Basic Energy Sciences (BES) Office Hour

Funding Opportunity Announcements and Proposal Writing Tips

June 20, 2024

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Program Managers

Office of Basic Energy Sciences

U.S. DEPARTMENT OF ENERGY | Office of Science

Energy.gov/science

https://science.osti.gov/bes/mse/

Outline

- Introduction
  - DOE and the Office of Science
  - Office of Basic Energy Sciences
- Funding Opportunity Announcements
- Proposal Writing Tips
- Q&A and Discussion

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)

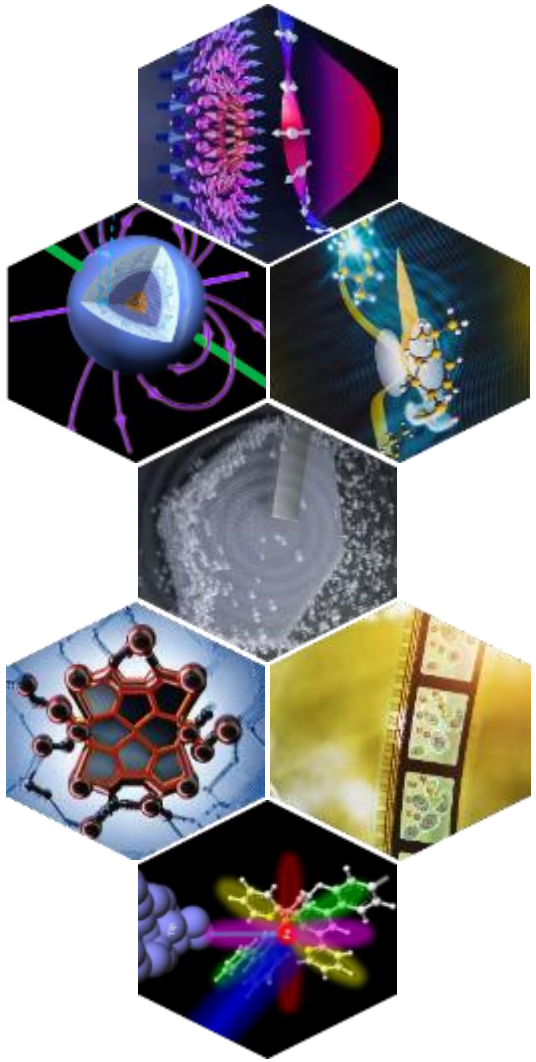
The Office of Science Research Portfolio

Advanced Scientific Computing Research	• Delivering world leading computational and networking capabilities to extend the frontiers of science and technology
Basic Energy Sciences	• Understanding, predicting, and ultimately controlling matter and energy flow at the electronic, atomic, and molecular levels
Biological and Environmental Research	• Understanding complex biological, earth, and environmental systems
Fusion Energy Sciences	• Supporting the development of a fusion energy source and supporting research in plasma science
High Energy Physics	• Understanding how the universe works at its most fundamental level
Nuclear Physics	• Discovering, exploring, and understanding all forms of nuclear matter
Isotope R&D and Production	• Supporting isotope research, development, production, processing and distribution to meet the needs of the Nation
Accelerator R&D and Production	• Supporting new technologies for use in SC's scientific facilities and in commercial products

Basic Energy Sciences: Understanding Matter and Energy at Electronic, Atomic, and Molecular Levels

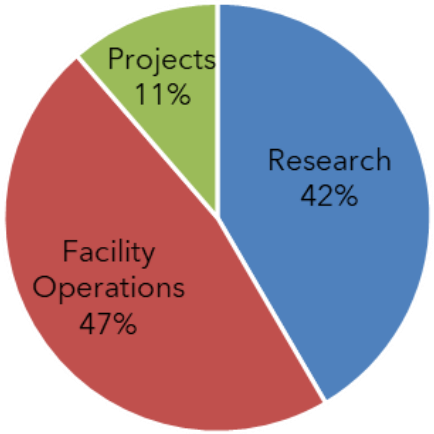
BES fulfills its mission through:

- Supporting **basic research in Chemical Sciences, Materials Sciences, Geosciences, and Biosciences**
  - "Grand Challenge" science
  - Discovery and design of materials and chemical processes that underpin a broad range of energy technologies
- Operating **world-class scientific user facilities** in X-ray, neutron, and nanoscale science
- Managing **construction and upgrade projects** to maintain **world-leading** scientific user facilities
- Ensuring **broad participation** in the research portfolio and user communities



Basic Energy Sciences – Organization

FY 2024 Appropriation $2.6B



Office of Basic Energy Sciences
Andy Schwartz
Acting Associate Director

* Established April 2023; staffing underway

Materials Sciences and Engineering Division
Andy Schwartz, Director

- Materials Discovery, Design and Synthesis
- Condensed Matter and Materials Physics
- Scattering and Instrumentation Sciences

Scientific User Facilities Division
Andy Schwartz, Acting Director

- X-ray and Neutron Scattering Facilities
- Nanoscale Science Research Centers
- Accelerator and Detector Research
- Construction & Major Item of Equipment Projects

Chemical Sciences, Geosciences and Biosciences Division
Gail McLean, Director

- Fundamental Interactions
- Photochemistry and Biochemistry
- Chemical Transformations

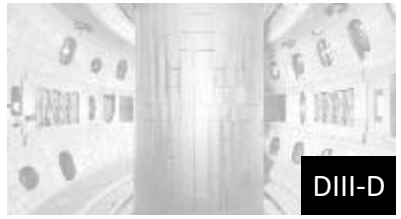
Collaborative Research Division*
Gail McLean, Acting Director

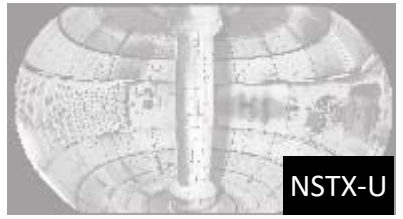
- Energy Frontier Research Centers
- Energy Earthshot Research Centers
- Energy Innovation Hubs
- Cross-SC Coordination

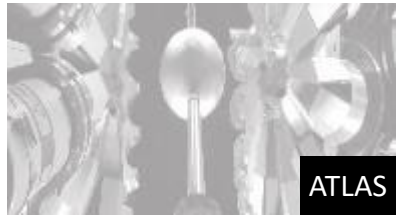
Research grouped by scientific topics, each impacting many energy technologies

