Office of Science Advisory Committee

Office of Science Update

Harriet Kung
Deputy Director for Science Programs
March 27, 2026

U.S. DEPARTMENT of ENERGY | Office of Science

U.S. DEPARTMENT of ENERGY | Office of Science

Our Mission:

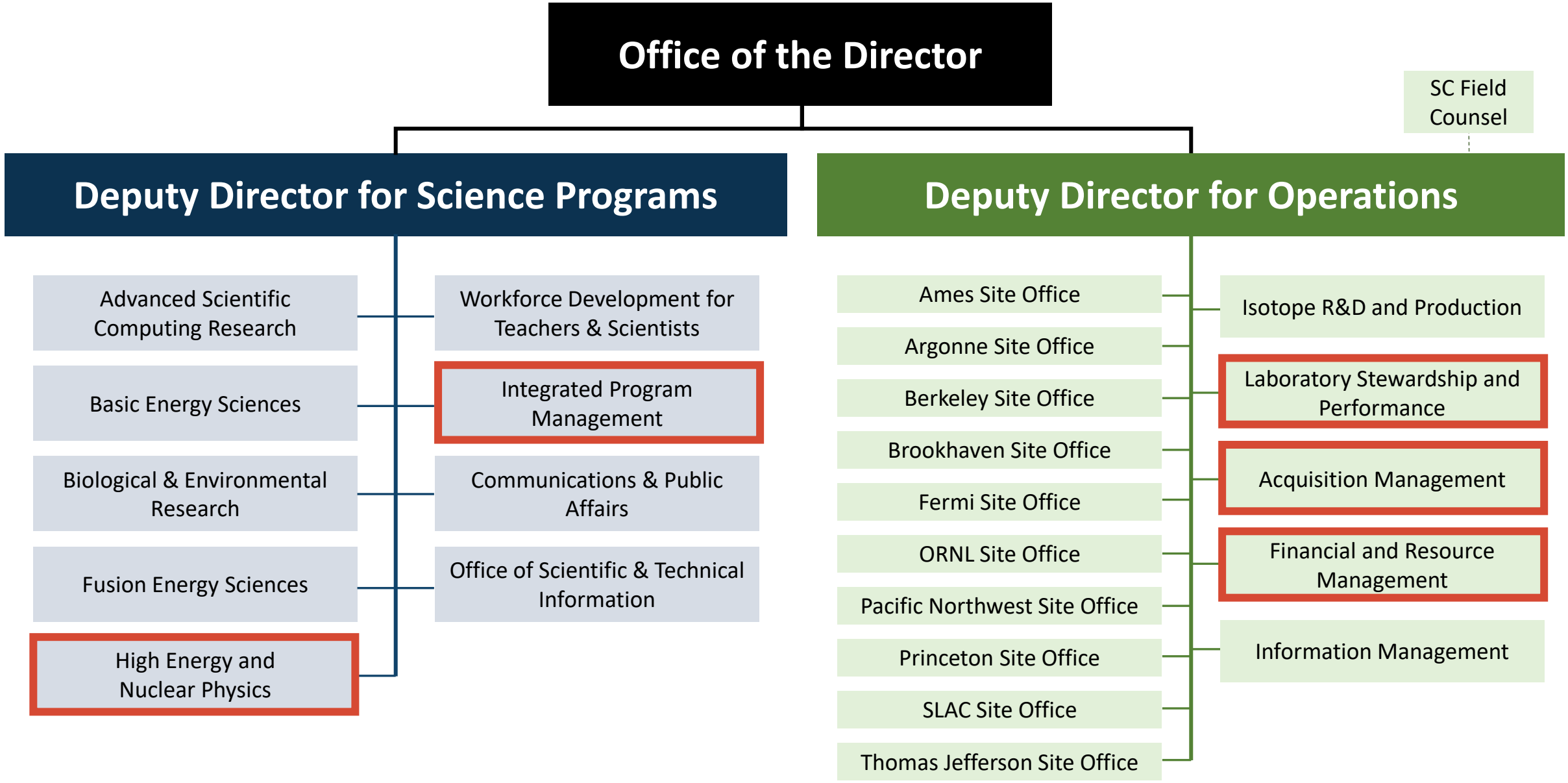
Deliver scientific discoveries and major scientific tools to transform our understanding of nature and advance the energy, economic, and national security of the United States.

