*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.*

How to Build a 3D Map of the Universe – and Why

One of the biggest mysteries in science began with a dying star.

It wasn't any particular dying star so much as the idea of one. In the 1980s, Saul Perlmutter at Berkeley Lab and his collaborators realized that they could use data about supernovae to research the history of the universe. Supernovae are extremely bright exploding stars that cast much of their mass out into space before they wink out. Over the course of a decade, Perlmutter's team collected enough data to look for a relationship between a supernova's brightness and distance from Earth. They expected to see

that very distant supernovae appear a bit brighter than they would in an expanding universe that wasn't slowing in its growth.

The data revealed something else entirely.

Click here to read more about dark energy and how researchers are working to understand the history of our universe.

NEWS CENTER

The Office of Science posted 60 news pieces between 11/12/2019 and 11/24/2019, including 24 university articles and 29 pieces from the labs and user facilities.

Researchers from Cairo University used Berkeley Lab's Advanced Light Source to study soil and mummified bone samples, exploring the samples' microscopic chemistry, structure, and other properties. These studies could provide a richer understanding of daily life and environmental conditions thousands of years ago in Ancient Egypt.

A team of scientists led by Stony Brook University have described a method that uses artificial intelligence to facilitate the conversion of carbon dioxide into methane by tracking the size, structure, and chemistry of catalytic particles. Improving the ability to convert carbon dioxide to methane would make an alternative energy source that can be easily stored and transported while reducing carbon emissions.

Researchers at Pacific Northwest National Lab have used artificial intelligence to improve the accuracy of patient diagnosis by up to 20 percent. By developing a graph-based learning method, the team translated medical knowledge and patient information into computer-friendly data that can be fed into machine learning algorithms.

University of California, Irvine researchers have identified the role of leafy plants in riparian flooding. As an adaptation to an overabundance of carbon dioxide in the atmosphere, plants regulate the amount of gas they consume and increase the amount of soil moisture stored underground. This phenomenon could have a large influence on flooding in the Mississippi River basin.

Researchers at Argonne National Lab are applying machine learning techniques to help protect data and critical infrastructure from cyberattacks. As technology becomes an even more fundamental and inextricable part of modern life, more sophisticated cybersecurity measures to protect government research and industry assets may become necessary.

Researchers from Washington State University used tubes made from peptoids to deliver cancer-killing drugs in a targeted manner. This precise and non-toxic treatment targets lung cancer cells at the nanoscale and can kill the cells even at a low dose, resulting in highly efficient treatment with less chemotherapy.

The Office of Science posted three highlights spotlighting BES between 11/12/2019 and 11/24/2019.
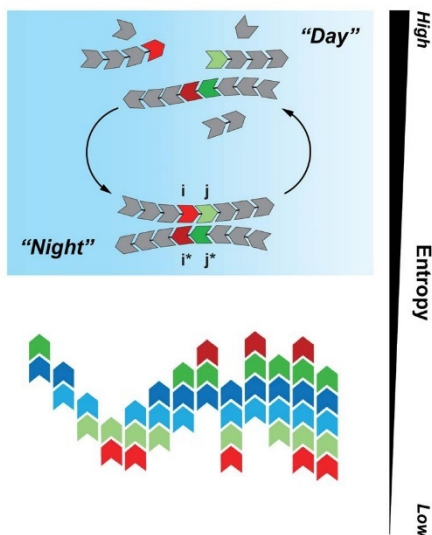
Researchers from Brookhaven National Lab have developed a model that describes the process of polymerization. This model shows how these polymers evolve from a "soup" of different monomers into a complex system. Scientists may be able to use this model in artificial nanoscale systems to create "evolving" nanostructures.