Basic Energy Sciences User Facilities

2 Neutron Sources
5 X-ray Light Sources
5 Nanoscale Science Research Centers





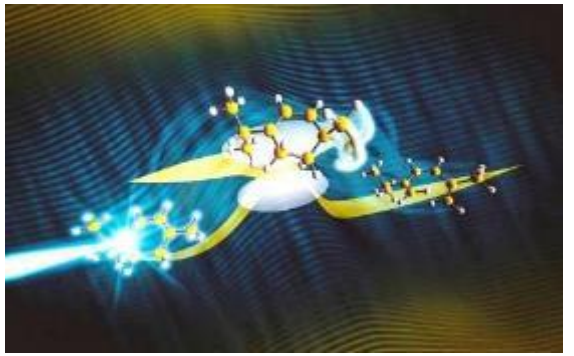


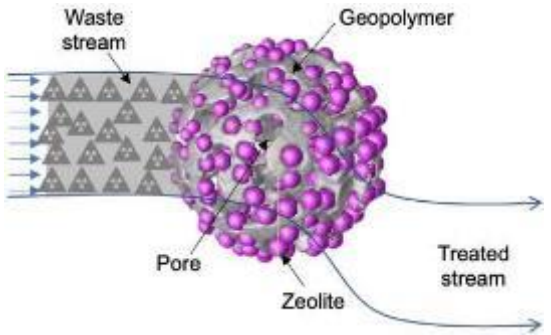
U.S. DEPARTMENT OF ENERGY
Office of Science

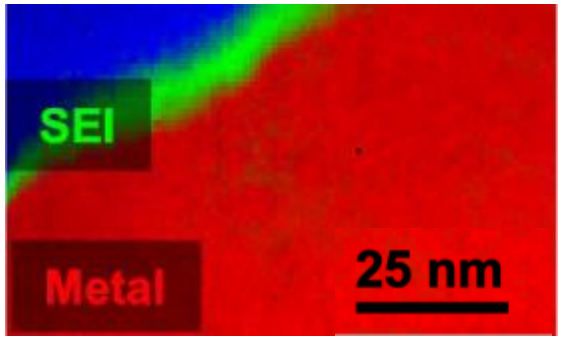
Fundamental Research is Supported in Each of the Major BES Research Modalities

Increasing scope and size

- **Core Research (>1500 awards)**
  - Supports single investigators (~ $170K+/year) & small groups ($500K-$2M/yr, 3-yr)
  - Fundamental materials & chemical sciences research
  - Includes SC Early Career Research Program awards (5-yr awards, separate FOA)
- **Energy Frontier (EFRC) & Energy Earthshot Research Centers (EERC), Computational Science Centers (CMS/CCS)**
  - Supports larger teams ($2-5M/yr, 4-yr)
  - Fundamental, use-inspired research per Basic Research Needs Workshop reports
- **Energy Storage & Fuels from Sunlight Energy Innovation Hubs; Quantum Information Sciences Centers**
  - Large-team research awards ($8-25M/yr, 5-yr)
  - Fundamental research on topics that have proven challenging for traditional funding modalities
  - Defined research goals, milestones, and management

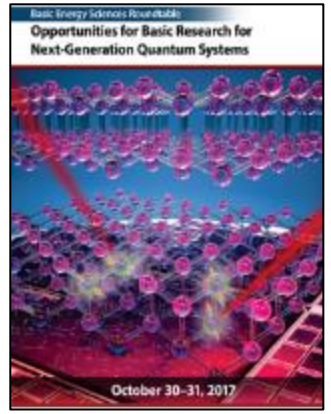


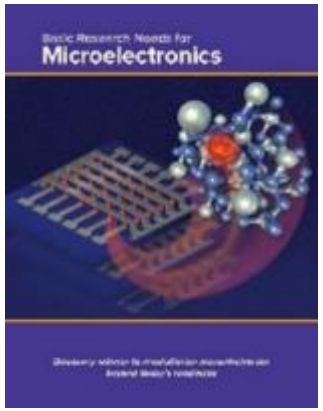




Current Research Priorities in BES

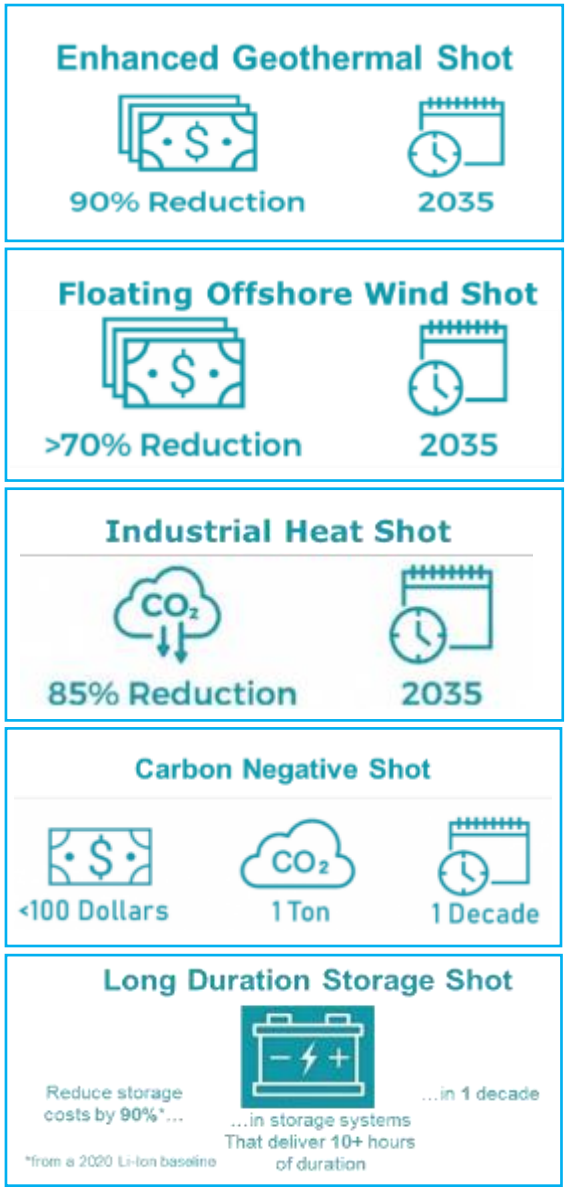
- Science in support of **clean energy and sustainable manufacturing**
  - Supported by strategic planning and cross-DOE initiatives, including Energy Earthshots
  - Strategic planning reports in recent years include hydrogen, carbon dioxide removal, solar fuels, microelectronics, manufacturing, nuclear energy
- Science addressing **national priorities**
  - Quantum Information Science (QIS), including National QIS Research Centers
  - Microelectronics
  - Data, artificial intelligence, and machine learning
  - Accelerate transition of science advances to technologies
- Forefront science in **core research foundations** (assessed annually)
  - BESAC charge to provide advice on prioritization strategies
- Support to **broaden participation** in research
  - Early Career, EPSCoR, RENEW, and FAIR





SC Energy Earthshots FY 2023 Funded Award Announcements
(BES, BER, ASCR)

- SC announced 29 awards totaling ~$264M for 3- to 4-year awards under the SC Energy Earthshots Initiative that address key scientific challenges that underpin the stretch goals for the first 6 DOE Energy Earthshots.
  - Closely coordinated with the Energy Technology Offices.
- BES awards supported 8 Energy Earthshot Research Centers (EERCs).
  - Large multi-investigator, multi-disciplinary, and multi-institution (academic, national lab, industrial) teams to advance foundational knowledge and enabling capabilities to address Earthshot goals.
- BES supported 9 foundational science, small group awards.
  - Focus on use-inspired fundamental research to address knowledge gaps that limit achievement of the Energy Earthshot goals.