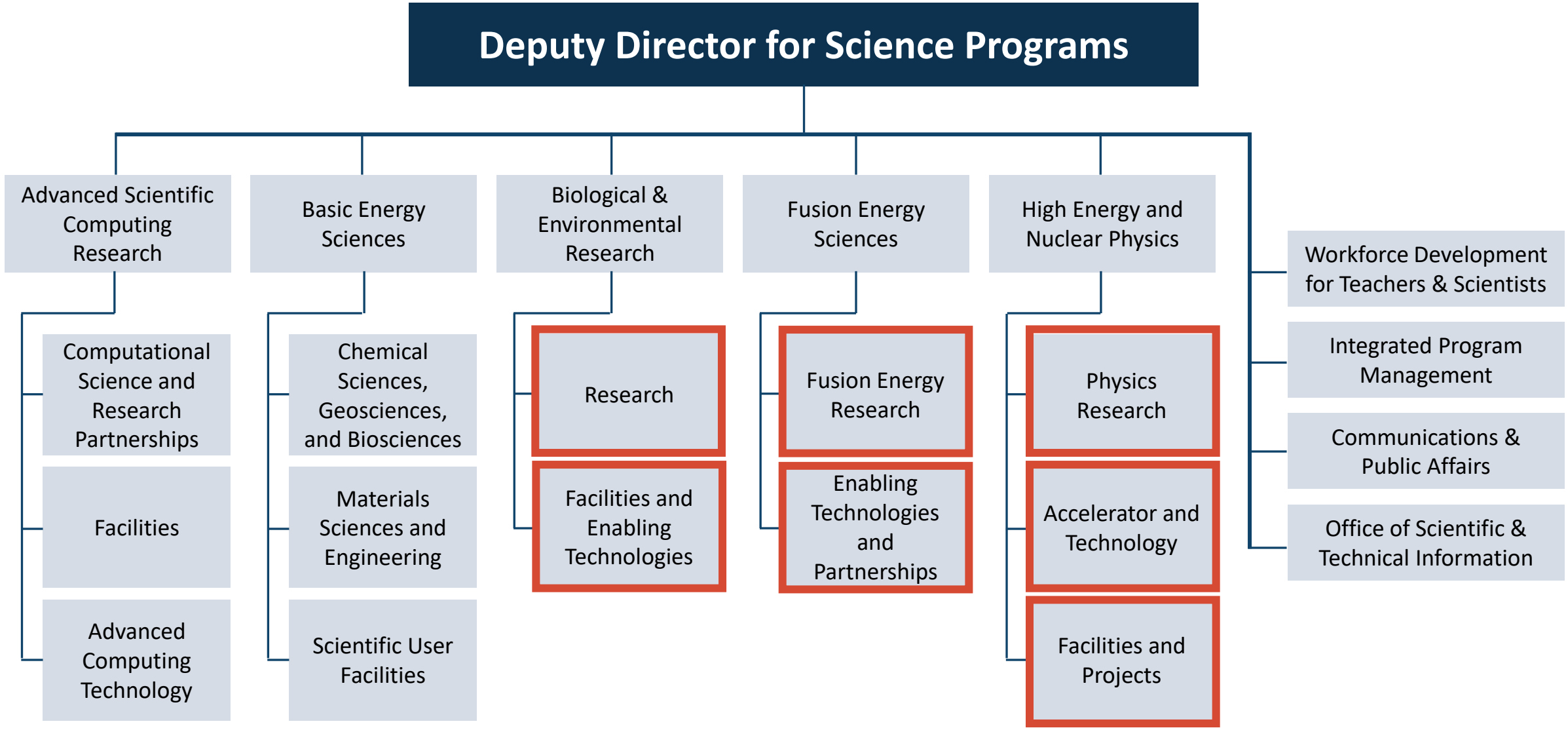
Nearly **28,000** researchers supported at more than **300** institutions and **17** DOE national laboratories

Steward **10** of the 17 DOE national laboratories

Nearly **43,000** users of **28** Office of Science scientific user facilities

$8.4B
(FY26 Enacted)


