U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

22 July 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.

Coffee, Collaboration, and Catalysts: Three Key Ingredients to Changing Our View of Bioproducts

Coffee cups, it seems, can act as catalysts. A catalyst makes an event—one that's otherwise unlikely to happen—occur. Lawyers, pushy aunts, and certain materials can all be catalysts. But for researchers at the Catalysis Center for Energy Innovation (CCEI), it often starts with cups of coffee.

"We frequently sit out in front of our department on the veranda and just talk shop," said Paul Dauenhauer, associate professor at the University of Minnesota and CCEI co-director. "Casual conversations lead to innovations."

Those innovations include learning, at a molecular level, what it takes for catalysts to turn corn stover (everything but the kernels), wood shavings, or other forms of biomass into platform chemicals. These chemicals, normally made from petroleum, serve as jumping off points to make water bottles, sticky tape, car lubricants, and the plastic liner of paper coffee cups.

"Simply put, we're trying to develop a range of catalysts and synthesis methods," said Angela Norton, a CCEI scientist and a graduate student at the University of Delaware, "to turn non-edible biomass into soaps, detergents, lubricants, and tires."

Click here to read more about collaboration at the Catalysis Center for Energy Innovation.

NEWS CENTER

The Office of Science posted 110 news pieces between 6/24/2019 and 7/21/2019, including 61 university articles and 45 pieces from the labs and user facilities.

A team led by scientists from SLAC National Accelerator Lab has narrowed down how strongly dark matter particles might interact with normal matter. Based on the number and distribution of small satellite galaxies seen orbiting the Milky Way, the team found this interaction to be at least a thousand times weaker than the strongest interaction allowed by previous astrophysical analyses. This study could help researchers refine their models for the evolution of the universe.

Rising temperatures in Earth's northern latitudes could affect microbial communities in ways likely to increase their production of greenhouse gases methane and carbon dioxide, a new Georgia Tech study of experimentally warmed Alaskan soil suggests. The study provides quantitative information about how rapidly microbial communities responded to the warming at critical depths, underscoring the importance of accurately representing the role of soil microbes in climate models.

Artificial proteins engineered from scratch have been assembled into nanorod arrays, designer filaments and honeycomb lattices on the surface of mica, demonstrating control over the way proteins interact with surfaces to form complex structures previously seen only in natural systems. The collaborative study led by scientists at Pacific Northwest National Lab provides a foundation for understanding how protein-crystal interactions can be systematically programmed. This sets the stage for designing novel protein-inorganic hybrid materials.

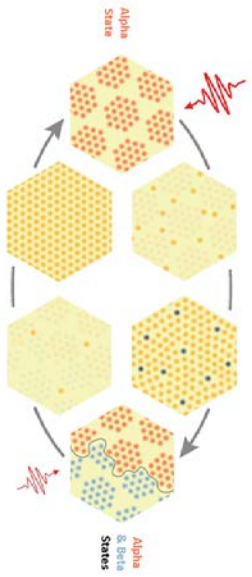
Thin-film solar panels, cell phones, and LED light bulbs are all made using some of the rarest, most expensive elements found on the planet. An international team including researchers at the University of Michigan has devised a way to make these kinds of optoelectronic materials from cheaper, more abundant elements. These compounds can also be "tuned" to efficiently harvest electrical energy from the different wavelengths of light in the solar spectrum and to produce the range of colors typically used in lighting.

Beryllium, a hard, silvery metal long used in X-ray machines and spacecraft, is finding a new role in the quest to bring the power that drives the sun and stars to Earth. Physicists from Princeton Plasma Physics Lab and General Atomics have concluded that injecting tiny beryllium pellets into ITER, a multinational fusion facility under construction in France, could help stabilize the plasma that fuels fusion reactions, demonstrating the practicality of fusion power.

Humans have a huge impact on Earth's subsurface – through mining, fossil fuel extraction, irrigation and energy waste storage – and have to deal with the environmental problems that ensue. To virtually peer into the ground, many researchers use complex modeling approaches that account for factors like the interactions among microorganisms and how plants absorb and return water and nutrients. These biogeochemical approaches are the bread and butter of research by Stanford University's Kate Maher.

SCIENCE HIGHLIGHTS

The Office of Science posted new highlights spotlighting BES between 6/24/2019 and 7/21/2019.



To better store data, scientists need ways to change a material's properties suddenly. Now, scientists from MIT have devised a surprisingly simple way of flipping a material from one state into another and back again with flashes of light. A single light pulse turns thin sheets of tantalum disulfide from its original (alpha) state into a mixture of alpha and beta states. Domain walls separate the two states. A second pulse of light dissolves the walls, and the material returns to its original state.