https://www.energy.gov/policy/energy-earthshots-initiative

BES Participates in SC Programs to Broaden Participation

RENEW

Reaching a New Energy Sciences Workforce

FAIR

Funding for Accelerated, Inclusive Research

EPSCoR

DOE Established Program to Stimulate Competitive Research (EPSCoR)

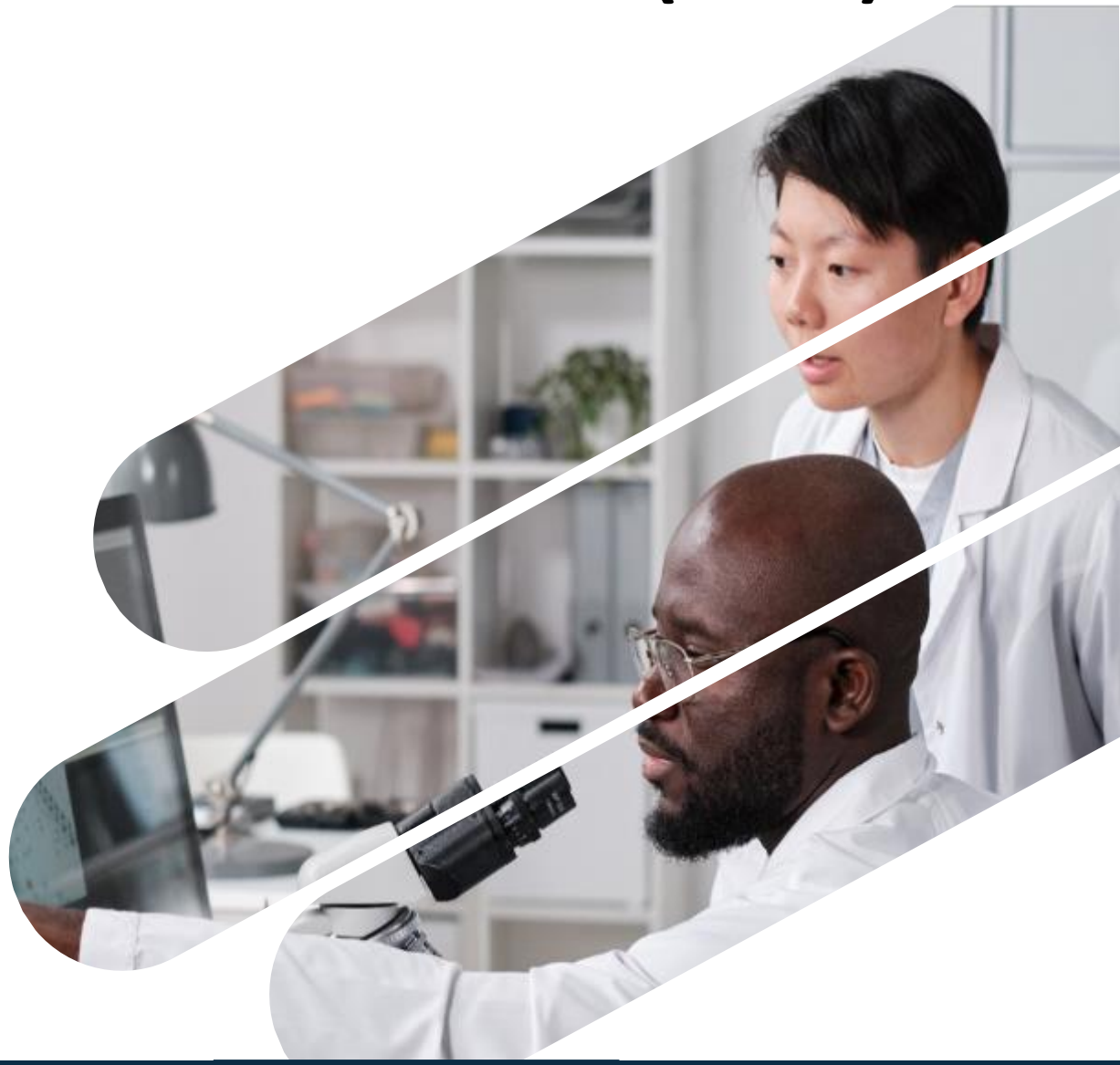
Reaching a New Energy Sciences Workforce (RENEW)

- Build foundations for students in Office of Science research
- Leverage our national laboratories, user facilities, and research infrastructure to provide training opportunities
- Participate in program research meetings and professional development events
- In FY23, Department of Energy Awarded $70 Million in Training Opportunities for Students and Faculty from Historically Underrepresented Institutions

https://science.osti.gov/initiatives/RENEW

Funding for Accelerated, Inclusive Research (FAIR)

- Building research capacity, infrastructure, and expertise at institutions historically underrepresented
- Includes minority serving institutions (MSIs) and emerging research institutions (ERIs)
- Supporting mutually beneficial relationships between MSIs and ERIs with partnering institutions
- Department of Energy Awarded $37 Million to Build Research Capacity in Historically Underrepresented Institutions