Office of the Director
SC Field Counsel
Deputy Director for Science Programs
Advanced Scientific Computing Research
Basic Energy Sciences
Biological & Environmental Research
Fusion Energy Sciences
High Energy and Nuclear Physics
Workforce Development for Teachers & Scientists
Integrated Program Management
Communications & Public Affairs
Office of Scientific & Technical Information
Deputy Director for Operations
Ames Site Office
Argonne Site Office
Berkeley Site Office
Brookhaven Site Office
Fermi Site Office
ORNL Site Office
Pacific Northwest Site Office
Princeton Site Office
SLAC Site Office
Thomas Jefferson Site Office
Isotope R&D and Production
Laboratory Stewardship and Performance
Acquisition Management
Financial and Resource Management
Information Management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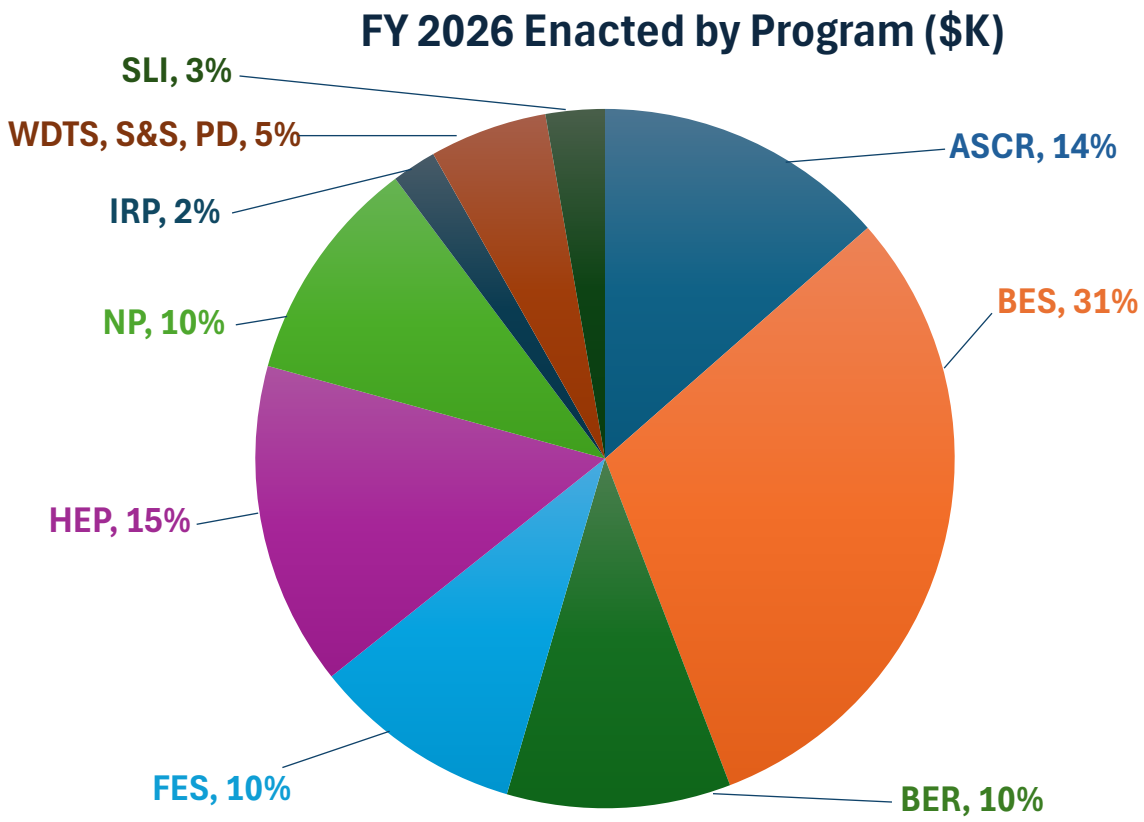
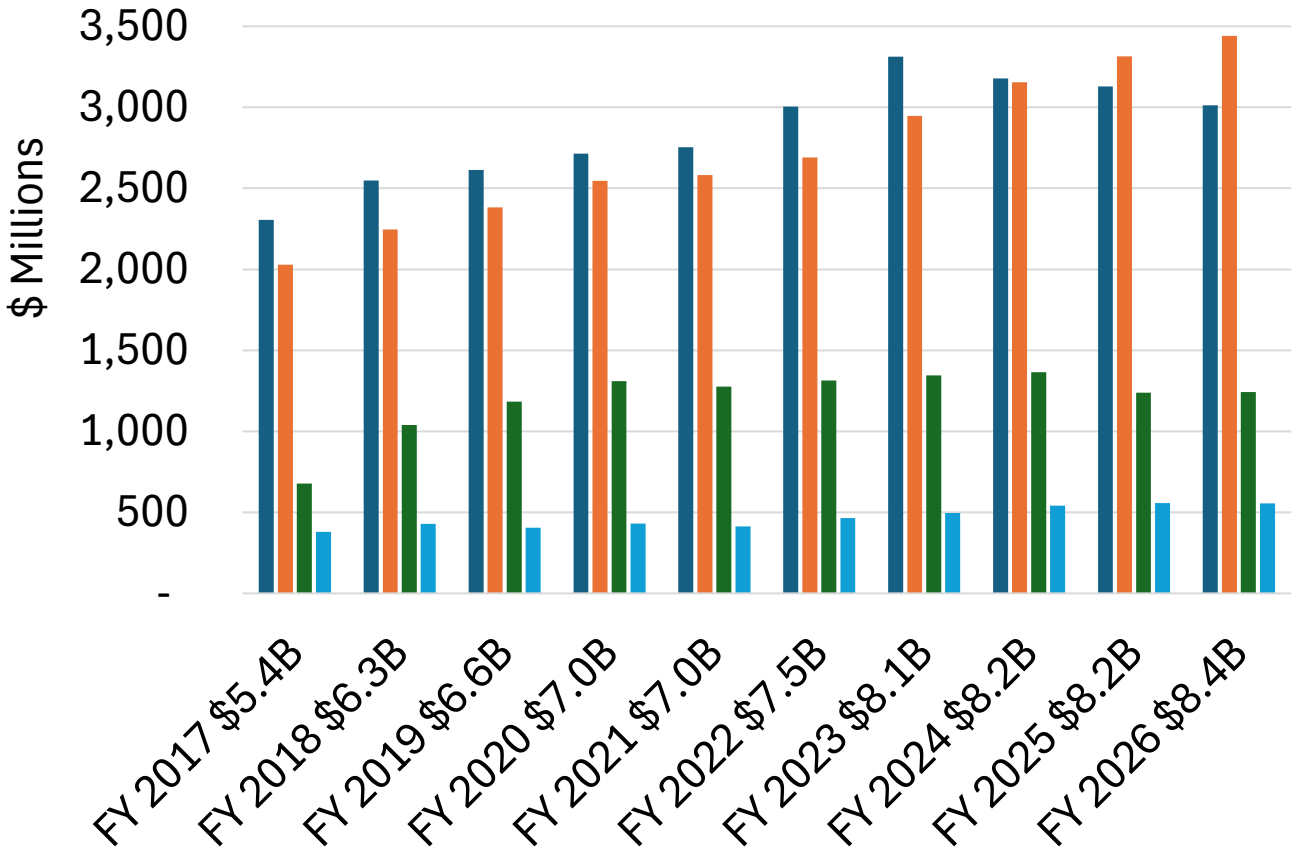
Computational Science and Research Partnerships
Facilities
Advanced Computing Technology
Chemical Sciences, Geosciences, and Biosciences
Materials Sciences and Engineering
Scientific User Facilities
Research
Facilities and Enabling Technologies
Fusion Energy Research
Enabling Technologies and Partnerships
Physics Research
Accelerator and Technology
Facilities and Projects