Researchers from Indiana University have devised a powerful new molecule that captures chloride for the extraction of salt from liquid. The research and the resulting molecular cage could help increase the amount of drinkable water on Earth.
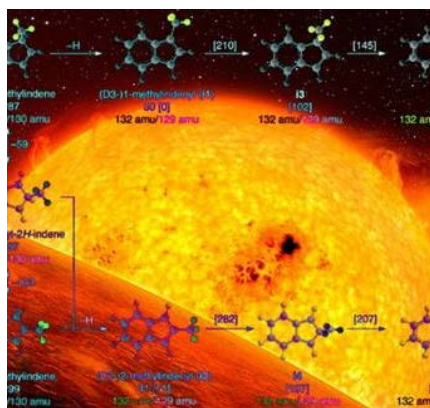

A study led by researchers from the University of Hawaii at Manoa revealed two key pathways that lead to the formation of some carbon-based particles. Understanding the fundamental reactions that lead to these particles will help scientists better understand the origin and evolution of molecules in the universe.

TOP TWEETS

The Office of Science sent out 68 tweets between 11/12/2019 and 11/24/2019. Here are our two most popular from the past two weeks:
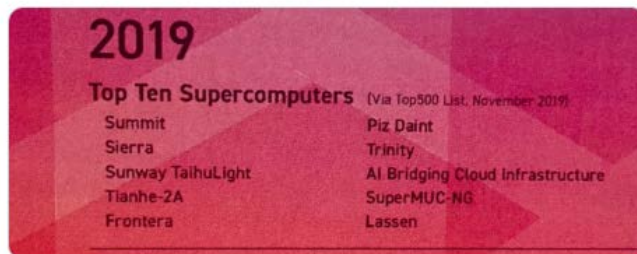
BY THE NUMBERS

15 Years of INCITE

In its 15th year, the Innovative and Novel Computational Impact on Theory and Experiment (INCITE) program has allocated supercomputer access to 47 science projects with the goal of accelerating discovery and innovation. INCITE has tackled science's most difficult problems by giving researchers the opportunity to conduct their work on the world's most powerful computers. Scientists from academia, industry, and national laboratories have explored a wide range of inquiry, from the formation of galaxies to the molecular dynamics of construction materials.

END NOTES

PODCAST: The Sound of Science
The Human Element: Expanding the Periodic Table

It's the International Year of the Periodic Table! Oak Ridge National Lab has been helping shape the periodic table for more than seven decades. The lab discovered three elements and contributed to the discovery of several more through its isotope production and detector technology. Hear the stories behind the discoveries of promethium, tennessine, and more on this episode of "The Sound of Science."

Follow the Office of Science on social media!

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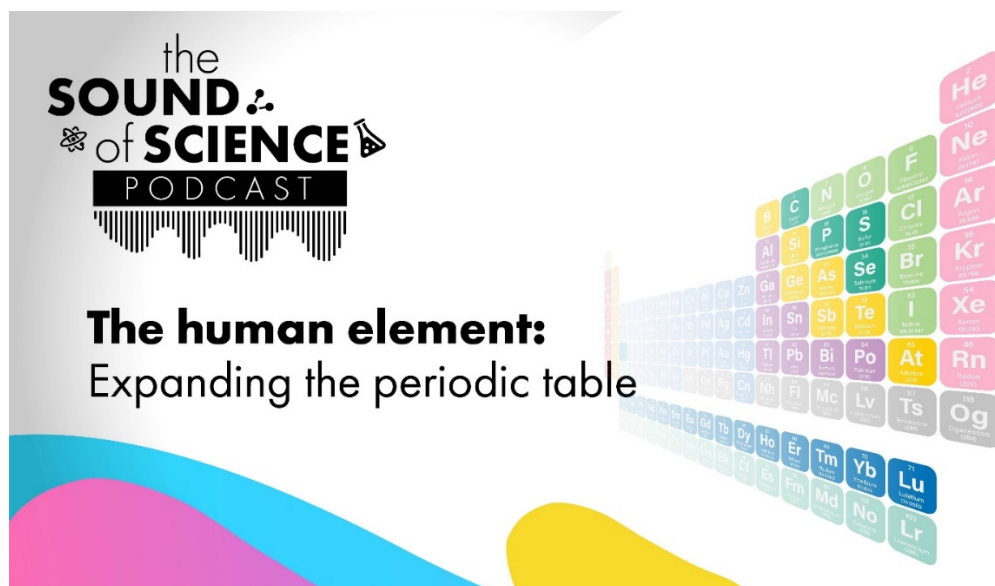
No. 24: 25 November 2019

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