https://science.osti.gov/initiatives/FAIR

BES Funding Opportunities

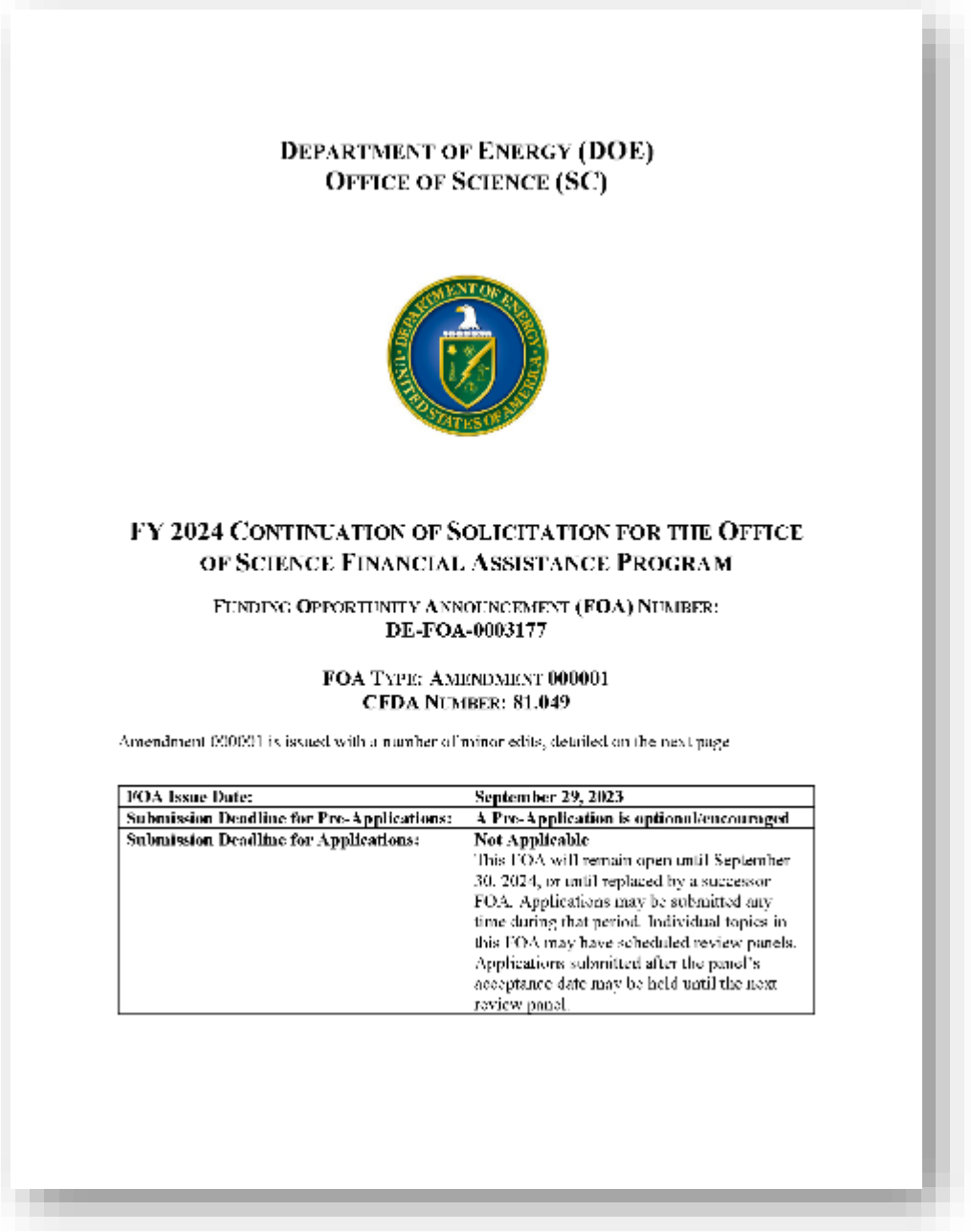
Continuation of Solicitation for the Office of Science Financial Assistance Program (annual “Open Call”)

The annual, broad, open solicitation that covers all research areas in the Office of Science and is open throughout the Fiscal Year

For BES, the solicitation includes brief descriptions of 24 core research areas, with current priorities/areas of interest and contact information for program managers (contacting program managers is encouraged).

BES identifies the following “**overarching research priorities**” relevant to multiple core research areas for the Open Call:

- Fundamental Science to Enable Clean Energy
- Critical Materials/Minerals
- Fundamental Science to Transform Processing and Fabrication
- Artificial Intelligence and Machine Learning (AI/ML)



DEPARTMENT OF ENERGY (DOE)
OFFICE OF SCIENCE (SC)

FY 2024 CONTINUATION OF SOLICITATION FOR THE OFFICE OF SCIENCE FINANCIAL ASSISTANCE PROGRAM

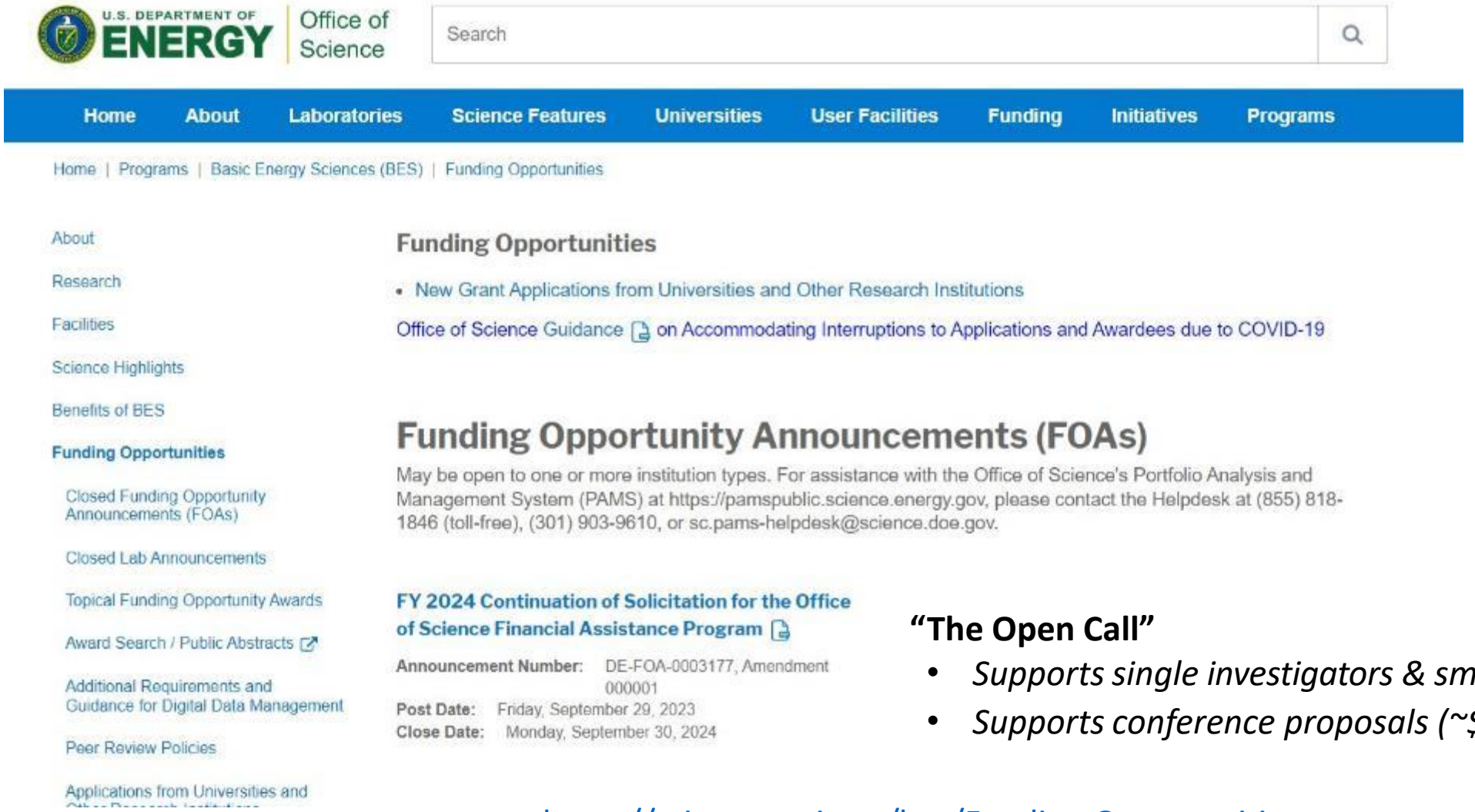
FUNDING OPPORTUNITY ANNOUNCEMENT (FOA) NUMBER:
DE-FOA-0003177

FOA TYPE: AMENDMENT 000001
CFDA NUMBER: 81.049

Amendment [000001] is issued with a number of minor edits, detailed on the next page

FOA Issue Date:	September 29, 2023
Submission Deadline for Pre-Applications:	A Pre-Application is optional/encouraged
Submission Deadline for Applications:	Not Applicable This FOA will remain open until September 30, 2024, or until replaced by a successor FOA. Applications may be submitted any time during that period. Individual topics in this FOA may have scheduled review panels. Applications submitted after the panel's acceptance date may be held until the next review panel.