TOP TWEETS

The Office of Science sent out 108 tweets between 6/24/2019 and 7/21/2019. Here are our two most popular from the past month:

DOE Science
@doescience

Colors in fireworks are produced when elements are heated, releasing excess energy as light. Higher energy compounds like copper chloride emit cooler colors & lower energy compounds like strontium chloride emit warmer colors #FourthofJuly @ENERGY energy.gov/articles/5-fac ...

DOE Science
@doescience

Researchers @PNNLab have successfully tested highly porous materials and found they can absorb key components of a class of toxic chemicals found in 43 states bit.ly/2XG40vw

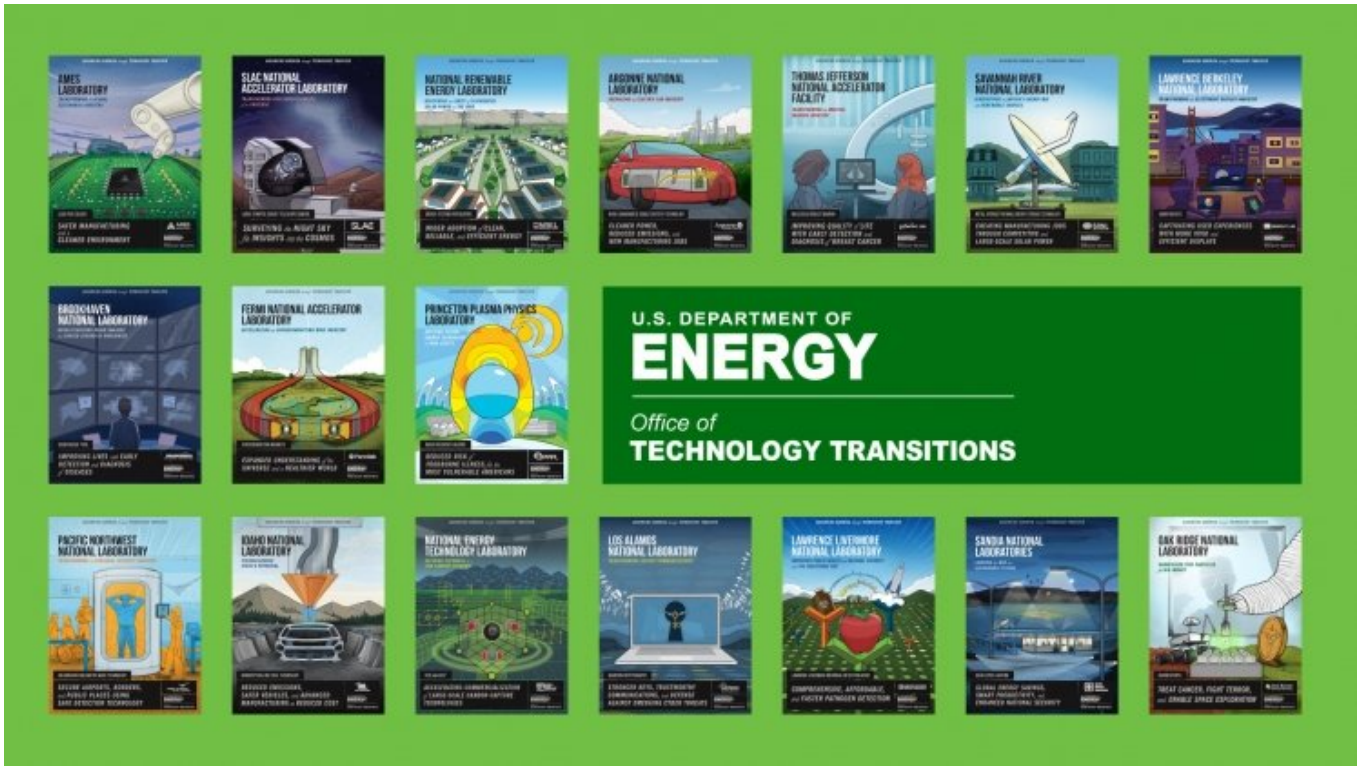
BY THE NUMBERS

Presidential Early Career Award for Scientists and Engineers

The White House has announced the 2019 recipients of the Presidential Early Career Award for Scientists and Engineers (PECASE). Established in 1996, the PECASE acknowledges the contributions scientists and engineers have made to the advancement of science, technology, education, and mathematics education and to community service as demonstrated through scientific leadership, public education, and community outreach. This year, 39 of the awardees from 14 states across the country were nominated by the DOE.

END NOTES

Advancing America through Technology Transfer



The DOE's Office of Technology Transitions (OTT) is celebrating the incredible success stories written by the 17 national labs through a new poster series. The Advancing America through Technology Transfer series selects one story from each lab and transforms it into a work of art that captures the spirit of the lab and its surrounding area. With each project, OTT strives to showcase the impacts these lab-derived technologies have on our everyday lives, our economic competitiveness, and our national security.

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