnership with Los Alamos, Oak Ridge, and Pacific Northwest national laboratories, the National Microbiome Data Collaborative will leverage existing data science resources and high performance computing systems to facilitate the more efficient use of microbiome data for applications in energy, environment, health, and agriculture.

Simulations run by researchers at Georgia Tech have found that technology used to measure the flow of antineutrinos from nuclear reactors could also allow continuous remote monitoring to detect fueling changes that might indicate the diversion of nuclear materials. The technique, which could be used with existing pressurized water reactors as well as future designs, could supplement other monitoring techniques including the presence of human inspectors.

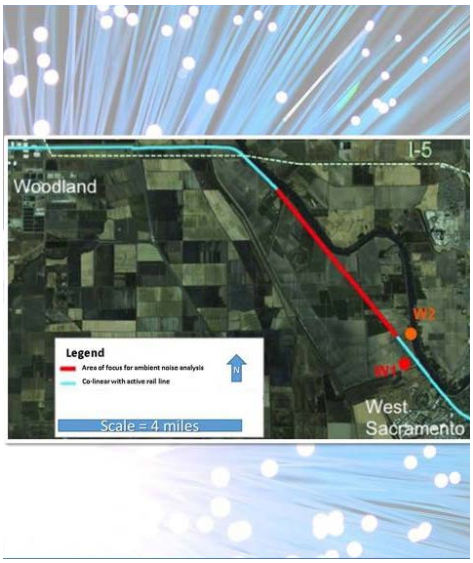
SCIENCE HIGHLIGHTS

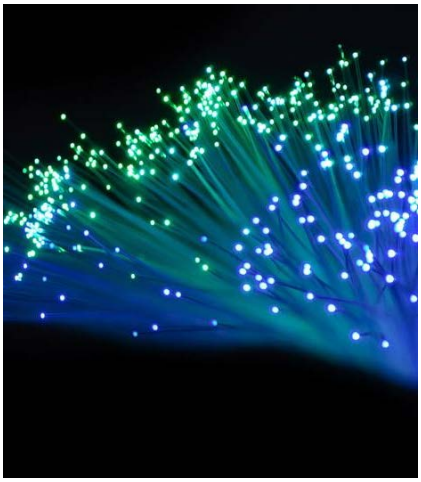
The Office of Science posted 15 new highlights spotlighting ASCR, BES, and NP between 7/22/2019 and 8/30/2019.



Scientists from West Virginia University have discovered a superconducting material that transmits electricity when cooled and, when exposed to low-energy ultraviolet light, also acts as a superconductor at higher temperatures. This effect may improve devices for next-generation quantum computers and quantum sensors, enable the discovery of new materials and drugs, and benefit artificial intelligence research.

Because of the expense and labor involved, only a few traditional seismic sensors have been installed in remote areas of California, making it hard to gather data on the impact of earthquakes. Using distributed acoustic sensing along a 20-mile segment of the ESnet Dark Fiber Testbed, scientists recorded seven months of passive seismic data, showing how unused fiber-optic cable could serve as a highly sensitive earthquake sensor.





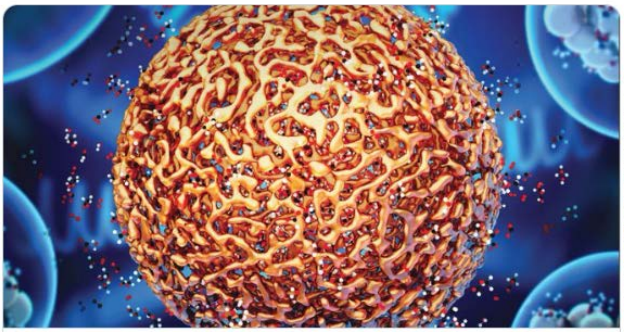
For doctors, measuring exactly how much radiation cancer patients receive in real time is hard. Now, with scintillating fibers developed at Jefferson Lab, the OARtrac system allows clinicians to monitor and adjust radiation delivered to patients. In basic nuclear physics research, this material is used to help identify particles produced in experiments.

TOP TWEETS

The Office of Science sent out 154 original tweets between 7/22/2019 and 8/30/2019. Here are our two most popular from the past month:

DOE Science @doescience

Since 2009, @ENERGY has taken a unique approach to empower the creative, multi-disciplinary, multi-institutional teams necessary to tackle the toughest scientific challenges in energy technologies: the Energy Frontier Research Center program



Ten Years at the Frontiers of Energy Science
Celebrating 10 years of science at Energy Frontier Research Centers across America.
energy.gov

DOE Science @doescience

.@ENERGY has approved the $815M upgrade of @advancedphoton, a premier national research facility that equips scientists for discoveries that impact technologies, the economy, and national security @argonne bit.ly/2Ov55To

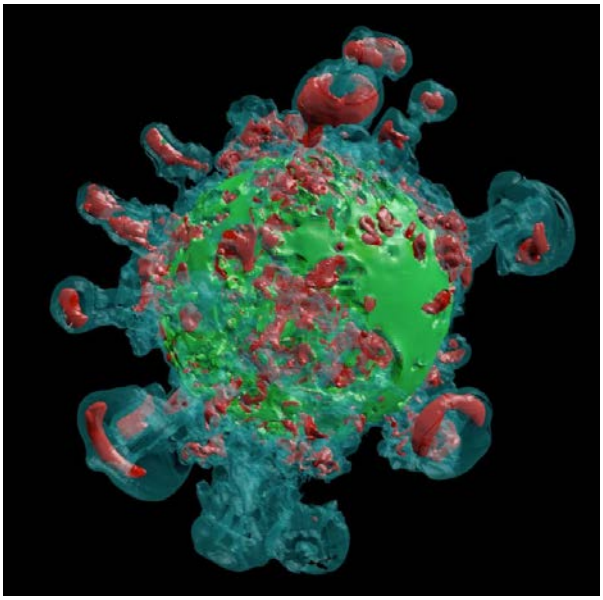
BY THE NUMBERS

Department of Energy's Early Career Research Program

The Office of Science has selected 73 scientists from across the nation – 27 from national laboratories and 46 from universities – to receive significant funding for research as part of the 2019 Early Career Research Program. The program, now in its tenth year, is designed to bolster the nation's scientific workforce by providing support to exceptional researchers during the crucial early career years, when many scientists do their most formative work. These awards, given out annually, support researchers at national laboratories and universities for five years.

END NOTES

Podcast: ECP's Exastar Project Seeks Answers Hidden In The Cosmos



Prodigious and mysterious, the cosmos has many important secrets to reveal through stars exploding as supernovae and colliding neutron stars and black holes. “In those astrophysical explosions, you reach some of the most extreme conditions in the universe, much greater than anything we can achieve here on Earth, and so you can probe physics at new regimes,” said Daniel Kasen of Berkeley Lab and principal investigator of ExaStar, a project within the Exascale Computing Project. “You can probe matter denser than the atomic nucleus. You can probe extreme gravitational fields that produce ripples in space time, gravitational waves.”

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