Overview of the Office of Science and Opportunities for International Collaboration

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Office of Science
DOE

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U.S. DEPARTMENT OF ENERGY | Office of Science

Energy.gov/science

U.S. DEPARTMENT OF ENERGY | Office of Science

The nation's largest supporter of basic research in the physical sciences

Principal roles:

- Direct support of scientific research
- Direct support of the development, construction, and operation of unique, open-access scientific user facilities available for use by external researchers

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.

More than **34,000 r**esearchers supported at more than **300** institutions and **17** DOE national laboratories

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

More than **37,000** users of **28** Office of Science scientific user facilities

$8.1B (FY 23 enacted)

U.S. DEPARTMENT OF ENERGY | Office of Science

Driving Discovery Science for the Nation

Discovery science supported by the Office of Science builds the foundation for ensuring America's future prosperity and competitiveness by addressing its energy, environment, and national security challenges.

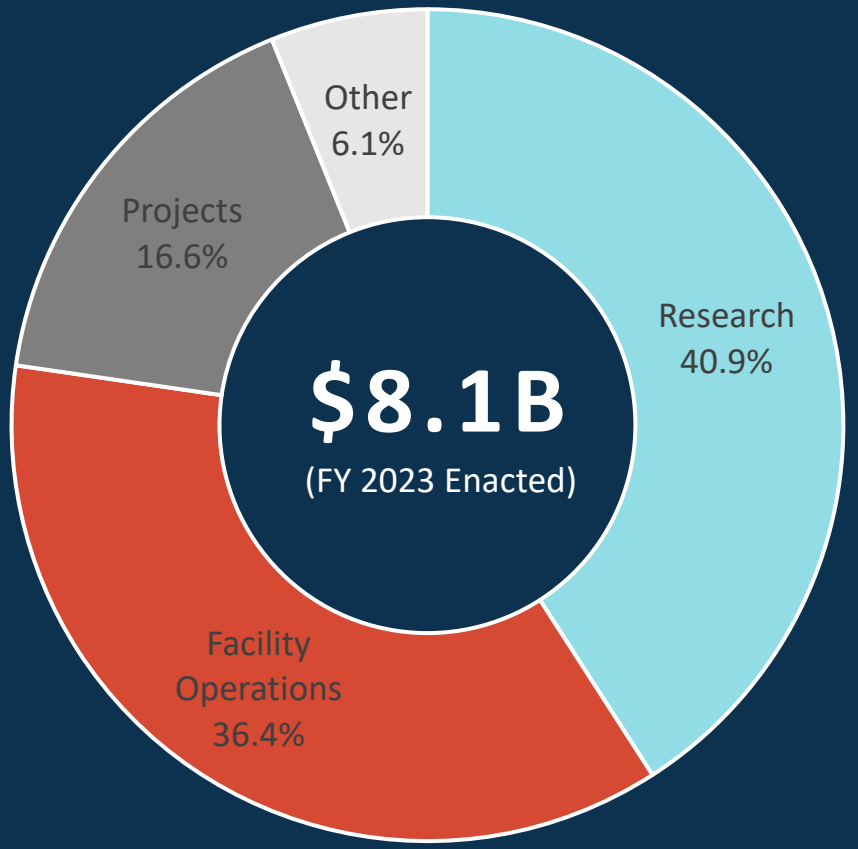
Fostering Great Minds and Great Ideas

The Office of Science addresses the world's most challenging scientific problems, supporting innovation from America's brightest minds, across multiple disciplines, and at universities, DOE's national laboratories, and other research institutions.