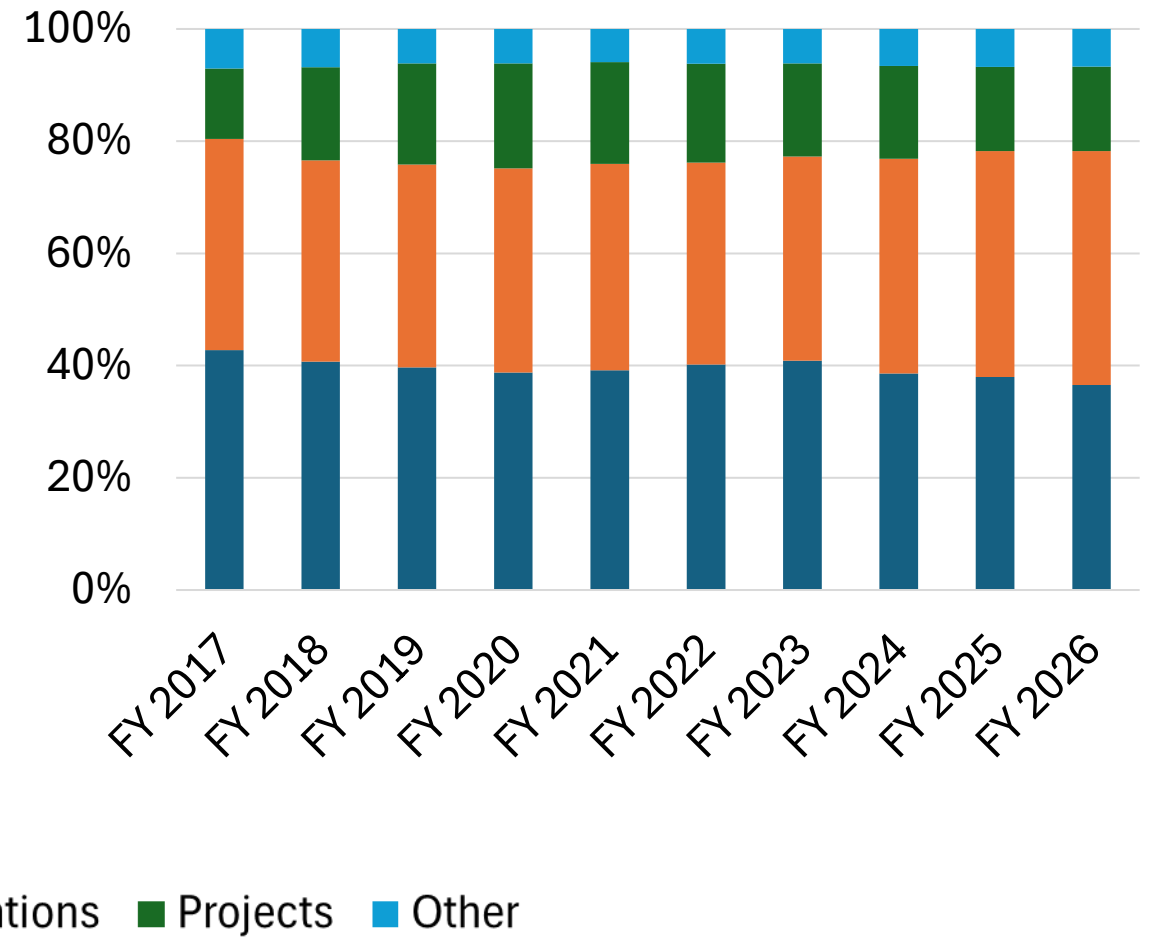
Office of Science Budget: FY 2026 Enacted $8.25B + $150M



	FY 2024 Enacted	FY 2025 Enacted	FY 2026 Enacted
Office of Science			
Advanced Scientific Computing Research	1,016,000	1,036,235	1,116,328
Basic Energy Sciences	2,625,625	2,588,285	2,528,486
Biological and Environmental Research	900,000	870,000	854,000
Fusion Energy Sciences	790,000	790,000	805,657
High Energy Physics	1,200,000	1,224,570	1,235,156
Nuclear Physics	804,000	825,600	866,141
Isotope R&D and Production	130,193	169,636	170,000
Accelerator R&D and Production	29,000	27,000	—
Workforce Development for Teachers and Scientists	40,000	31,000	32,000
Science Laboratories Infrastructure	288,351	260,843	225,401
Safeguards and Security	190,000	190,000	190,000
Program Direction	226,831	226,831	226,831
Total, Office of Science	8,240,000	8,240,000	8,250,000
IIJA Supplemental			150,000
Grand Total, Office of Science	8,240,000	8,240,000	8,400,000

Trends in Research, Facility Operations, and Project Funding





Office of Science Advisory Committee Charges

Facilities of the Future Charge

- Review proposed facilities and upgrades, identify any gaps, and prioritize the facilities that are most crucial to the needs of the nation for the next ten years (2026-2036)
- Consider how proposed facilities integrate with and support the Genesis Mission for AI and QIS, as well as other Administration priorities in fusion, microelectronics, biotechnology, and discovery science

