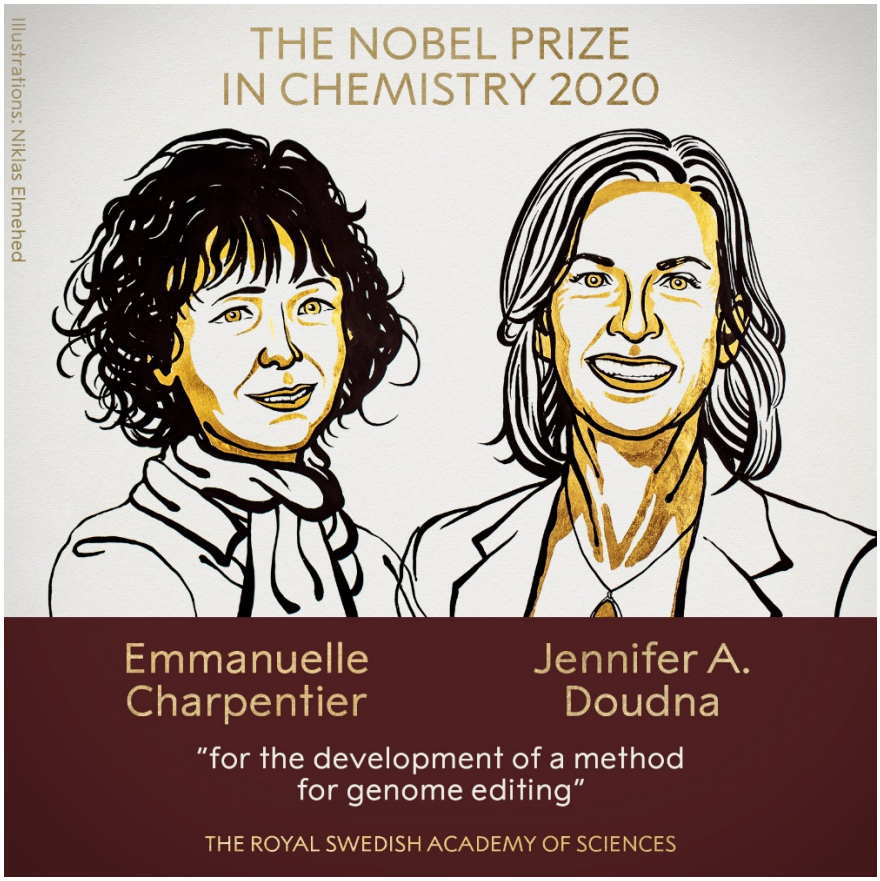
U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

13 October 2020

*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.*



Jennifer Doudna Wins 2020 Nobel Prize in Chemistry

Biochemist Jennifer Doudna, a professor at UC Berkeley and faculty scientist at the Department of Energy's Lawrence Berkeley National Laboratory, is co-winner of the 2020 Nobel Prize in Chemistry for "the development of a method for genome editing." She shares the Nobel Prize with co-discoverer Emmanuelle Charpentier, who currently serves as the scientific and managing director of the Max Planck Unit for the Science of Pathogens in Berlin. Together, they form the first all-woman research team to win a Nobel Prize.

The discovery of the CRISPR-Cas9 genetic engineering technology has radically changed genomics research. This genome-editing technology enables scientists to change or remove genes quickly, with a

precision only dreamed of just a few years ago. Labs worldwide have redirected the course of their research to incorporate this new tool, with huge implications across biology, agriculture, and medicine.

Click here to read more about Doudna, CRISPR-Cas9, and the 2020 Nobel Prize in chemistry.

NEWS CENTER

The Office of Science posted 55 news pieces between 9/28/2020 and 10/13/2020.

A statistician from Lawrence Berkeley National Laboratory is investigating where genetics and environment are most closely intertwined to explain how they both may affect people's alcohol consumption, weight gain, and lung health.

A multidisciplinary team used user facilities at Argonne National Laboratory to develop a material that can sense glutamate in the brain, potentially leading to new tools to combat neurological disorders.

A team led by SLAC National Accelerator Laboratory has invented a structure that could make particle accelerators 10 times smaller.

With data from the Arecibo Observatory, researchers from the University of Central Florida have discovered a "gamma-ray heartbeat" coming from a cosmic gas cloud, challenging previous models of black holes.

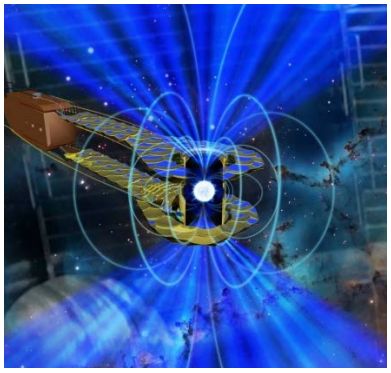
A team from the University of Chicago, Northern Illinois University, and Argonne National Laboratory has discovered a new catalyst that can consistently and efficiently convert carbon dioxide and water into ethanol at low cost.

