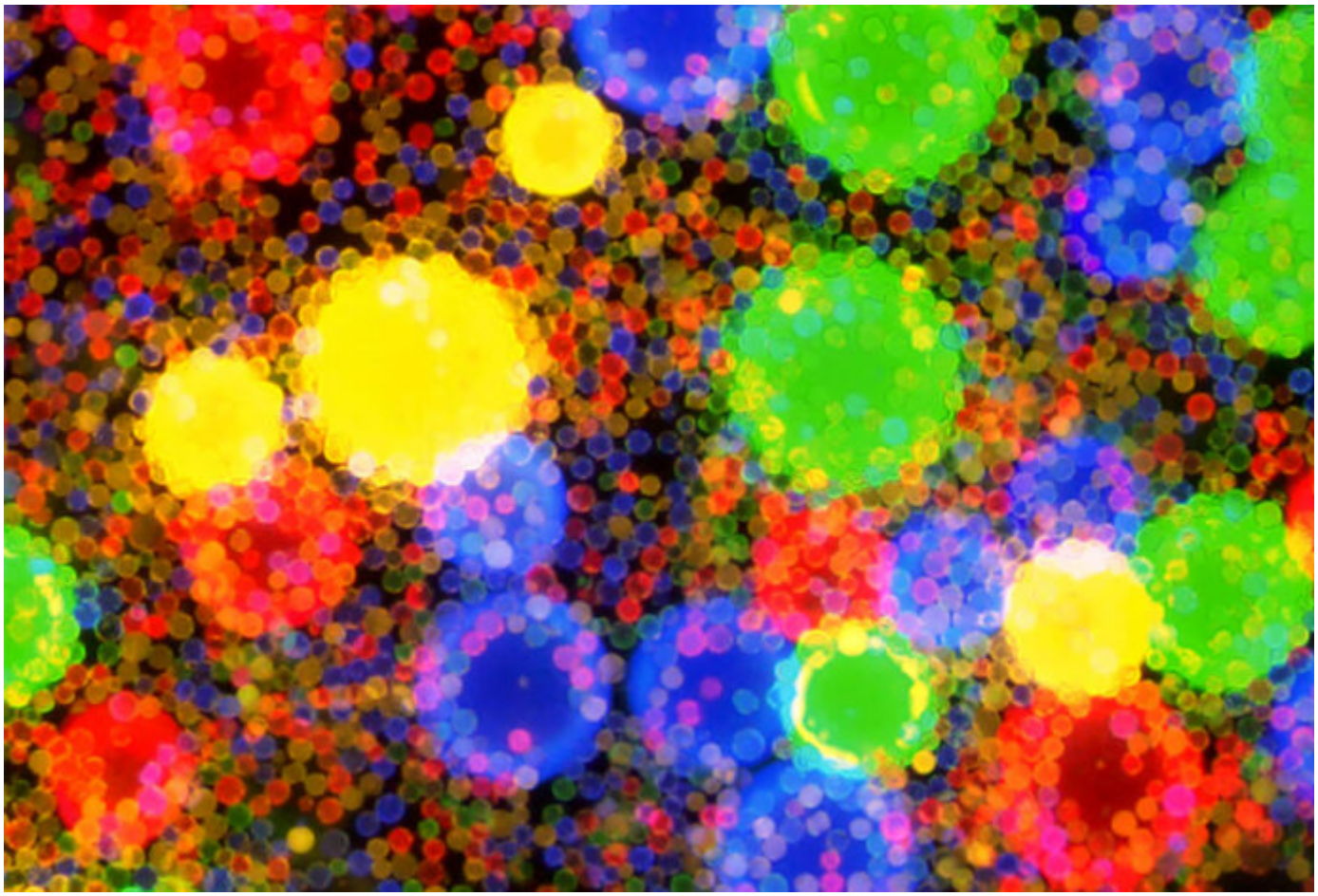
U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

28 October 2019

*Comm*unique provides a biweekly 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.*



For gut microbes, not all types of fiber are created equal

Certain human gut microbes with links to health thrive when fed specific types of ingredients in dietary fibers, according to a new study from Washington University School of Medicine in St. Louis. The researchers identified fibers that selectively increase the abundance of beneficial microbes and tracked down the bioactive components of fibers responsible for their effects. To decipher how members of gut communities compete or cooperate with each other for these fiber ingredients, they also invented a

type of artificial food particle that acts as a biosensor for monitoring nutrient processing within the intestine.

Click here to read more about how new technologies for measuring nutrient processing could help develop more nutritious foods.

NEWS CENTER

The Office of Science posted 63 news pieces between 10/14/2019 and 10/28/2019, including 27 university articles and 28 pieces from the labs and user facilities.