BES Funding Opportunity Announcements (FOA)



"The Open Call"

- *Supports single investigators & small groups*
- *Supports conference proposals (~$5-$10 K).*

https://science.osti.gov/bes/Funding-Opportunities

Strategic Directions are Reflected in FOAs and Program Descriptions

- Annual funding opportunity announcement ("open call") is updated to reflect programmatic emphasis and topical areas that will not be supported or that are being de-emphasized.
- Examples:
  - **Biomolecular Materials**: An area of emphasis will be activities to understand and control assembly mechanisms to seamlessly integrate capabilities developed for one length scale across multiple length scales as the material is constructed.
  - **Mechanical Behavior and Radiation Effects**: There will be an increased emphasis in the program on research to understand defect evolution in materials in radiation environments.
  - **Condensed Phase and Interfacial Molecular Science (CPIMS):** For fiscal year 2024, the CPIMS program seeks increased emphasis in Systems Chemistry, for which energy is provided to dissipative systems at the molecular level, seeking to understand how interacting molecular networks can lead to emergent reactive behavior.
  - **Catalysis Science**: This program does not support: (1) the study of transformations appropriate for pharmaceutical applications; (2) non-catalytic stoichiometric reactions; (3) whole cell or organismal catalysis; (4) studies where the primary focus is photochemistry or photophysics; and (5) studies primarily focused on process or reactor design and optimization.
- Additional information is included in the annual budget submission and on the BES web page for each program

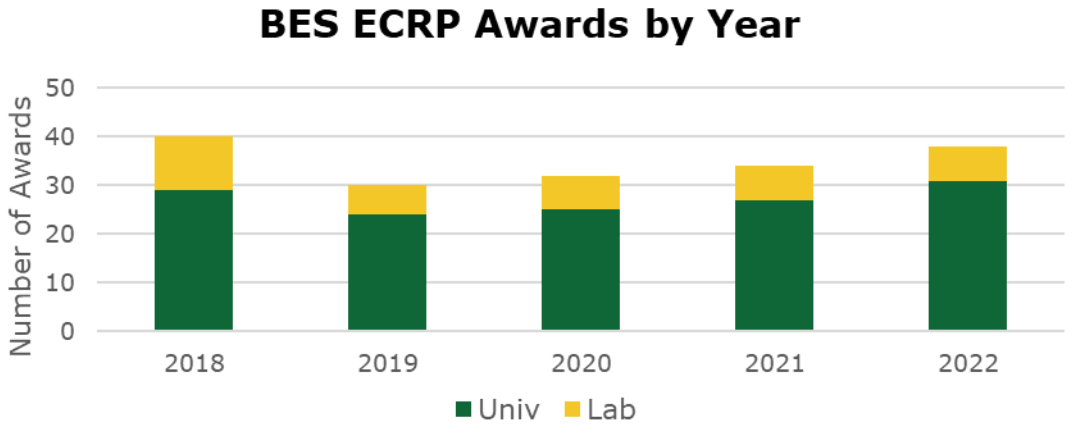
Topical FOAs, such as Early Career, use proposal deadlines but dates are not available until the FOA is released

Office of Science Early Career Research Program

- University and National labs eligible:

  Eligibility: Within 12* years of receiving a Ph.D. (likely reverting to 10 years in future), either untenured academic assistant or associate professors on the tenure track or full-time DOE national lab employees
- No co-PIs.
- A PI can submit one proposal per competition.
- A PI cannot participate more than three times.
- 5-Yr Awards: University grants $175,000/yr min., National lab awards $550,000/yr min. (typical requests)

https://science.osti.gov/early-career



Proposal submission encouraged or not encouraged after internal ***review of pre-applications***:

- Conducted by individual PMs or by 3 PMs chosen for their topical knowledge and diversity of perspective;
- Comparative reviews compare pre-applications within a topical field with priority given to scientifically innovative and forward-looking basic research with the highest likelihood of success as a full application

Additional BES FOAs in FY24

- **FAIR FOA**: Funding for Accelerated, Inclusive Research on topics that cross the Office of Science, supports capacity building research at non-R1 minority serving institutions (MSI) and emerging research institutions (ERI), including partnering with DOE National Laboratories and facilities and R1 MSI/ERI.
- **RENEW FOA**: The SC-wide Reaching a New Energy Science Workforce initiative leverages SC's world-unique National Laboratories and user facilities to provide internships for students at academic institutions currently underrepresented in the research portfolio.
- **EPSCoR FOA**: Funding for U.S. states and territories that do not have large federally-supported academic research programs.
- **Energy Frontier Research Centers (EFRCs)**: Fundamental team science. Supports larger teams ($2-4M/yr, 4-yr).

Broadening Participation

- **Applications are always encouraged from:**
  - New institutions
  - Institutions without current SC awards
  - Minority-serving institutions
  - Predominantly-undergraduate institutions
  - New investigators
  - Investigators from populations underrepresented in the SC portfolio

- Program managers are always available to discuss research concepts, opportunities to submit proposals, or ways to form new collaborations

If you want to submit a proposal to a BES core program:

- BES uses the “open call” to solicit proposals for its core programs
  - Open call is a continuous process (no fixed deadline for submission)
  - Single PI and multiple PI teams are allowed
  - Reviews take 4 – 6 months to complete
  - Awards are made based on strength of the merit review and available resources
  - Proposals may be held up to one year for consideration for funding
- Proposal/Review Process
  - Contact program manager, preferably by email, to discuss research ideas
  - White papers/pre-proposals are encouraged but not required for academic research
  - All proposals are peer reviewed
  - Anonymous reviewer comments are available to the PI once funding recommendations are made
  - Review process is not a consensus review meaning there is no review/panel summary
- Funding levels
  - Peer review will assess requests versus research needs (10 CFR 605)
  - Typical academic awards support 1 summer month for the PI plus students/postdoc
- Delineation from other grants
  - Separate research proposals that can “stand alone” with respect to research output

General Grant Writing Tips

- Read the FOA closely
  - Check eligibility rules and due dates (for topical FOAs)
  - Consider program descriptions and priorities in regard to your idea
  - Consider relevance of the proposed research for the program and DOE
  - Check whether a preapplication or letter of intent is required or encouraged
  - Propose hypothesis-driven fundamental science for core programs
- Learn what kinds of research the program has funded previously
  - Abstracts of funded research on DOE website
  - PI meeting books for BES programs also available on the website
- Contact the program manager listed in the FOA for the program
  - Email the program manager to see if a white paper is requested and/or whether your topic is a fit for the program
  - Volunteer to review proposals for BES