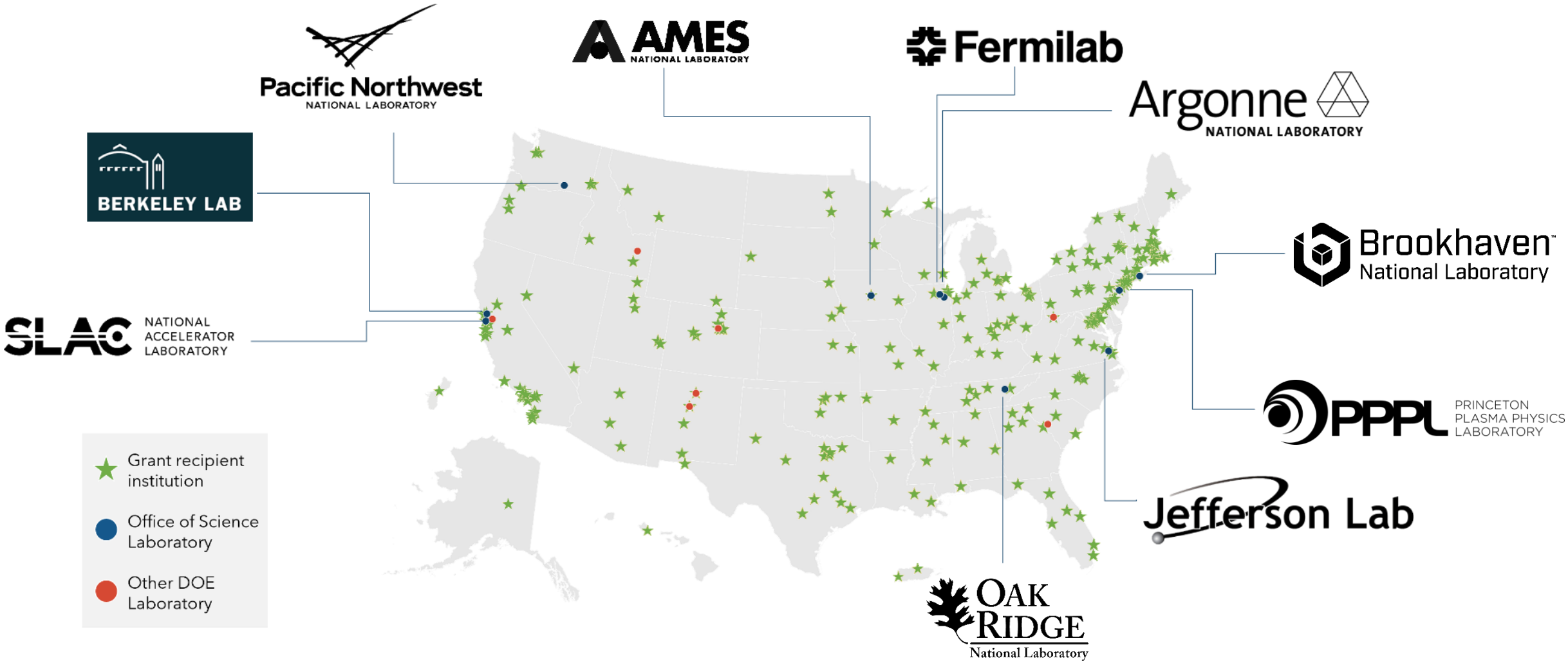
Providing Unique, World-Class Facilities

