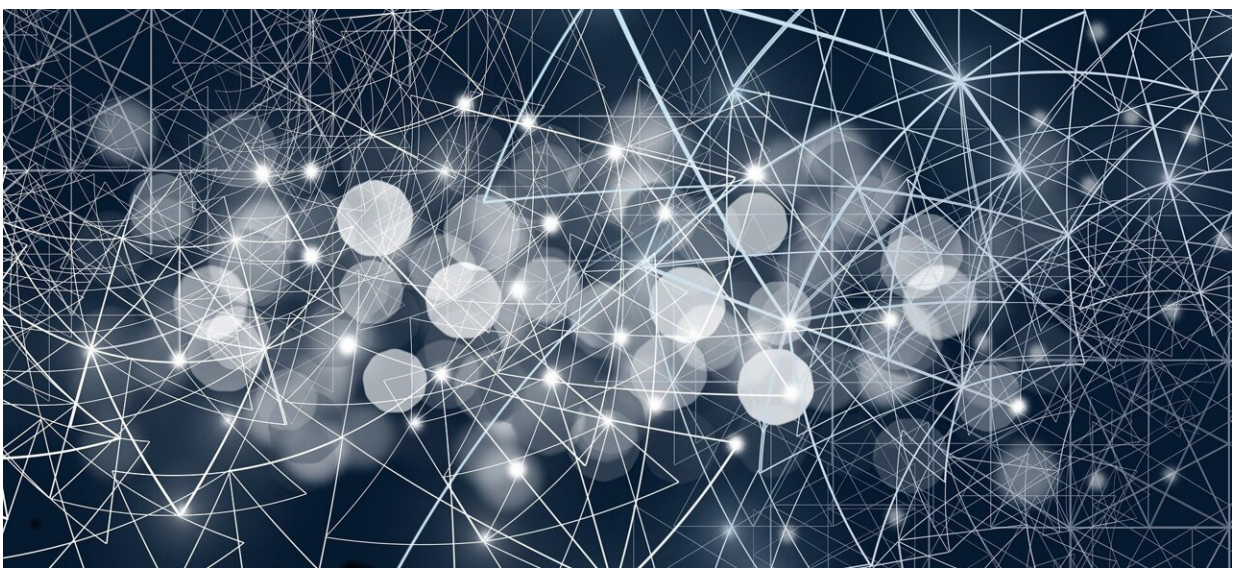


New report unveils ambitious roadmap to harness the power of AI in scientific discovery

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Innovations in artificial intelligence (AI) are rapidly shaping our world, from virtual assistants and chatbots to self-driving cars and automated manufacturing. Seizing on the potential of AI to transform science, the nation's leading experts in science and technology have released a blueprint for the United States to accelerate progress by expanding its capabilities in AI and big data analysis.

["AI for Science, Energy, and Security"](#) lays out a comprehensive vision for the U.S. Department of Energy (DOE) to expand its work in scientific use of AI by building on its existing strengths in world-leading high performance computing systems and data infrastructure.

The report is the product of a series of workshops held in 2022 under the guidance of DOE's Office of Science and the National Nuclear Security Administration. The sessions brought together over 1,000 scientists, engineers and staff from DOE labs, academia, and [technology companies](#) to talk about the rapidly emerging opportunities and challenges of scientific AI.

The report identifies six AI capabilities and describes their potential to transform DOE's program areas. These range from control of complex systems like power grids to foundation models like the large language models behind generative AI programs such as ChatGPT. The report also lays out the crosscutting technology needed to enable these AI-powered transformations.

"Advances in AI could dramatically change the way we pose and solve scientific problems," said Rick Stevens, associate [laboratory](#) director of Computing, Environment and Life Science at DOE's Argonne National Laboratory who co-led the workshops and report development. "There's so much untapped potential for AI innovations to both drive new scientific discoveries and speed up the pace of those discoveries. DOE is the natural leader for developing trustworthy, responsible AI to support our nation's energy transition and nuclear deterrence efforts."

The report describes scientific "grand challenges" where AI plays a major role in making progress toward solutions. These include improved climate models, the search for new quantum materials, new nuclear reactor designs for clean energy and more.

Six DOE national laboratories led the AI workshop series and resulting report: Argonne, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Oak Ridge National Laboratory and Sandia National Laboratories.

Provided by Argonne National Laboratory

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