General Grant Writing Tips continued

- Plan ahead -- start writing early
- Keep review criteria in mind when writing the proposal
- Ensure that the key points are clearly articulated and obvious to the reader
- Reach out to colleagues and mentors during the writing process for feedback before you submit
  - Ask a colleague in your technical area to provide comments on clarity and logic, including the research plan and methodology
  - Ask a colleague outside your specific research area to review the proposal for clarity, logic, and significance
  - Try to obtain examples of successful BES proposals from your mentors and colleagues
  - If the proposal is a revision of a previously declined proposal, make sure you have considered the reviewers' concerns from the unsuccessful proposal
- Check grammar, spelling, formatting, and completeness
  - Ensure that you have followed the requirements for formatting (font, margins, page limits, etc.)
  - Check the document for consistent formatting and inclusion of all required components
- Contact the technical contact listed in the FOA if you have questions

Characteristics of Successful Proposals

- Easy to read and well-organized
- Objectives and rationale clearly fit the program and convince the reviewer of the need for the research
- Research plan is realistic for timeframe, personnel, and budget – not overly ambitious
- Analyzes the literature to establish the foundation for the research and helps the reader identify the gaps in understanding that need to be addressed
- Communicates the importance and potential impact of the work as well as its relevance to the program
- Sufficient preliminary data to support the goals and feasibility of the planned research
- Appropriately detailed research plan
  - Discussion of potential pitfalls and alternative approaches
  - Not too much technical detail but not too vague either - colleague input can be particularly helpful
- Research team with appropriate expertise; if a new area for the PI, collaborators can bring in the needed expertise

BES Oversight of Awards

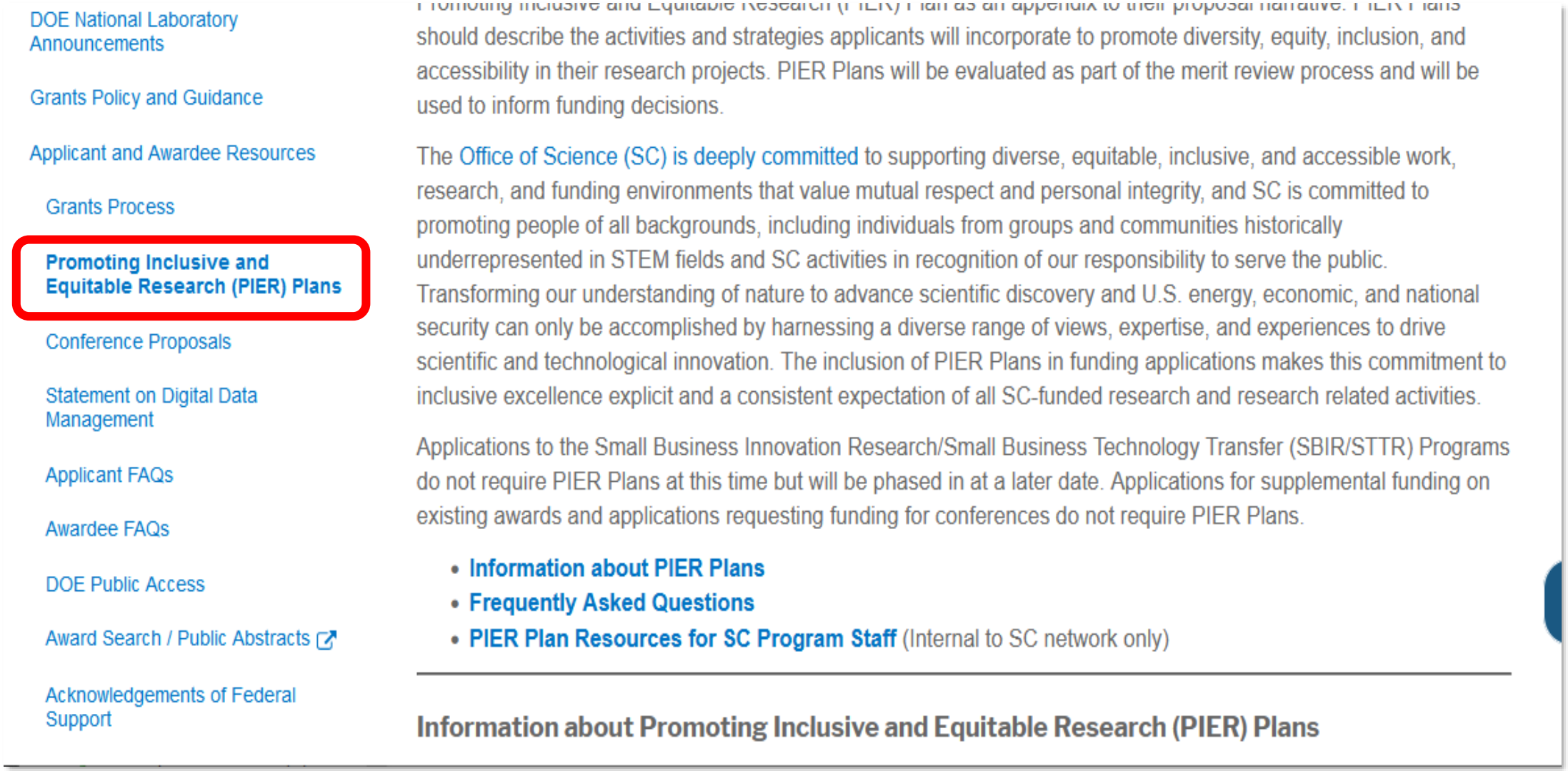
- BES Program Managers use a variety of mechanisms to monitor active research projects
  - Annual Reports (submitted 3 months prior to end of each budget period)
  - Research Highlights (PIs asked to use a standardized highlight template)
  - Principal Investigator Meetings (held annually/biennially for each BES program)
  - Large multidisciplinary, multi-institutional team awards such as EFRCs and Hubs may include management reviews, mid-term reviews, and on-site scientific visits/reviews
- Most BES awards are eligible to submit renewal proposals
  - One exception: 5-year Early Career Awards are not renewable but may submit a new proposal to the core program to continue Early Career-related research
  - Discussion with program manager is encouraged before submission of a renewal proposal
  - If progress has been slow and productivity low, a no-cost extension may be appropriate
  - Renewal proposals typically due at least six months prior to end of current award period

SC Requirements for Proposals

- **PIER Plans:** All FOAs, DOE National Lab Announcements, and other funding solicitations require applicants to submit a **Promoting Inclusive and Equitable Research (PIER) Plan** as an appendix to their proposal narrative.
  - To aid in assessment of PIER Plans, merit review includes a standard criterion: "Quality and Efficacy of the Plan for Promoting Inclusive and Equitable Research".
- **Conference Proposals**: For applications to SC requesting funds to support a conference, the host organizations of the conference must have an established **code of conduct or policy** in place that addresses discrimination and harassment, including sexual harassment, other forms of harassment; and must include a **recruitment and accessibility plan** for speakers and attendees that includes discussion of recruitment of individuals from groups historically underrepresented in the research community.