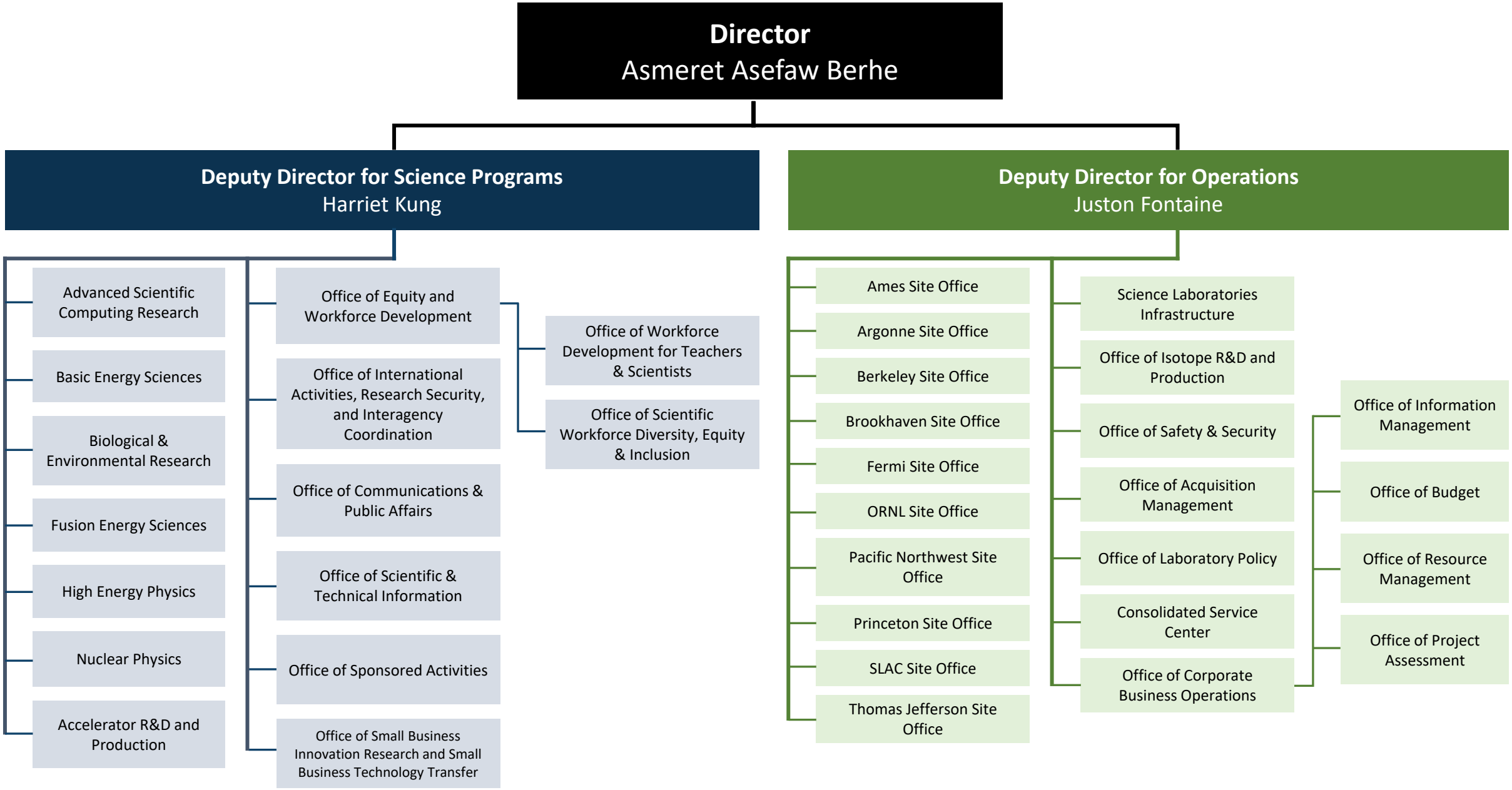
The Office of Science stewards a suite of scientific user facilities that provide the broad scientific community with world-leading capabilities for research - from physics, materials science, and chemistry to genomics and medicine.

Office of Science Budget



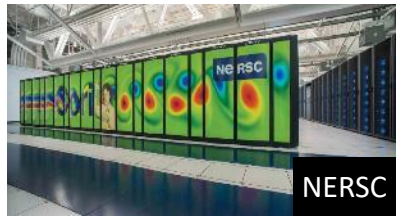
Where we are, who we support

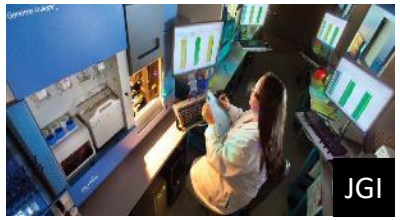


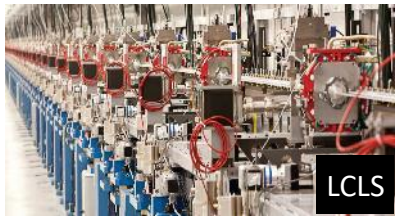

Director
Asmeret Asefaw Berhe
Deputy Director for Science Programs
Harriet Kung
Advanced Scientific Computing Research
Basic Energy Sciences
Biological & Environmental Research
Fusion Energy Sciences
High Energy Physics
Nuclear Physics
Accelerator R&D and Production
Office of Equity and Workforce Development
Office of Workforce Development for Teachers & Scientists
Office of Scientific Workforce Diversity, Equity & Inclusion
Office of International Activities, Research Security, and Interagency Coordination
Office of Communications & Public Affairs
Office of Scientific & Technical Information
Office of Sponsored Activities
Office of Small Business Innovation Research and Small Business Technology Transfer
Deputy Director for Operations
Juston Fontaine
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
Science Laboratories Infrastructure
Office of Isotope R&D and Production
Office of Safety & Security
Office of Acquisition Management
Office of Laboratory Policy
Consolidated Service Center
Office of Corporate Business Operations
Office of Information Management
Office of Budget
Office of Resource Management
Office of Project Assessment

