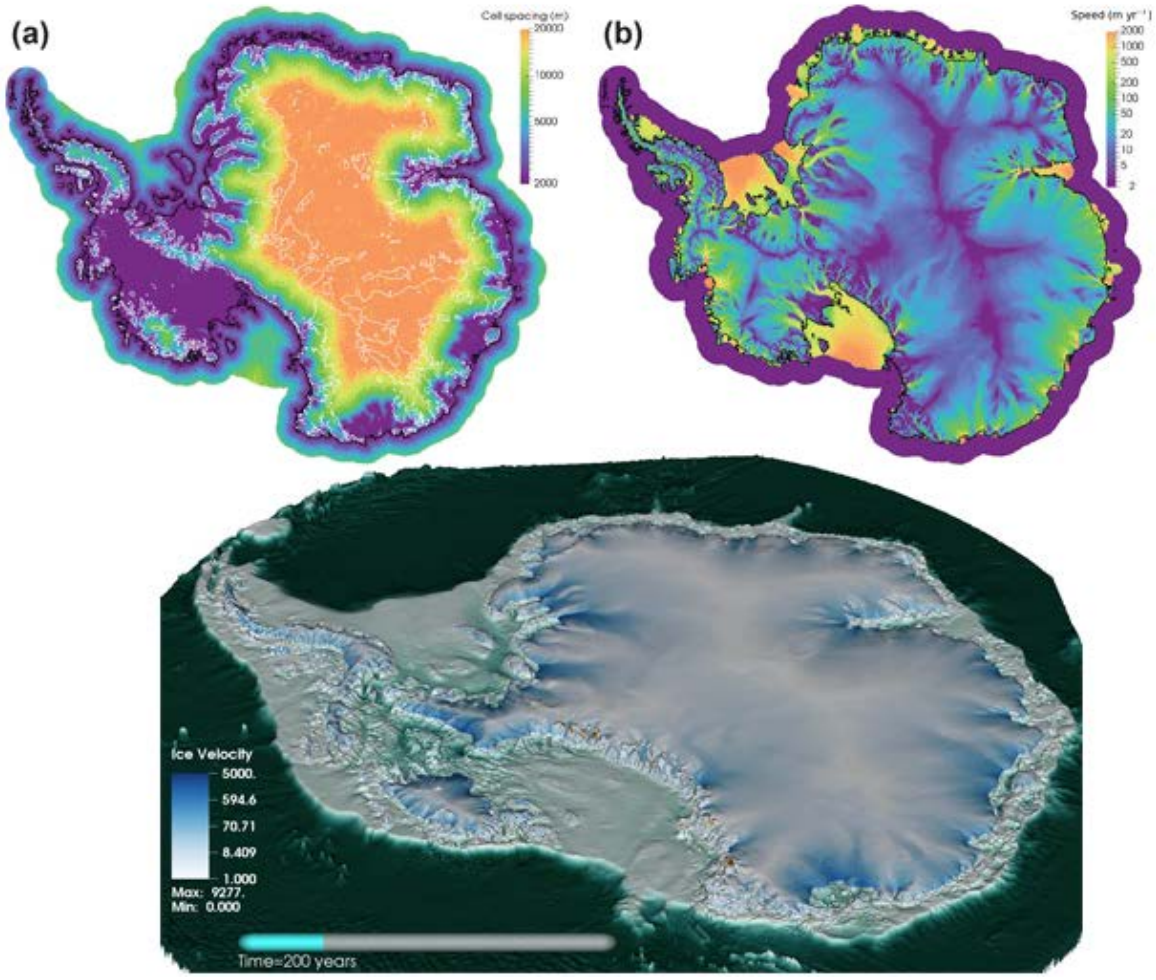
U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

6 January 2020

*Comm*unique provides a review of the work of the Office of Science Communications and Public Affairs in 2019, including feature stories, science highlights, social media posts, and more. This is only a sample of our work promoting research done at universities, national labs, and user facilities throughout the country. *Please note that some links may expire after time.*



Simulating Ice at the Bottom of the World: Modeling the Antarctic Ice Sheets

In June, the Office of Science Communications and Public Affairs posted an article about innovative Earth systems models at Los Alamos National Lab, Sandia National Labs, and Berkeley Lab.
The collapse of the Larsen B ice shelf in the West Antarctic Peninsula shattered more than ice — it shattered scientists' prevailing view of ice sheets and their floating shelves. Scientists had previously thought ice sheets would respond to recent climate change on time scales of hundreds to thousands of years. After all, for interior regions of the Antarctic ice sheet, conditions are still very similar to those at the end of the last Ice Age. But where ice meets ocean, change can happen fast.

Scientists who work to understand and model Earth systems, including ice sheets, had to change their approach too.

Click here to read more about the MALI and BISICLES ice sheet models supported by the Department of Energy.

NEWS CENTER

The Office of Science posted 1,364 news pieces in 2019, including 689 university articles and 623 pieces from the labs and user facilities.

Berkeley Lab researchers have unveiled a clue into the unusual properties of high-temperature superconductors—and the answer lies within an unexpected source: the electron spin. Learning more about these high temperature superconductors may allow their use in practical applications, like as a new material for building super-efficient electrical wires.

A precise and non-toxic treatment that targets lung cancer cells at the nanoscale is able to effectively kill the cells even at a low dose. Researchers from Washington State University and Pacific Northwest National Lab used tiny tubes made from organic molecules called peptoids to deliver cancer-killing drugs in a targeted manner.