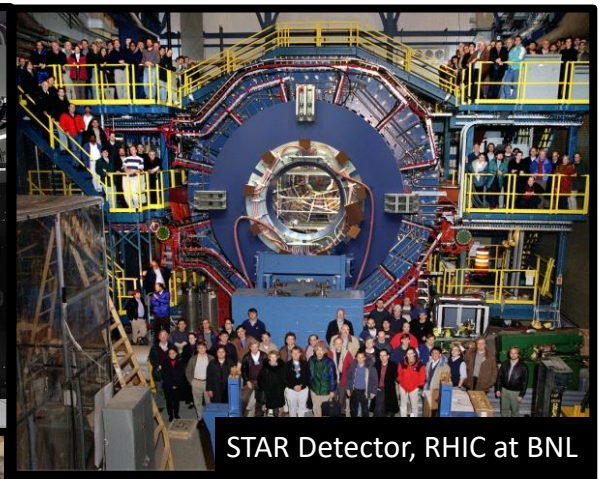
AI for Transformative Science Charge

- Identify how to prioritize SC resources to accelerate the application of AI for transformative scientific and engineering discovery focused on pressing national science and technology challenges
- Create a decadal roadmap articulating near, mid, and long-term priorities for SC to achieve the Genesis Mission

28 SC User Facilities

- Open access
- Allocation determined through peer review of research proposals
- Free for non-proprietary work published in the open literature
- Full cost recovery for proprietary work
- Does not compete with private capability
- Formal user organization

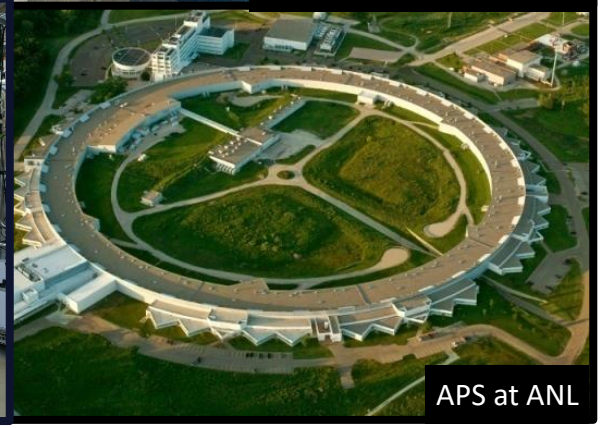
OLCF at ORNL


STAR Detector, RHIC at BNL


SBN Detector at Fermilab


DIIID at General Atomics


AMP2, EMSL at PNNL


APS at ANL

2003 *Facilities for the Future of Science*

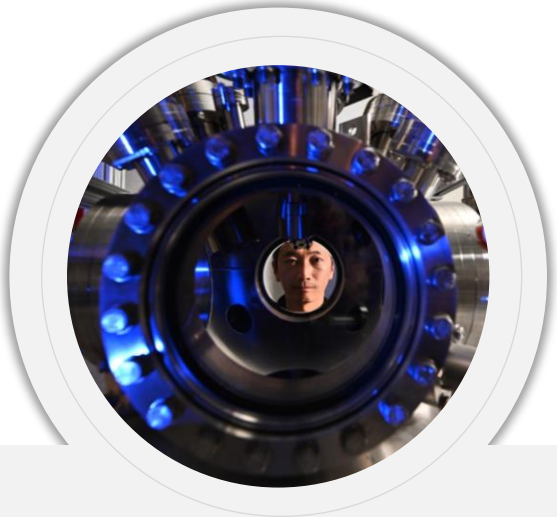
- Report provided a prioritized list of major scientific facilities for the next 20 years
  - Input gathered from the broad scientific community, including SC workshops, SC advisory committees and other community reports
  - 2007 interim report highlighted progress
  - 12 of the facilities have been completed and have had high impact on S&T

"We believe that the 20-year vision of future scientific facilities currently being developed in the Office of Science is outstanding and could have a far-reaching, positive effect on the Nation's leadership in science."

–Dr. Charles M. Vest, Chair of SEAB Task Force on the Future of Science Programs

Genesis Mission: Transforming Science and Technology through AI

AI will be used to address grand challenges, ignite innovations, and drive unprecedented progress for national and global impact.

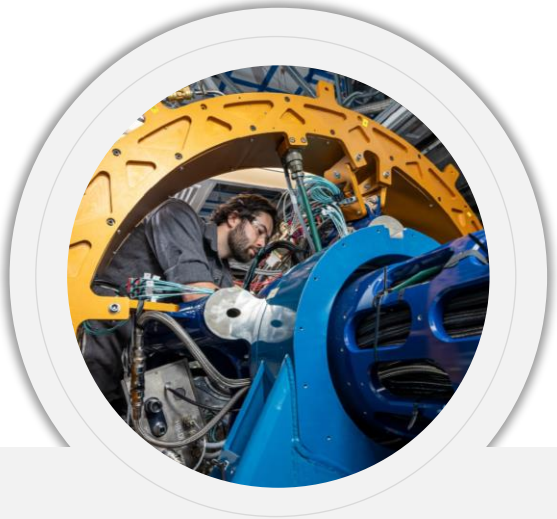


Energy Dominance

AI will be used to accelerate sustainable fusion power, optimize advanced nuclear reactor design and operation, and enable a more intelligent and resilient electrical grid.