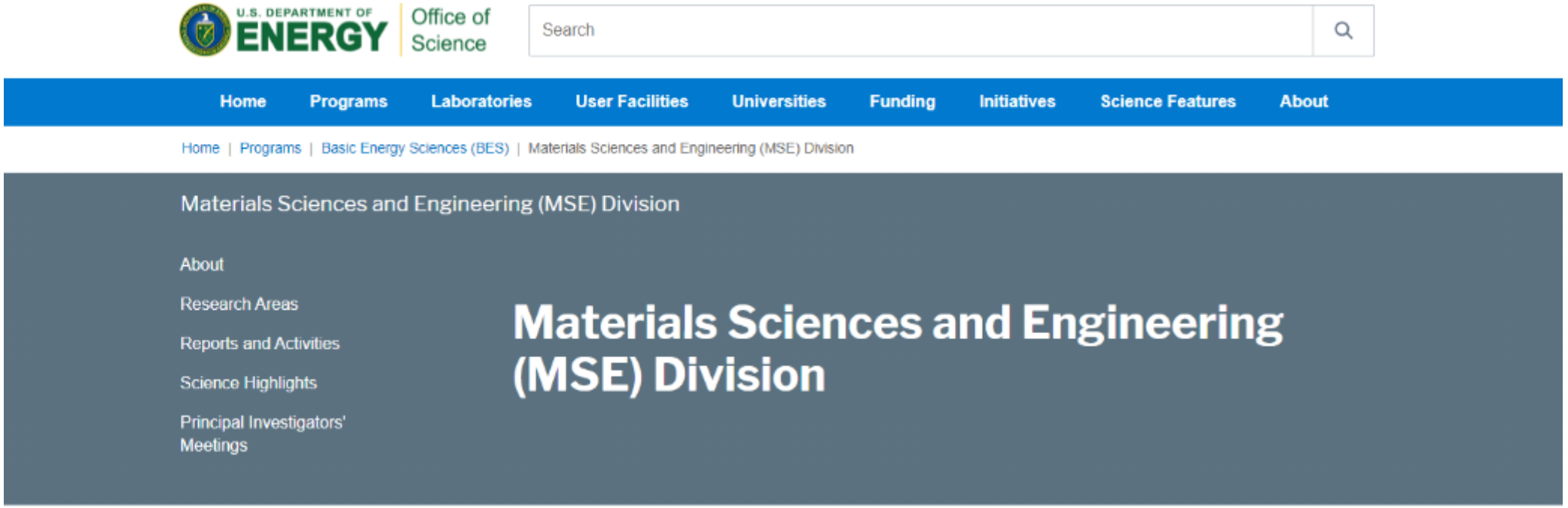
Where to find more information

Informational Resources are available on the SC Website



https://science.osti.gov/grants/Applicant-and-Awardee-Resources

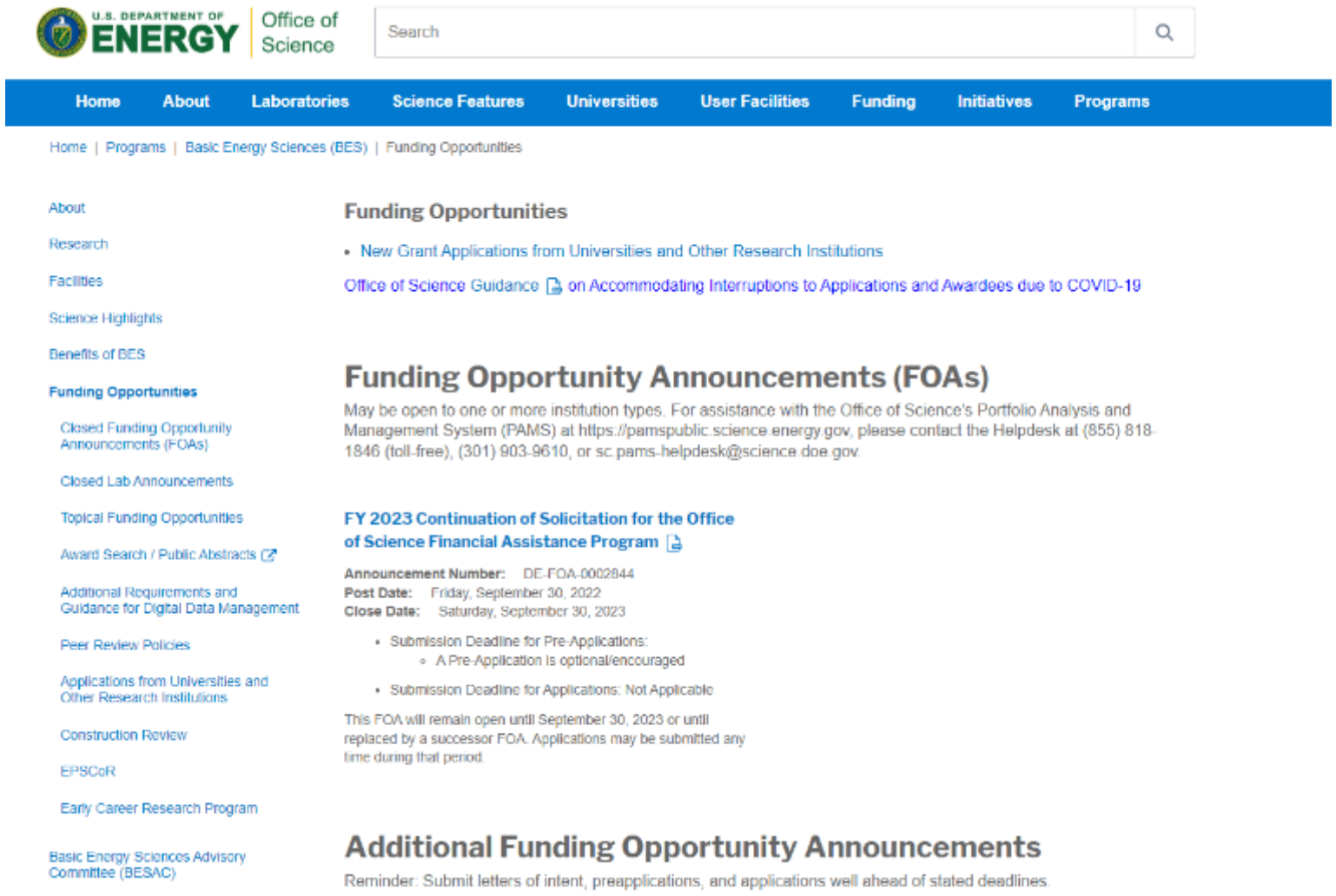
Check BES Research Division Webpages



- Descriptions of all core research areas (funding programs)
- Abstract books from Principal Investigator Meetings
- Contact information for Program Managers

https://science.osti.gov/BES/MSE OR https://science.osti.gov/BES/CSGB

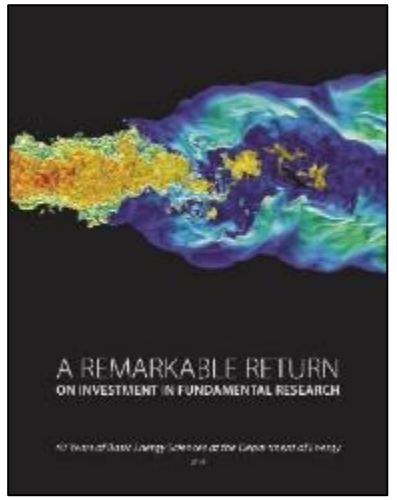
BES Funding Opportunity Announcements Webpage