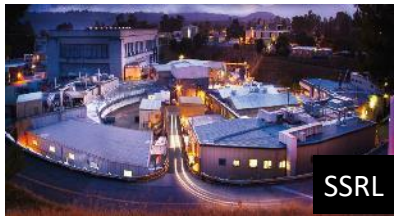
Office of Science User Facilities

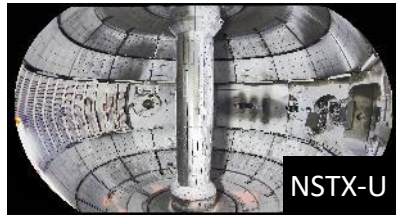
FY 2023
28 scientific
user facilities
>37,000 users

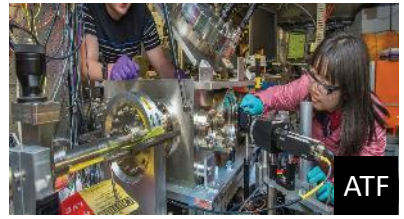






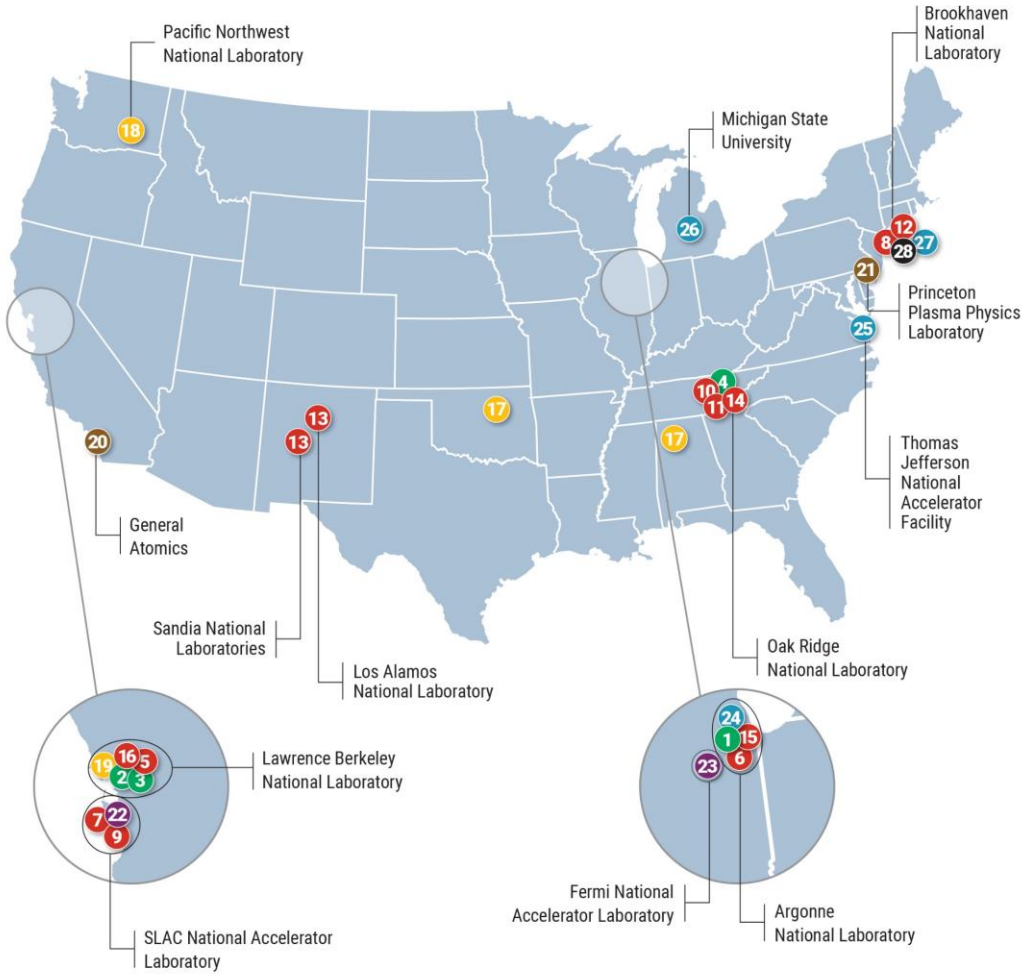






U.S. DEPARTMENT OF ENERGY
Office of Science

U.S. Department of Energy
Office of Science User Facilities



Advanced Scientific Computing Research (ASCR)

1. **Argonne Leadership Computing Facility (ALCF)**
   Argonne National Laboratory
2. **Energy Sciences Network (ESnet)**
   Lawrence Berkeley National Laboratory
3. **National Energy Research Scientific Computing Center (NERSC)**
   Lawrence Berkeley National Laboratory
4. **Oak Ridge Leadership Computing Facility (OLCF)**
   Oak Ridge National Laboratory

Basic Energy Sciences (BES)

LIGHT SOURCES

5. **Advanced Light Source (ALS)**
   Lawrence Berkeley National Laboratory
6. **Advanced Photon Source (APS)**
   Argonne National Laboratory
7. **Linac Coherent Light Source (LCLS)**
   SLAC National Accelerator Laboratory
8. **National Synchrotron Light Source II (NSLS-II)**
   Brookhaven National Laboratory
9. **Stanford Synchrotron Radiation Lightsource (SSRL)**
   SLAC National Accelerator Laboratory

NEUTRON SOURCES

10. **High Flux Isotope Reactor (HFIR)**
    Oak Ridge National Laboratory
11. **Spallation Neutron Source (SNS)**
    Oak Ridge National Laboratory

NANOSCALE SCIENCE RESEARCH CENTERS

12. **Center for Functional Nanomaterials (CFN)**
    Brookhaven National Laboratory
13. **Center for Integrated Nanotechnologies (CINT)**
    Sandia National Laboratories and Los Alamos National Laboratory
14. **Center for Nanophase Materials Sciences (CNMS)**
    Oak Ridge National Laboratory
15. **Center for Nanoscale Materials (CNM)**
    Argonne National Laboratory