Using the Advanced Photon Source, researchers from the University of Guelph investigated fractal dimension, a feature of the geometric configuration of tiny particles of chocolate. In imaging these particles, the researchers looked to see if the smooth versus grainy texture of a piece of chocolate could be due to the amount of open space within the chocolate at the microscopic level.

UC San Diego researchers have developed a systematic and combined approach to identifying key genes that enable surprisingly diverse antibiotic cocktails for crop defense. Knowledge of effective plant defense mechanisms can help future crops face a rising slate of threats and meet the demands of growing human populations.

Researchers at Oak Ridge National Laboratory have demonstrated bio-inspired devices that accelerate routes to neuromorphic, or brain-like, computing. The device, a lipid-based "memcapacitor," is a charge storage component with memory that processes information much like synapses do in the brain. This discovery could support the emergence of computing networks modeled on biology.

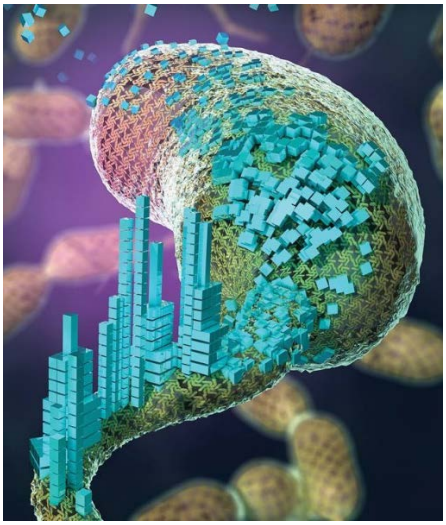
Researchers from the University of Missouri are using a prediction method to determine the function of specific proteins to produce algae suited for use as biofuels. Using high performance computing and deep learning, they predict how proteins fold and thus what their properties will be, saving time and money by keeping researchers from having to test the properties of millions of possible protein structures.

A team led by Pacific Northwest National Laboratory have uncovered a root cause of the growth of needle-like structures—known as dendrites and whiskers—that plague lithium batteries, sometimes causing a short circuit, failure, or even a fire. Understanding what causes these structures to start and grow will lead to new ideas for eliminating and controlling them to minimize damage.

Scientists at UC Irvine have predicted that climate change will cause Valley fever's range to more than double in size by 2095, reaching previously unaffected areas of the western United States. Using a model based on temperature and rainfall, researchers mapped where Valley fever is currently found, and then used those projections to predict future expansion.

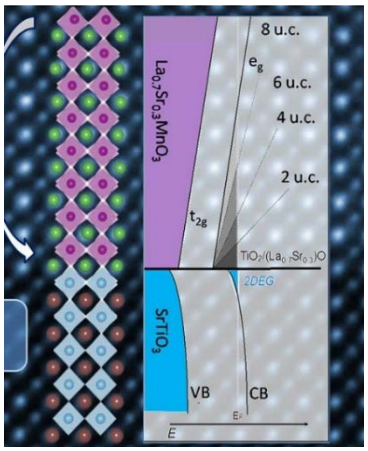
SCIENCE HIGHLIGHTS

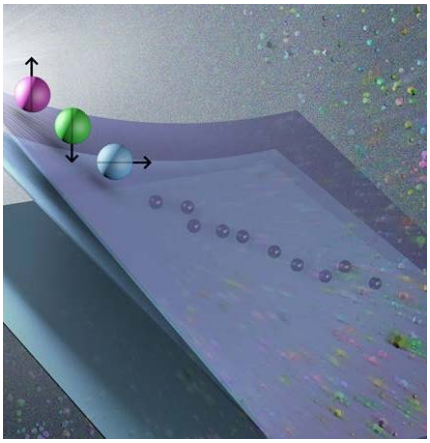
The Office of Science posted four highlights spotlighting BES between 10/14/2019 and 10/28/2019.



Bone and mollusk shells can regenerate and change structure while also being very strong and durable. Borrowing from this complexity, researchers from the Molecular Foundry have been exploring a new class of materials called engineered living materials that combine living cells and synthetic components. The new approach opens the door to new applications in bioelectronics, biosensing, smart materials, and catalysis.

A team from West Virginia University has determined why lanthanum strontium manganite, a widely applicable material, behaves differently—and worse—as it gets thin. Understanding this mechanism may identify routes to resolve challenges and lead to more efficient electronics.