Discovery Science

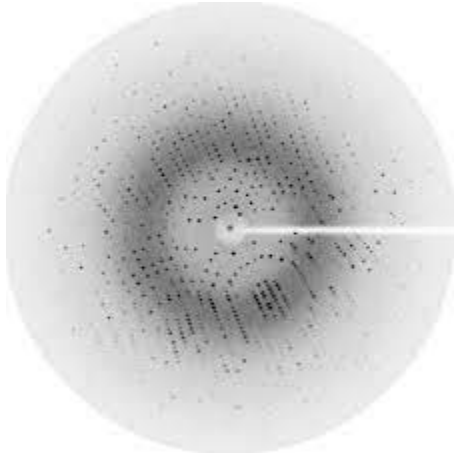
AI will be used to illuminate molecular dynamics, unify data to understand the universe from quarks to cosmos, and generate new quantum algorithms.



National Security

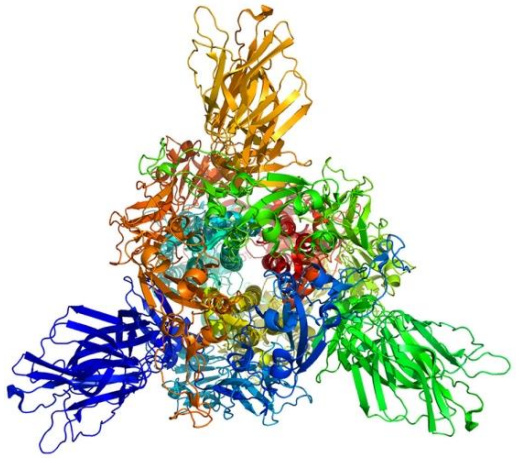
AI will be used to secure critical materials, accelerate advanced manufacturing, and discover mission-ready materials for defense and industry.

Computers revolutionized experimental science fifty years ago…



Pre-1970's
"1 Ph.D. thesis"
4-5 years

1970's - current
Weeks to Months

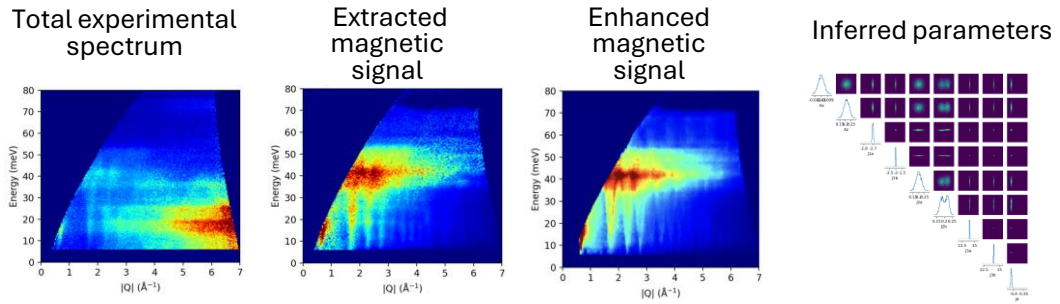


Future
Minutes - Hours

…the Genesis Mission will revolutionize the way we do science again

Quantum materials discovery

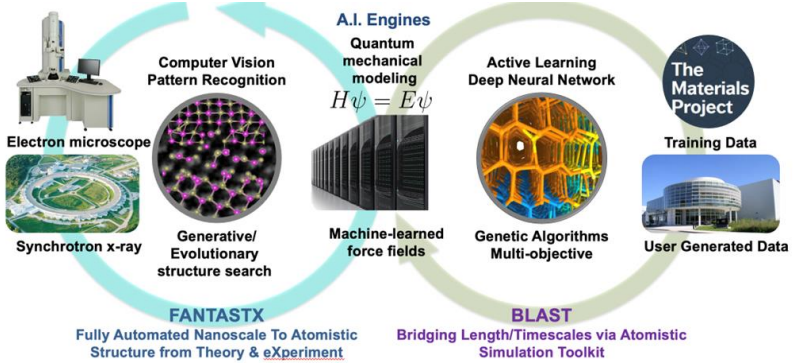
OAK RIDGE National Laboratory



Uses AI to propose solutions that align with multiple experimental data from light and neutron sources to determine how energy levels, dynamics, and properties emerge, reducing a process that once took months or years to just days or hours (>10× faster experiment-to-solution time)

Seeing, designing materials at the level of atoms

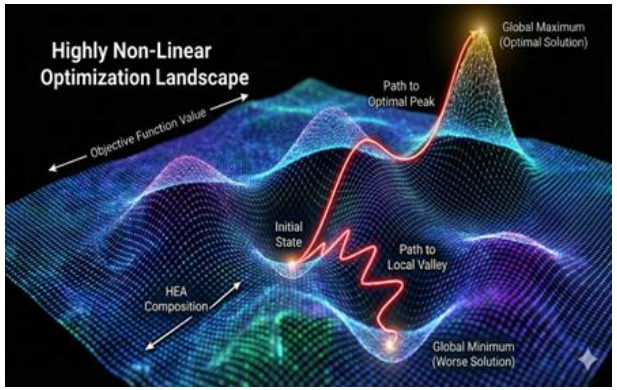
Argonne NATIONAL LABORATORY



Tight integration of physics-driven simulations with AI enable unprecedented atomic structure visualization and discovery acceleration.

