

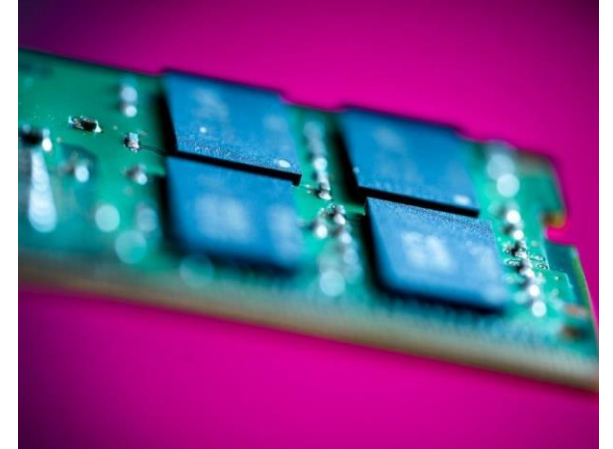
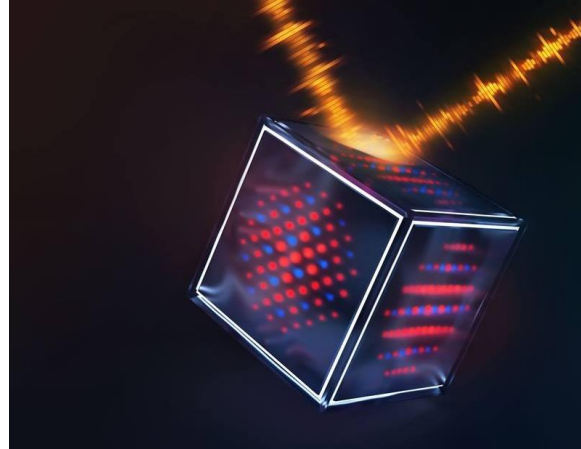
DOE's Office of Critical and Emerging Technologies

BESAC – September 2024

Office of Critical and Emerging Technologies (CET) Overview

- Launched in December 2023
- Goal: leverage DOE's broad scientific and technical expertise to accelerate progress on critical technologies
- DOE is directed in the October 2023 White House AI Executive Order to:
 - *“establish an office to coordinate development of AI and other critical and emerging technologies across Department of Energy programs and the 17 National Laboratories.”*

Critical and Emerging Technology Areas



Artificial Intelligence

Biotechnology and
Biomanufacturing

Quantum Science

Semiconductors and
Microelectronics

Responsible use of each of these emerging technologies brings enormous potential to solve urgent problems and to drive economic development for years to come.

Executive Order: Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence

Issued October 30, 2023 with directives to over 20 federal agencies, and deadlines from 30 to 365 days.

DOE has a critical role to play in the **highlighted** sections:

- **Guidelines, standards, best practices for AI safety and security**
- **Promoting innovation and competition**
- Supporting workers
- Advancing Equity and Civil Rights
- Protecting consumers, patients, passengers, students
- **Protecting privacy**
- **Federal Government use of AI**
- **Strengthening Leadership Abroad**

Partnerships – with other agencies, industry, academia, internationally– will be key to success.

Artificial Intelligence EO implementation at DOE

- **White House Executive Order (2023) guides the U.S. Government's work on AI, both unlocking potential applications and mitigating risks**
- **Promote benefits of AI**
 - Pilot [program](#) to train new AI researchers
 - Identify AI energy applications
 - [Tools/Models/Partnerships](#) for science, energy, climate, and national security
 - Supporting the National AI Research Resource Pilot to expand access to computing resources
 - Developing a Global AI Research Agenda to promote best practices worldwide
- **Manage Risks of AI**
 - [Assessment](#) of potential risks and benefits related to AI and critical infrastructure
 - Making [testbeds](#) available
 - Testing and model evaluation for chemical, biological, radiological, nuclear, and cyber threats
 - [Research Coordination Network](#) for privacy enhancing technologies launched w/NSF
 - Understanding model thresholds and performance

Frontiers in AI for Science, Security, and Technology (FASST)

- **FASST** - A proposed initiative that leverages DOE's enabling infrastructure to advance safe, secure, trustworthy AI for scientific discovery, applied energy, and national security.
- Open **RFI** – closes November 11, 2024

AI-ready data

Data is the fuel that drives the engine of AI.

FASST will transform DOE's vast repositories of classified and unclassified scientific data into the world's largest, high-quality repository of AI-ready datasets. These data repositories will be made available to partners to train, test, and validate the next generation of scientific AI models.

Frontier-scale compute and platforms

FASST will build the next generation of energy efficient AI-enabled supercomputing platforms and algorithms, including high speed data networks and storage.

FASST will establish public-private partnerships that will lead to innovation, including vendor agreements to develop, leverage and advance the frontier of what is currently possible.

Safe, secure, trustworthy science-based models

Combining DOE's scientific data with computing power, DOE will develop, train, test, the world's most powerful integrated AI models for science.

These frontier-scale models will accelerate scientific discovery across all branches of science. Developing these models will also provide insight into the properties of AI systems at scale, enabling the ability to predict and manage emergent behaviors for safety, security, trustworthiness, and privacy.

AI applications

AI models developed through FASST will revolutionize the way DOE delivers on its science, energy, and security mission.

AI-accelerated scientific discoveries can lead to batteries made with abundant materials, new cancer-fighting drugs, and assure our national security. These AI models will also be combined with autonomous labs – a combination of robotics, machine learning, and simulations – to independently conduct scientific experiments, generate valuable data and create a virtuous cycle for developing even more capable models.

Learn more:

<https://www.energy.gov/cet/office-critical-and-emerging-technologies>

Contact us:

CETOffice@hq.doe.gov