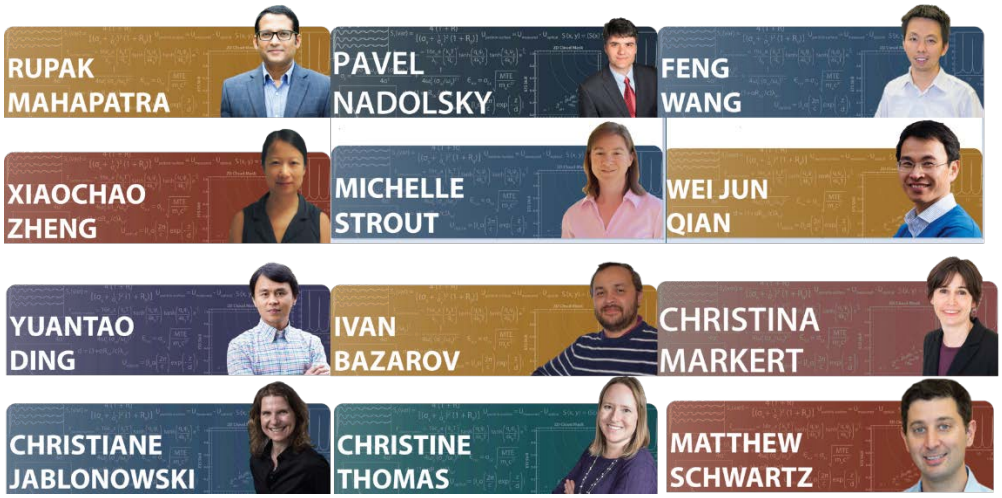
Researchers from the Center for Nanoscale Materials have developed two new methods to assess and remove error in how scientists measure quantum systems. These new methods improve the accuracy and precision of quantum processes without needing to use aditional hardware or computational resources.

TOP TWEETS

The Office of Science sent out 54 tweets between 10/14/2019 and 10/28/2019. Here are our two most popular from the past two weeks:

BY THE NUMBERS

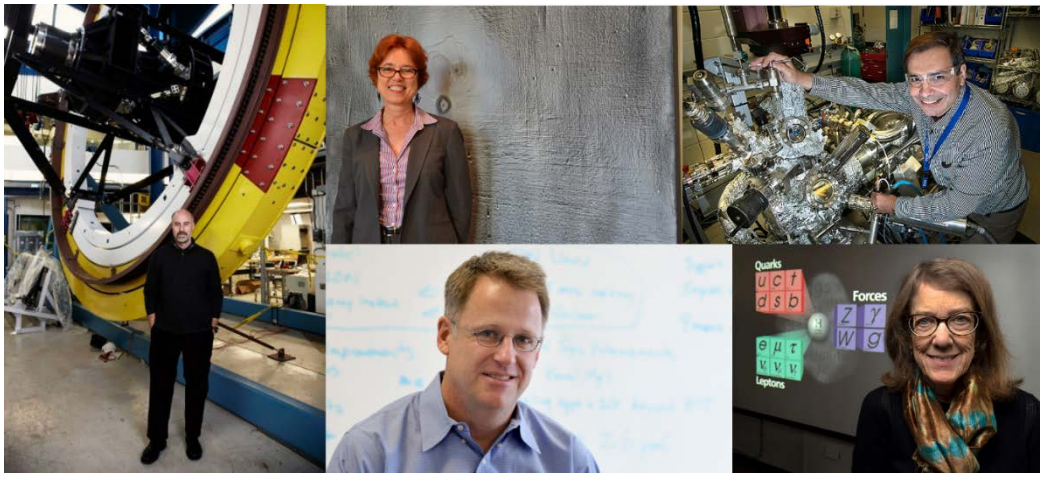
Early Career Research Program



2019 marks the 10th year of the Early Career Research Program, an effort to bolster the nation's scientific workforce by providing support to exceptional researchers during their crucial early career years, when many scientists do their most formative work. Awardees are scientists who must have received their PhDs within the past 10 years. On average, 20 university scientists and 40 national laboratory scientists are awarded every year. In 2010, the first year of the program, 69 awards were given out and this year, 2019, 73 scientists were awarded the funding. The Office of Science is running a series of profiles of the 2010 awardee class to show how this opportunity helped shape their research careers.

END NOTES

2019 Distinguished Scientists Fellows



The Department of Energy named five national laboratory scientists as the inaugural class of Office of Science Distinguished Scientists Fellows. The newly established award, authorized by the America COMPETES Act and bestowed on scientists with outstanding records of achievement, provides each fellow with $1 million over three years to be devoted to a project or projects of their choosing. Candidates were nominated by their individual laboratories and chosen by competitive peer review. The 2019 fellows are:

- Sally Dawson of Brookhaven National Laboratory
- Ian Foster of Argonne National Laboratory
- Joshua Frieman of Fermi National Accelerator Laboratory
- Barbara Jacak of Lawrence Berkeley National Laboratory
- José Rodriguez of Brookhaven National Laboratory

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No. 22: 28 October 2019