AI for Materials Fracture Research

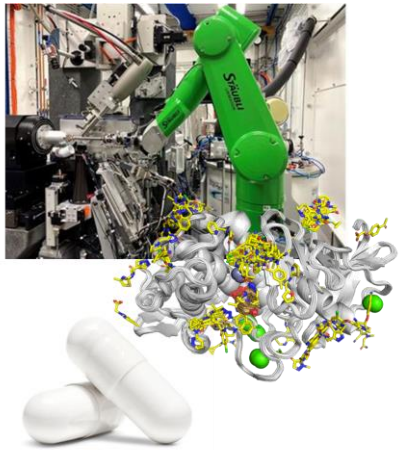
Los Alamos NATIONAL LABORATORY



- AI-guided workflow fuses literature mining, simulations, and optimization
- Robotically manufactured high-entropy alloys for testing and evaluation
- Accelerate discovery by increasing productivity and efficiency 100x.

Powering the Future of Biotechnology

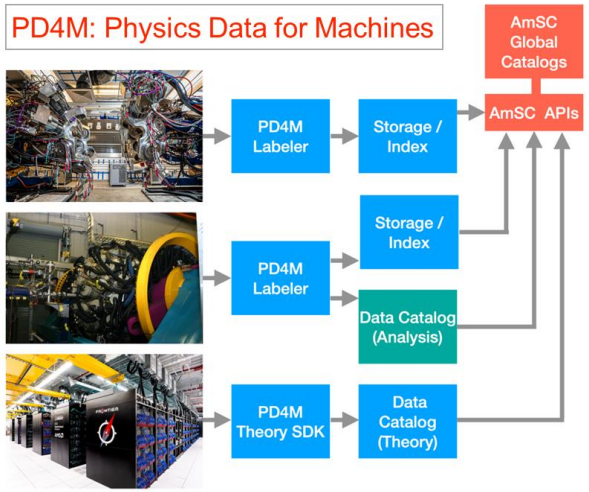
Brookhaven National Laboratory



- Integration of AI, robotics, and X-ray science into a continuously operating discovery platform
- 50% throughput increase in FY25 vs. FY24 (70,000+ samples/year), with a clear pathway to an additional 50% gain

PD4M : Advancing Nuclear Physics with Autonomous Data Labeling

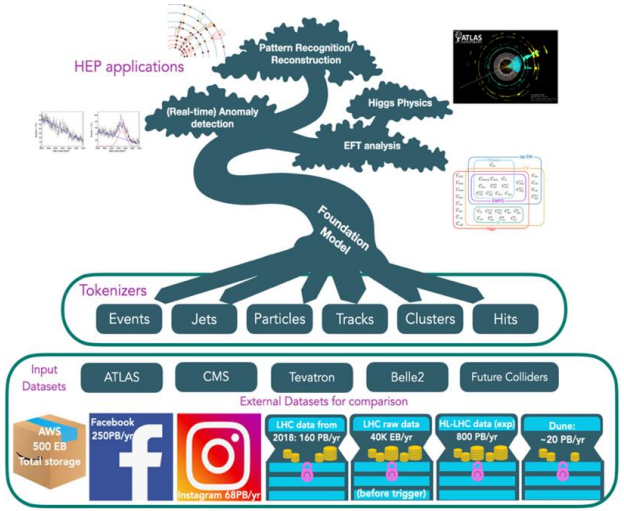
BERKELEY LAB



- Live data-taps on operational nuclear physics experiments to stream complete, fully-contextualized data autonomously at scale (~10 Gb/s current→ 1 Tb/s projected)
- Interface existing HPC-based nuclear theory codes to AmSC data catalogs
- Enables full utilizaitoin of data
- Accelerates analysis >10x

Cross-Experiment Discovery for Particle Physics

Fermilab

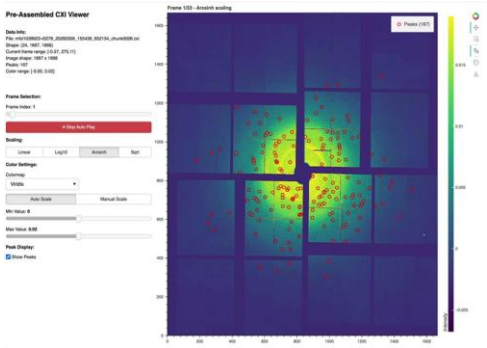


- Heterogeneous detector data is standardized and unified
- Physics-informed foundation models (e.g., hierarchical tokenization and pretraining) are developed to enable AI-driven reasoning across experiments

Accelerating Structural Biology with PeakNet

SLAC

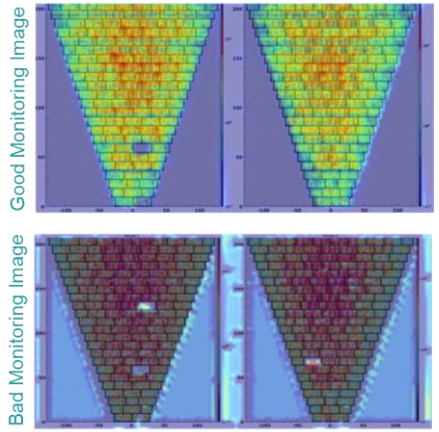
Real-time segmentation of Bragg Peaks



- Autonomous Learning: Adapts to real-time background fluctuations without manual tuning
- Scalable Architecture: Connects SLAC's data center to remote HPC to scale inference across remote HPC GPU/CPU
- Massive Training: Initially trained on 20,000 images with a roadmap to ingest 7 PB of LCLS data
- Yield higher (>72%) of indexable hits

