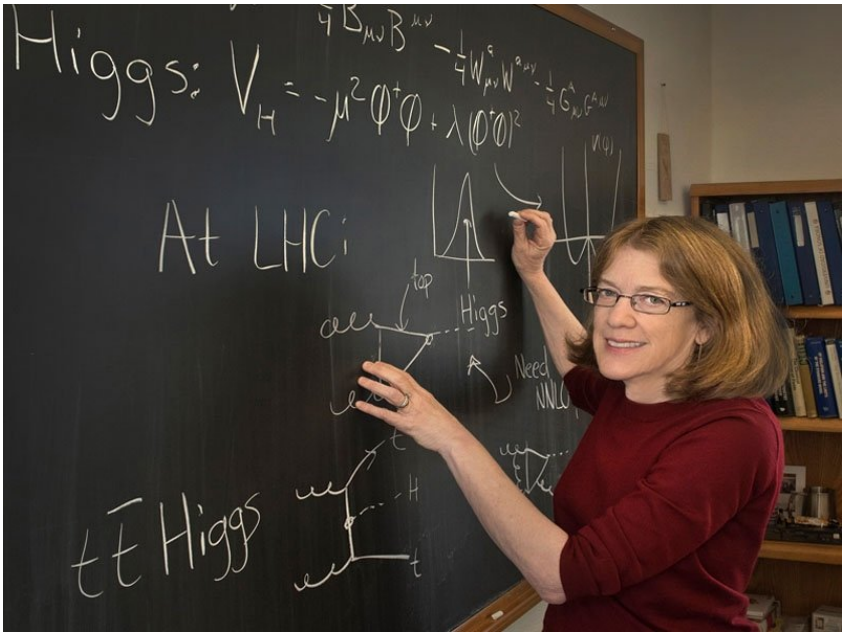
U.S. DEPARTMENT OF ENERGY

Office of Science

# COMMUNIQUE

21 January 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.*




## The Big Questions: Sally Dawson on the Higgs Boson

*The Big Questions series features perspectives from the five recipients of the Department of Energy Office of Science's 2019 Distinguished Scientists Fellows Award describing their research and what they plan to do with the award. Sally Dawson is a senior scientist at DOE's Brookhaven National Laboratory.*

What particle causes the universe's fundamental particles to have mass?

That question drove the effort to discover the Higgs Boson, the focus of my work for the past 30 years.

The Standard Model is a physics theory that explains how all particles and fundamental forces except gravity interact. In the 1970s, scientists realized that the accepted theories of the time predicted that elementary particles could not have mass. Except that they knew that wasn't true; experiments had already shown that these particles did have mass. Something was missing.

Click here to read more about Sally Dawson's work at Brookhaven Lab and the hunt for the Higgs Boson.

# NEWS CENTER

**The Office of Science posted 63 news pieces between 1/6/2020 and 1/20/2020, including 30 university articles and 26 pieces from the labs and user facilities.**

Scientists from Argonne National Laboratory and the University of Chicago have launched a testbed for quantum communications experiments. The Argonne quantum loop, a pair of connected, 26-mile-long fiber optic cables, will serve as a testbed for researchers interested in leveraging the principles of quantum physics to send unhackable information across long distances.

A study from the University of Michigan reveals the precise mechanism by which proteins identify, capture, and destroy genetic material from viruses and how some viruses, including HIV, evade capture. Understanding this mechanism may be the first step toward creating better methods to protect against viruses.

Research led by Pacific Northwest National Laboratory and Indiana University School of Medicine used mass spectrometry to identify a protein that can delay the onset of Type 1 diabetes in diabetic mice. This research provides a new target for diabetes prevention and treatment in humans.

A study led by UC Berkeley researchers reveals how sorghum crops alter the expression of their genes to adapt to drought conditions. Understanding how sorghum survives harsh conditions could help researchers design crops that are more resilient to climate change.

A major issue with operating tokamaks is keeping plasma free from impurities. Now, scientists at Princeton Plasma Physics Laboratory have found that sprinkling a type of powder into plasma could aid in harnessing the ultra-hot gas within a tokamak facility necessary to produce fusion reactions and create electricity.

Inspired by multi-messenger astrophysics, a team from Columbia University and UC San Diego have introduced a “multi-messenger” approach to quantum physics. This new method lets researchers simultaneously examine multiple properties when testing quantum materials, expanding the power of measurement techniques.

# IN THE NEWS

*New York Times*: How Insects Cope With the Effects of Gravity

Researchers at Argonne are studying insects with synchrotron X-rays to gain insight into phenomena at the intersection of physics and biology.

*Business Insider*: The US is building its first new particle collider in decades on Long Island. Stephen Hawking called the technology a 'time machine.'

The United States is building its first new particle collider in decades at Brookhaven Laboratory on Long

Island. The Electron-Ion Collider, expected to be operational by 2030, will give scientists more precise, 3D snapshots of the building blocks that form protons and electrons.

### *PBS Space Time:* How to Capture Ghost Particles

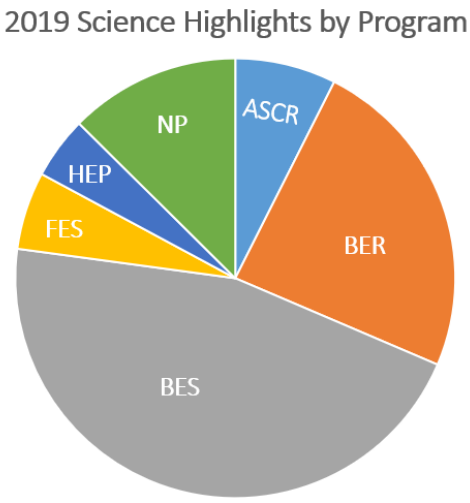
Fermilab's Don Lincoln talked to PBS Space Time about the neutrino, an elusive particle that may hold powerful secrets about the forces of nature.

# TOP TWEETS

The Office of Science sent out 52 tweets between 1/6/2020 and 1/20/2020. Here are our two most popular from the past two weeks:



# BY THE NUMBERS




In 2019 the Office of Science posted 175 science highlights about research on subjects from superconductors to algae for biofuel to innovative cancer treatments. The highlights summarize published journal articles based on work supported by the Office of Science. These articles feature findings that the Office of Science's six programs choose to amplify.

# END NOTES


The upcoming Large Synoptic Survey Telescope, which will conduct a vast astronomical survey for unprecedented discovery of the deep and dynamic Universe, will now be named after Vera Rubin, an astronomer most recognized for uncovering the discrepancy between the observed and predicted motions of matter in galaxies, a discovery interpreted as evidence for the existence of dark matter. The NSF Vera C. Rubin Observatory will begin operations in 2022 and is jointly funded by the NSF and DOE.

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