16. **The Molecular Foundry (TMF)**
    Lawrence Berkeley National Laboratory

Biological and Environmental Research (BER)

17. **Atmospheric Radiation Measurement (ARM) User Facility**
    Fixed and Mobile Sites Across the Globe
18. **Environmental Molecular Sciences Laboratory (EMSL)**
    Pacific Northwest National Laboratory
19. **Joint Genome Institute (JGI)**
    Lawrence Berkeley National Laboratory

Fusion Energy Sciences (FES)

20. **DIII-D National Fusion Facility**
    General Atomics
21. **National Spherical Torus Experiment Upgrade (NSTX-U)**
    Princeton Plasma Physics Laboratory

High Energy Physics (HEP)

22. **Facility for Advanced Accelerator Experimental Tests (FACET)**
    SLAC National Accelerator Laboratory
23. **Fermilab Accelerator Complex**
    Fermi National Accelerator Laboratory

Nuclear Physics (NP)

24. **Argonne Tandem Linac Accelerator System (ATLAS)**
    Argonne National Laboratory
25. **Continuous Electron Beam Accelerator Facility (CEBAF)**
    Thomas Jefferson National Accelerator Facility
26. **Facility for Rare Isotope Beams (FRIB)**
    Michigan State University
27. **Relativistic Heavy Ion Collider (RHIC)**
    Brookhaven National Laboratory

Accelerator R&D and Production (ARDAP)

28. **Accelerator Test Facility (ATF)**
    Brookhaven National Laboratory

OFFICE OF SCIENCE BY THE NUMBERS

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

FY23

6 CORE SCIENCE PROGRAMS

- Advanced Scientific Computing Research
- Basic Energy Sciences
- Biological and Environmental Research
- Fusion Energy Sciences
- High Energy Physics
- Nuclear Physics

3 ENGINEERING AND TECHNOLOGY OFFICES

- Accelerator Research and Development and Production
- Isotope Research and Development and Production
- Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR)