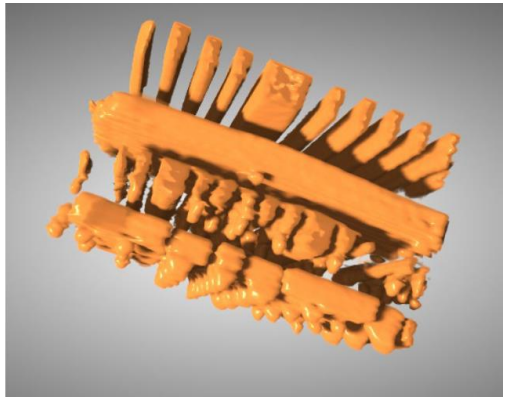
AI Data Quality Monitoring with Hydra

Jefferson Lab



- Train AI models to view monitoring plots to detect anomalies with high precision and at high rates
- Visually identify location of anomalies by inspecting inner layers of AI models
- Problems identified much quicker (minutes vs. hours) and much more consistently compared to current monitoring
- Allows scientists to focus on new data rather than operations

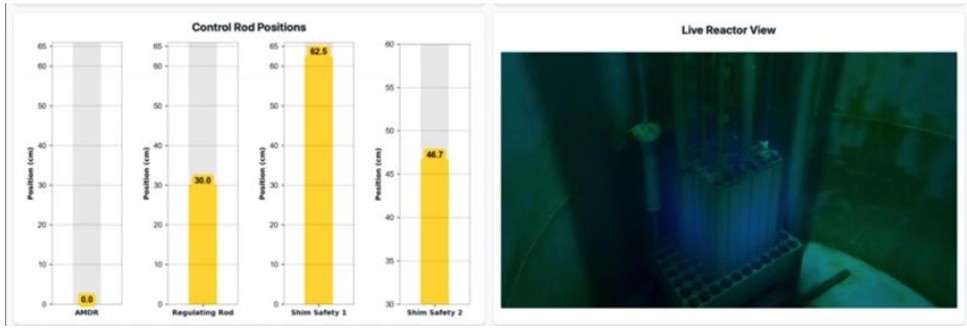
Scientific Imaging Beyond Current Limits



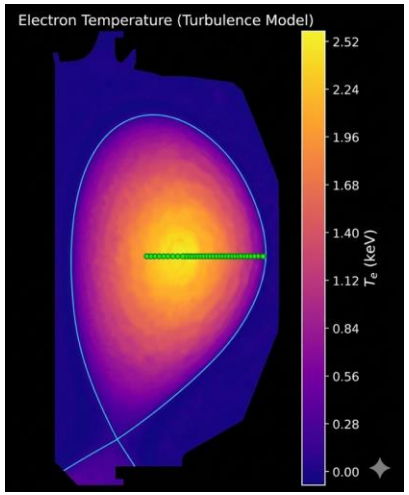
- Imaging tools are needed that go beyond current technical limits — extracting insight from incomplete data and integrating knowledge across techniques and disciplines.
- AI models trained on scientific data allow researchers to study materials and biological systems in real time while experiments are underway.
- 10x faster image reconstruction
- 10x reduction in data required

ACORN: Autonomous COntrol for Reactor techNologies

- Leverages physics- and data-driven model predictive control.
- Agnostic to reactor technologies.
- Demonstration planned at Purdue University Reactor One (PUR-1) and at INL's Neutron Radiography Reactor.

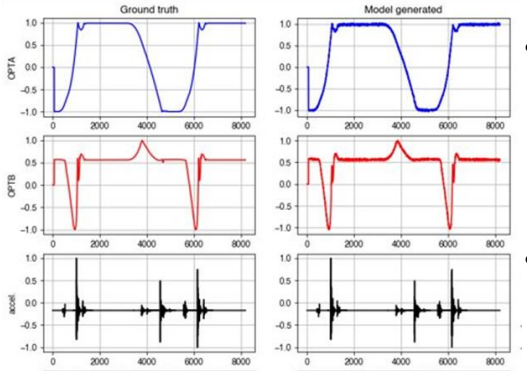


AI Foundation Models for Fusion Energy



- Ingest structured and unstructured data from experiments and codes
- Use spatiotemporal attention to capture long-range dependencies across data types
- Collaboration with PPPL, ORNL, NVIDIA and ANL in Fusion FM Seed project – early results by July

BANYAN: Scientific Foundation Models for National Security Applications



- Use a multi-modal (video plus sensor data) variant of a vision transformer to generate results of destructive tests (with non-destructive data)
- Use data from ~2k destructive tests for training

DOE is seeking input to engage the community

Request for Information for workforce development and partnerships

- Request for Information on Mobilizing Talent for the Genesis Mission and Developing an American Workforce to Advance Artificial Intelligence (AI) for Science and Engineering
- Sought input from educational institutions, private industry, philanthropic organizations, and others
- Received >240 responses—approximately 50% from academia, 25% industry, and 25% from other types of institutions, groups of researchers and individuals

Genesis Mission University / Science Philanthropy Summit

- Goal: Engage senior leaders across the US academic research enterprise to shape a shared vision, strategy, and approach to early Genesis Mission collaboration and partnerships
- Invitation-only event (February 18, 2026) brought >400 participants together with DOE senior leaders
- Discussed opportunities and perceived barriers to engage the Genesis Mission and charted forward-looking paths for strategic planning and community engagement