



U.S. DEPARTMENT OF
ENERGY

Office of Science

comm**UNIQUE**

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Communique 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.

Transforming Plastics Recycling with Discovery Science



In the wake of World War II, companies were left with excess fossil fuels with no war to consume them. Looking to turn extra natural gas into liquid fuel, the Philips Petroleum Company hired chemists J. Paul Hogan and Robert L. Banks. As they experimented with turning natural gas into gasoline, they tweaked their catalyst – a material used to speed up chemical reactions. They expected it would make a liquid. Instead, the process produced something entirely new. In June 1951, they discovered polypropylene, now one of the most common plastics in the world.

Nearly 75 years later, the products derived from this innovation are ubiquitous. At the current rate of production and disposal, there will be more plastics by mass in the ocean than fish by 2050. Current recycling systems won't provide us a way out of this challenge.

New solutions will require innovation on every level. To facilitate this shift, the DOE's Office of Science is supporting discovery research to tackle the problem.

[Click here to read more about the Office of Science's research to tackle the problem of plastics.](#)

NEWS CENTER

The Office of Science posted 37 news pieces between 1/11/2021 and 1/25/2021.

Researchers have determined the atomic structure of a coronavirus protein thought to help the pathogen evade and dampen response from human immune cells. They used [Berkeley Lab's Advanced Light Source](#) to examine the virus's protein structure. The resulting structural map has laid the groundwork for new antiviral treatments tailored specifically to SARS-CoV-2.

In the future, devices could use electrons' spin states to control transistors, just as devices now use electrons. Researchers at the [University of Wisconsin-Madison](#) have designed a structure that uses a class of materials called antiperovskites to manipulate spin states, bringing us closer to a new generation of devices.

Scientists including those from [SLAC National Accelerator Laboratory](#) had a surprise when they crafted a nickel-based catalyst used in making hydrogen fuel. As they built it one atomic layer at a time, they found the top-most layer of atoms rearranged to form a new pattern. Understanding this transformation will give them a new way to turn catalytic activity on and off.

An international research team has sequenced the full genome of an ornamental variety of miscanthus, a wild perennial grass emerging as a prime candidate for sustainable bioenergy crops. The team was led by the [Center for Advanced Bioenergy and Bioproducts Innovation](#) (CABBI), a U.S. Department of Energy (DOE) Bioenergy Research Center.

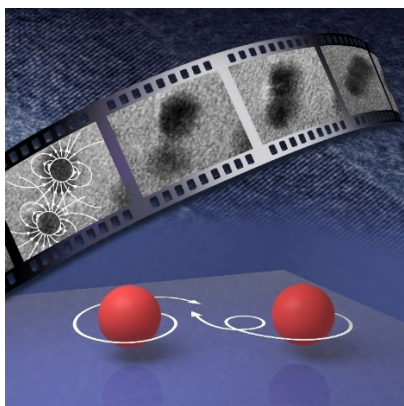
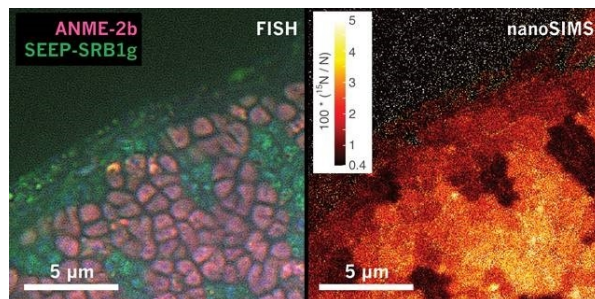
A team of researchers used the [Advanced Photon Source user facility at Argonne National Laboratory](#) to confirm an effective antibody that prevents the dengue virus from infecting cells in mice. It may lead to treatments for this and similar diseases.

Red algae have persisted in hot springs and surrounding rocks for about 1 billion years. Now, a team led by [Rutgers University](#) scientists is investigating why these cells have thrived in harsh environments.