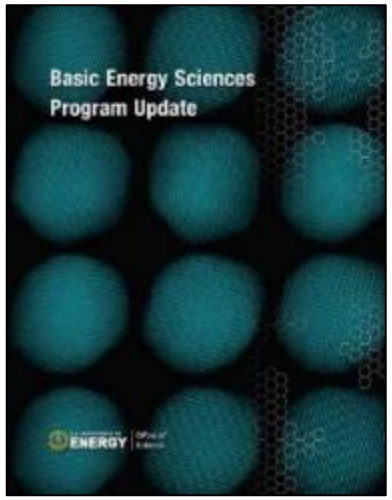


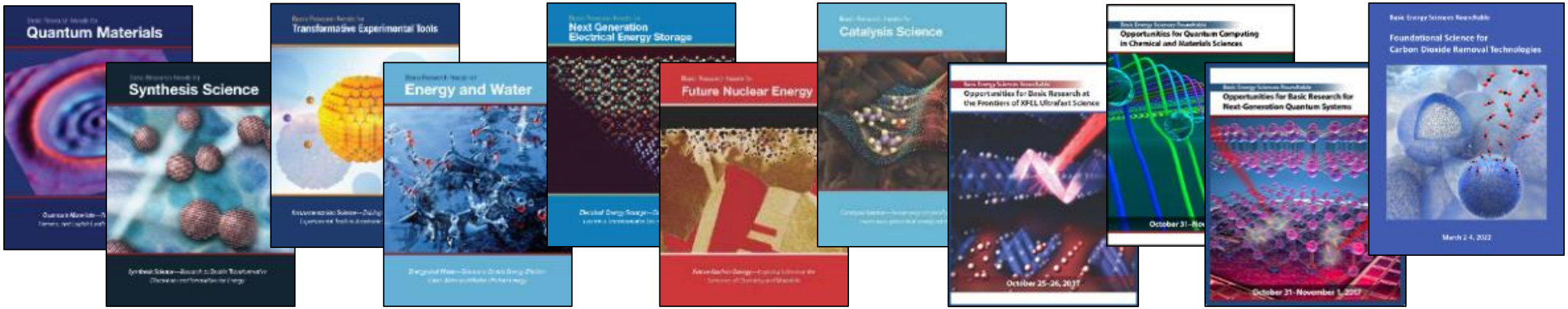
https://science.osti.gov/bes/Funding-Opportunities

Other Online Resources

- BES at 40
  - Highlights on the impact of BES
- BRN Workshop and Roundtable Reports
  - Topical Reports identifying priority research directions and opportunities

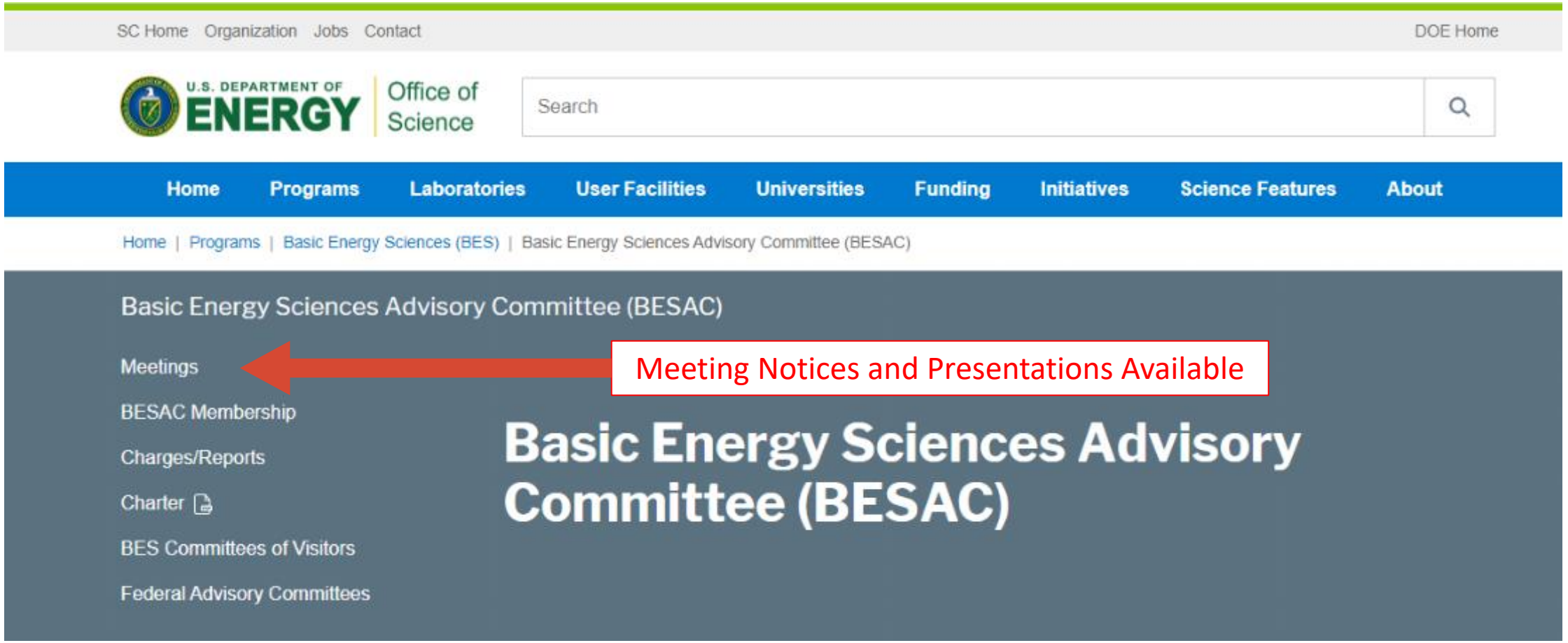






https://science.osti.gov/bes/Community-Resources

Basic Energy Sciences Advisory Committee (BESAC)



Next BESAC Meeting will be held September 24-25, 2024 (hybrid)

https://science.osti.gov/bes/besac

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SCAN ME

Thank you