A physicist at Princeton Plasma Physics Laboratory has developed a mathematical technique to help simplify the design of stellarators' complex magnetic coils. This design could make stellarators a potentially more cost-effective facility for producing fusion energy.

A research team led by the University of California, San Diego has discovered the root cause of why lithium metal batteries fail—bits of lithium metal deposits break off during discharging and are trapped as "dead" or inactive lithium that the battery can no longer access. These findings could pave the way for bringing rechargeable lithium metal batteries from the lab to the market.

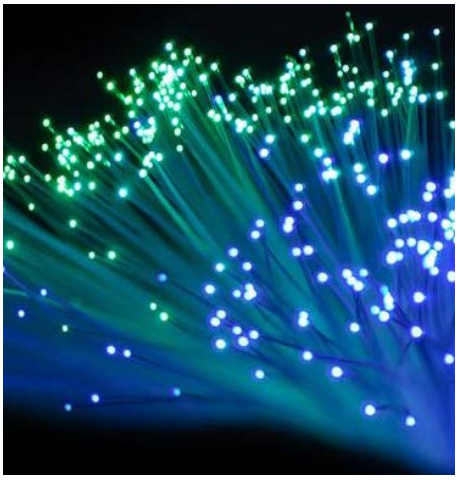
Scientists from Ames Laboratory and Northeastern University have developed a model for predicting the shape of metal nanocrystals sandwiched between 2D materials like graphene, moving 2D quantum materials a step closer to applications in electronics.

Northwestern University chemists have used visible light and extremely tiny nanoparticles to quickly and simply make molecules similar to the lead compounds for drug development. These reusable catalysts use energy from visible light to activate molecules on their surfaces and fuse them together

to form configurations useful for biological applications.

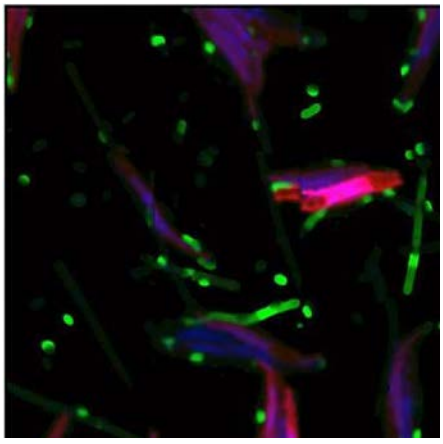
SCIENCE HIGHLIGHTS

The Office of Science posted 173 highlights spotlighting all six scientific programs in 2019.



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.

Precise measurements of the history of the expansion of the universe may reveal why this expansion is accelerating. The Dark Energy Survey has combined its four primary cosmological probes to more accurately search for dark energy.



Algae convert carbon dioxide from the air into other compounds, “fixing” carbon. This process can potentially produce reliable renewable fuels, but algal performance must first be improved. Researchers from Livermore Lab found that bacteria growing on algae can increase its carbon fixation.

IN THE NEWS

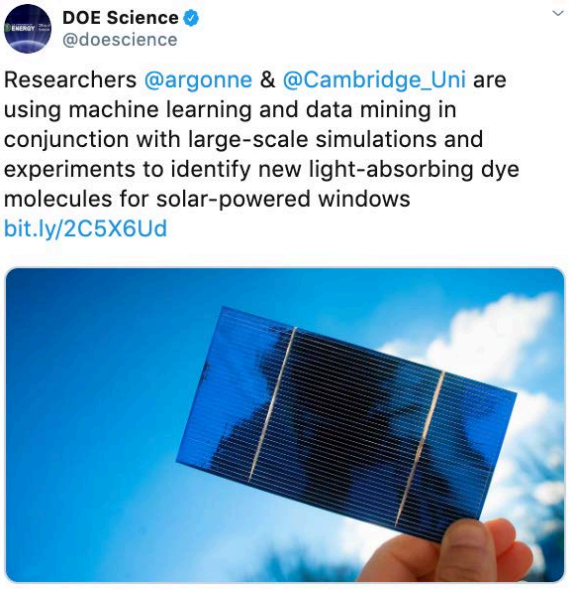
NPR: The Convoluted Story Of How The First Atoms Of Tennessine Were Created
Researchers at Oak Ridge National Laboratory tell the story of the discovery of element 117, tennessine.

Forbes: Silicon Valley X-ray Laser Used To See Attosecond Electron Movement
Researchers at SLAC have invented a way to produce X-ray bursts that can see electrons move at a billionth of a billionth of a second.

Science Friday: Combing Over What Makes Hair So Strong
Berkeley Lab's Rob Ritchie talks about the strength of natural materials, including hair, and what they can teach about manufacturing strong, synthetic materials.

TOP TWEETS

The Office of Science sent out 1400 tweets in 2019. Here are our two most popular from the past year:



BY THE NUMBERS

In 2019, the Office of Science covered science ranging from algal bioenergy, to dark energy, to project management and X-ray light sources. Office of Science content was viewed nearly 3 million times on Energy.gov, Newswise, and EurekAlert! this year.

END NOTES

2019 was a big year for the Office of Science! Among other events, Department of Energy supercomputers once again topped the list of the world's fastest supercomputers in June and November. In September, the Office of Science Communications and Public Affairs team held the fourth

science communications summit—Scientists as Communicators—at SLAC. In December, DOE-supported scientists M. Stanley Whittingham and John Goodenough won the Nobel Prize for their work in developing lithium-ion batteries and the Office of Science recognized the inaugural class of Distinguished Scientists Fellows. Here's to an innovative and discovery-filled 2020!

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