SCIENCE HIGHLIGHTS

The Office of Science posted two new highlights between 1/11/2021 and 1/25/2021.

Two groups of microbes work together to break down methane in sediments on the ocean floor. Some can also make nitrogen from air available for use by other microbes. Researchers from the [California Institute of Technology](#) found that both types of microbes fix nitrogen, but trade places doing it depending on the environmental conditions.



Researchers from [Pacific Northwest National Laboratory](#) have gained a new understanding of how nano-particles assemble and crystalize in a model system of the semiconductor zinc oxide. This description will help scientists use particles to design and synthesize materials with specific shapes and arrangements. It also expands the ways to use zinc oxide, including solar panels and cell phone batteries.

IN THE NEWS

The Guardian: [Cities provoke, worsen and prolong storms, finds research](#)

This article reports on research by Jiwen Fan, from the Pacific Northwest National Laboratory, examining how buildings and air pollution in cities influence the development of thunderstorms.

Vice: [What is 'error-correcting memory' and why does the creator of Linux think you need it?](#)

This reported article on the technology of error-correcting memory quotes Al Geist, from Oak Ridge National Laboratory, on the need for this technology in supercomputers.

Mashable: [Here's everything you need to know about the dawn of the quantum internet](#)

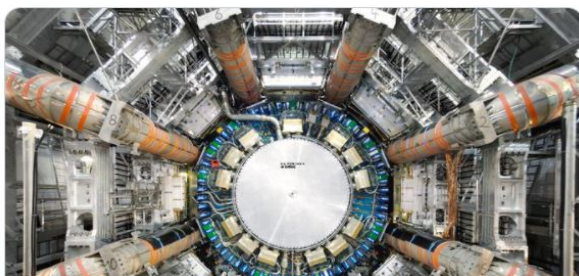
This video describes the work of Fermilab and its partners to teleport quantum information more than 25 miles over a fiber-optic network.

TOP TWEETS

The Office of Science sent out 57 tweets between 1/11/2021 and 1/25/2021. Here are the two most popular:



Science #PicOfTheWeek: @CERN's ATLAS experiment observed particles of light ricocheting off each other to produce new particles. Researchers from @BerkeleyLab analyzed these interactions, finding that matter was produced from light
newscenter.lbl.gov/2020/09/23/lhc...



Congratulations to the winners of this year's Ernest Orlando Lawrence Awards! These eight researchers have made exceptional contributions to science, technology, or engineering in areas related to @Energy's mission. – Dir. Chris Fall energy.gov/science/article...



BY THE NUMBERS

Honoring the Lawrence Award Winners



On January 19, 2021, the Department of Energy [recognized eight distinguished U.S. scientists and engineers](#) with the Ernest Orlando Lawrence Award. They received the award for their contributions in research and development supporting the Energy Department's missions in science, energy, and national security. The recipients were: M. Zahid Hasan (Princeton University and Lawrence Berkeley National Laboratory), Susannah G. Tringe (Lawrence Berkeley National Laboratory), Dustin Froula (University of Rochester), Yi Cui (Stanford University and SLAC National Accelerator Laboratory), Dan Kasen (University of California Berkeley and Lawrence Berkeley National Laboratory), Robert B. Ross (Argonne National Laboratory), Dana M. Dattelbaum (Los Alamos National Laboratory), and Krista S. Walton (Georgia Institute of Technology).

END NOTES

Early Career Research Program Profiles



The DOE Office of Science's Early Career Research Program provides financial support that's foundational to early career investigators. It enables them to define and direct independent research in areas important to DOE missions. The Office of Science runs features written by the scientists about their work and experience with the program. The 2010 recipients have [shared their stories](#) and the 2011 recipients are beginning their look back, starting with [Suzanne E. Lapi](#) and [Ryan Hayward](#).

Please see the [Communique archive](#) on Energy.gov for past issues.

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