U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

13 May 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.

Big Help from Small Microbes: Electron Transfers to Produce Fuels and Fertilizer

This is article part of a series that explores how scientific teams at the Department of Energy's Energy Frontier Research Centers come together to solve intractable problems.

Scoop up a handful of good garden soil. The dark soil may well contain tiny bacteria that take in nitrogen from the air and release a compound (nitrogen-rich ammonia) that nourishes corn, carrots, and other plants. The microbe makes ammonia using a bit of energy it gathers from sunlight. Industrial manufacturers make ammonia too, using a much more energy-intense process. By some estimates,

industrial ammonia makers burn through more than 1 percent of the world's energy production each year.

What if we could apply the best parts of the bacteria's highly efficient process to industry to produce ammonia and other chemicals? That's what the Center for Biological Electron Transfer and Catalysis (BETCy) is digging into. At BETCy, center director John Peters and his colleagues are learning how electron transfer processes drive energy-intensive reactions. These transfers maximize the reactions' efficiencies at the molecular level. Learning the processes well enough to use the best parts could let industrial reactions soar over energy barriers.

Click here to read more about the diverse team of experts at the Center for Biological Electron Transfer and Catalysis.

NEWS CENTER

The Office of Science posted 61 news pieces between 4/29/2019 and 5/13/2019, including 30 university articles and 29 pieces from the labs and user facilities.

Because plastics contain various additives, very few plastics can be recycled without loss in performance or aesthetics. To solve this problem, a multidisciplinary team of researchers at Berkeley Lab has designed a recyclable plastic that, like a Lego playset, can be disassembled into its constituent parts at the molecular level, and then reassembled into a different shape, texture, and color again and again without loss of performance or quality.

If fusion is to be practical for electricity production, the power of the fusion reaction must be able to be controlled. A Department of Energy Computational Science Graduate Fellow at Harvard University and his colleagues created an artificial intelligence code to successfully forecast disruptions in fusion reactors. These predictions can be applied across machines, making it a major step forward for fusion energy initiatives.

Scientists at Pacific Northwest National Lab and their colleagues have taken one of the most in-depth looks ever at the protein activity that underlies colon cancer and have identified potential new molecular targets to try to stop the disease. The research provides a new window into cancer, uncovering long-hidden information spurring new questions and possibly leading to new avenues for treatment.

Researchers at the University of Texas at San Antonio listened to more than 70,000 note pairings in bird songs and classified the patterns in order to understand how human motor actions are sequenced. Specifically, they looked at the vocal branching in a song that occurs from one part of a song to the next. Bird singing occurs in a specialized brain circuit that allows scientists to study it with high degree of control, making it easier to discover principles of brain function that can then be translated to understanding human brains.

New research from NASA Goddard Institute for Space Studies, Lawrence Livermore National Lab, and Columbia University shows that greenhouse

A team of scientists including researchers at Stony Brook University and Brookhaven National Laboratory has studied a catalyst that decomposes nerve agents,

gas emissions in the first half of the 20th century significantly affected temperature and rainfall and caused large hydrological shifts over land. These observations and climate reconstructions using data from tree rings confirm that human activity has affected the worldwide drought risk as far back as the early 20th century.

eliminating their harmful and lethal effects. The research team focused on the decontamination of sarin and is working to develop air filters that destroy sarin before the molecules reach an individual.

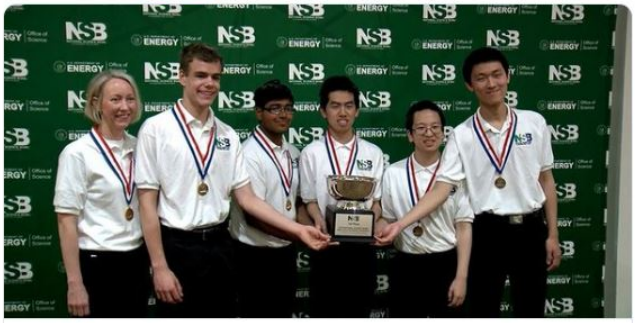
TOP TWEETS

The Office of Science sent out 38 tweets between 4/30/2019 and 5/13/2019. Here are our two most popular from the past two weeks:

DOE Science
@doescience

ICYMI: hear from students about their National Science Bowl experience bit.ly/2H62mdt

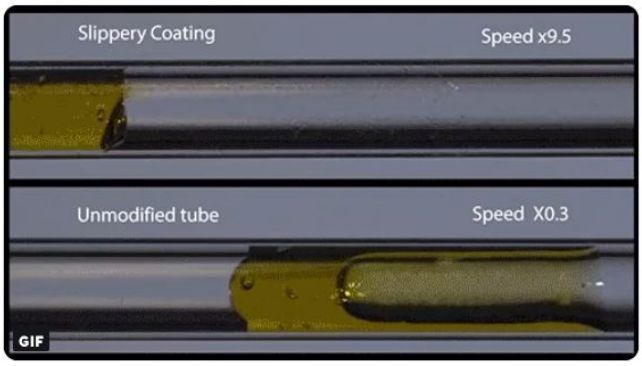
CC: @DOE_SC_NSB, @ENERGY, @ABC7News



National Science Bowl in DC attracts students from around the country
A test of scientific knowledge from astronomy to biology to physics and math. "I've had to learn some organic biochemistry, molecular cell biology and things like that I
wjla.com

DOE Science
@doescience

Engineered surface treatment developed @MIT can reduce waste and improve efficiency in many processes bit.ly/2VAboYl



BY THE NUMBERS

Department of Energy Computational Science Graduate Fellowship

The Department of Energy awarded 26 Computational Science Graduate Fellowships in early May to students at 19 different universities across the United States. Renewable for up to four years, the fellowship is guided by a comprehensive program of study that requires focused coursework in the areas of science and engineering, computer science, and applied mathematics. It also includes a three-month practicum at one of 21 Department of Energy labs or sites across the country. As part of the program, fellows receive a yearly stipend, full payment of their university tuition and required fees during the appointment period, and an annual academic allowance.

END NOTES

National Science Bowl 2019

On March 29, 2019, the annual National Science Bowl (NSB) was held at George Washington University's Lisner Auditorium. Local channel WJLA covered the NSB finals, interviewing members of a team from

Alexandria, Virginia and covering the winning matches. The team from Wayzata High School in Plymouth, Minnesota won the high school competition and the team from Jonas Clarke Middle School in Lexington, Massachusetts, won the middle school competition.

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