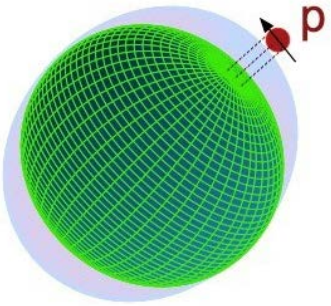
A study from Colorado State University aims to clarify the impact of black carbon on clouds and to improve climate models.

SCIENCE HIGHLIGHTS

The Office of Science posted two new highlights between 9/28/2020 and 10/13/2020.

The high-energy-density states in white dwarf stars—stars that have burned most of their fuel—are hard to reach in a lab. Scientists from Livermore Lab have conducted experiments on these high-pressure conditions with the world's most energetic laser.





Nuclei are more stable when they have certain numbers of protons or neutrons, pairs that tend to favor spherical shapes. However, researchers from Oak Ridge National Laboratory have found that deformed shapes can develop, pointing to new directions for scientists exploring how protons and neutrons interact.

IN THE NEWS

Scientific American: Possibility of dark bosons entices physicists

Hints of anomalies in heavy isotopes may be clues to new physics. Fermilab visiting scientist Elina Fuchs is quoted about "dark" bosons and her work on these anomalies.

Science: With to-do list checked off, U.S. physicists ask, 'What's next?'

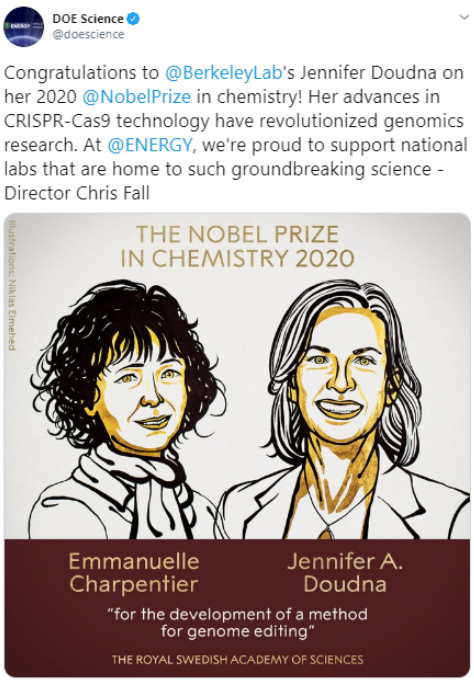
Thanks to a unified community and generous budgets, particle physicists in the U.S. have begun almost every project on a research road map laid out seven years ago. This article includes information on DUNE, LBNF, the Short-Baseline Neutrino program, and the PIP-II accelerator improvement plan and quotes Fermilab scientists on the future of particle physics experiments.

Forbes: The Bradykinin Hypothesis: What it is and what it can tell us

This article explains the Bradykinin Hypothesis, a theory potentially explaining the wide variety of symptoms related to COVID-19, and highlights Oak Ridge National Laboratory's study using the Summit supercomputer that resulted in the hypothesis.

TOP TWEETS

The Office of Science sent out 52 tweets between 9/28/2020 and 10/13/2020.
Here are the two most popular:



BY THE NUMBERS

ASCR @ 40

In 1980, the predecessor of DOE's Office of Science—the Office of Energy Research—began a small but dynamic program in applied mathematics, advanced computing, and networking for scientific research. Forty years later, the program now called Advanced Scientific Computing Research (ASCR) is tasked with discovering, developing, and deploying computational science and high-performance networking tools and services to enable researchers to analyze, model, simulate, and predict complex phenomena in energy, the environment, and security. Over the past four decades, ASCR has funded research at national laboratories and public and private institutions to foster and support fundamental research. This report showcases notable achievements over ASCR's 40 year history.

END NOTES

If Betelgeuse goes boom: How DUNE would respond to a nearby supernova

In late 2019, Betelgeuse, the star that forms the left shoulder of the constellation Orion, began to noticeably dim, prompting speculation of an imminent supernova. If it exploded, this cosmic neighbor—a mere 700 light-years from Earth—would be visible in the daytime for weeks. Yet 99% of the energy of the explosion would be carried not by light, but by neutrinos, ghost-like particles that rarely interact with other matter.

If Betelgeuse does go supernova soon, detecting the emitted neutrinos would "dramatically enhance our understanding of what's going on deep inside the core of a supernova," said Fermilab theorist Sam McDermott. And it would present a unique opportunity to investigate the properties of neutrinos themselves. The Deep Underground Neutrino Experiment, hosted by Fermilab and planned to begin operation in the late 2020s, is being developed with these goals in mind.

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