5 NATIONAL QUANTUM INFORMATION SCIENCE RESEARCH CENTERS

ACROSS ITS 10 NATIONAL LABS, OFFICE OF SCIENCE MAINTAINS APPROXIMATELY

24 MILLION SQUARE FEET OF SPACE

1,600 BUILDINGS

38,000 ACRES OF LAND OWNED

SUPPORTS RESEARCH SPANNING

16 DOE NATIONAL LABS

50 STATES, GUAM, PUERTO RICO, AND WASHINGTON, D.C.

>310 UNIVERSITIES AND HIGHER-LEARNING INSTITUTIONS

4 BIOENERGY RESEARCH CENTERS

2 ENERGY INNOVATION HUB PROGRAMS

51 ENERGY FRONTIER RESEARCH CENTERS

STEWARDS 10 DOE NATIONAL LABORATORIES

3 World-Leading Supercomputers

ESTIMATED RESEARCHERS SUPPORTED

- **11,100** Permanent PhDs
- **3,400** Postdoctoral Associates
- **5,200** Graduate Students
- **9,700** Other Scientific Personnel

OVER 39,500 USERS AT 28 OFFICE OF SCIENCE FACILITIES

10 SITE OFFICES

1 CONSOLIDATED SERVICE CENTER

OVER 100 NOBEL PRIZES

$8.1 BILLION OVERALL OFFICE OF SCIENCE BUDGET

$918 MILLION USER FACILITY CONSTRUCTION

$281 MILLION SCIENCE LABORATORIES INFRASTRUCTURE

ENERGY earthshots
U.S. DEPARTMENT OF ENERGY

Clean Fuels and Products Shot

Long Duration Storage Shot

Carbon Negative Shot

Hydrogen Shot

Industrial Heat Shot

Enhanced Geothermal Shot

Floating Offshore Wind Shot

ENERGY earthshots
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Hydrogen

1 Dollar

1 Kilogram

1 Decade

ENERGY earthshots | Storage™
U.S. DEPARTMENT OF ENERGY

Reduce storage costs by **90%** from a **2020** Li-ion baseline

In storage systems that deliver **10+** hours of duration

1 decade

ENERGY earthshots
U.S. DEPARTMENT OF ENERGY

Carbon Negative™

<100 Dollars

1 Ton

1 Decade

ENERGY earthshots
U.S. DEPARTMENT OF ENERGY

Enhanced Geothermal™

90% Reduction

2035

ENERGY earthshots
U.S. DEPARTMENT OF ENERGY

Floating Offshore Wind™

>70% Reduction

2035

ENERGY earthshots U.S. DEPARTMENT OF ENERGY | Industrial Heat™

85% Reduction

2035

ENERGY earthshots U.S. DEPARTMENT OF ENERGY | Clean Fuels & Products™

CO_2

>85% Reduction

2035

Promoting International Engagement

- We promote and facilitate Office of Science (SC) international partnerships. This entails:
  - Information sharing with international partners;
  - Facilitating meetings;
  - Negotiating international agreements; and
  - Participating in meetings such as JCMs.
- Our international engagements span information exchanges to the development of large research infrastructures.

Mechanisms that Enable International Engagement

- Agreements and Statements
  - Exchange of Letters; Statements of Intent
  - Laboratory-to-Laboratory Memoranda of Understanding
  - Laboratory International Cooperative Research and Development Agreements (*iCRADAs*) and Strategic Partnership Projects (*SPPs*)
  - Implementing Arrangements/Agreements that are subsidiary to S&T Agreements and facilitate long-term collaboration in e.g.:
    - Data sharing; Instrumentation development; Equipment exchange; Scientist visits
- Information exchanges (e.g. meetings and workshops)

SC collaboration with international partners reflects the following characteristics:

- Scientist-driven motivation
- Alignment with Administration priorities
- Community engagement and buy-in. Often validated via peer review.
- Mutual benefit
  - Parity in intellectual and financial contributions
- Mutual respect of intellectual property rights, openness and transparency
- Often facilitated by government-to-government agreements
  - Express shared expectations on intellectual property, access, funding, etc.
- Use of rigorous project management, where appropriate
- For peaceful purposes

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THANK YOU!