Informational Webinar: Established Program to Stimulate Competitive Research (DOE-EPSCoR) – EPSCoR State National Laboratory Partnership Grants

Funding Opportunity Announcement (FOA): DE-FOA-0003201

FOA Issue Date	e December 8, 2023	
Submission Deadline for Pre-Applications	5 January 17, 2024 at 5:00PM Eastern Time A Pre-Application is required	
Preapplication Response Date	e January 31, 2024 at 5:00PM Eastern Time	
Submission Deadline for Applications	February 28, 2024 at 11:59PM Eastern Time	
Andrew Schwartz and Tim Fitzsimmons Dis	Disclaimer : This presentation summarizes the contents of the FOA. Nothing in thi webinar is intended to add to, take away from, or contradict any of the requireme of the FOA. If there are any inconsistencies between the FOA and this presentatio statements from DOE personnel, the FOA is the controlling document.	

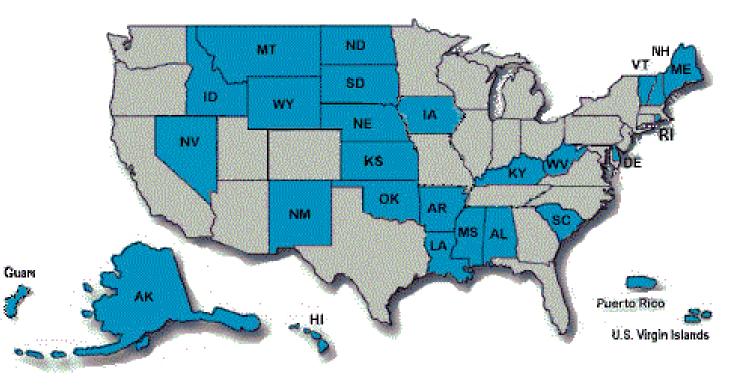




or

DOE EPSCoR – Eligibility

- DOE follows NSF eligibility criteria.
- Chips and Science Act of 2022 language effectively freezes jurisdiction eligibility through 2027.
- Current total DOE/NSF eligible entities: 25 states, Guam, Puerto Rico, and the US Virgin Islands.



• Eligibility has varied over time with Missouri, Tennessee and Utah having been eligible in the past decade or so.



DOE EPSCoR – Goals

- DOE EPSCoR emphasizes early-stage research that supports DOE's science and energy mission programs that will:
- Improve the capability of designated states and territories to conduct sustainable and nationally competitive scientific and energy-related research
- Jumpstart research capabilities in designated states and territories through training of scientists and engineers in energy-related areas
- Build beneficial relationships between scientists and engineers in the designated jurisdictions with world-class laboratories managed by the DOE, leveraging DOE national user facilities and taking advantage of opportunities for intellectual collaboration across the DOE system
- Through broadened participation, DOE EPSCoR seeks to augment the network of energy-related research performers across the Nation



EPSCoR State – National Lab Partnership Grants

- Biennial Funding Opportunity Announcements (FOAs) for EPSCoR State National Laboratory Partnership Grants (larger EPSCoR Implementation Grant FOAs issued in alternate years).
- Maximum funding of \$1,000,000 over four years with possibility of one renewal of up to three years. Any subsequent support subject to competitive solicitation process of the relevant DOE core program.
- Promotes interactions between the EPSCoR Community and unique scientific capabilities at the DOE National Laboratories in conducting collaborative research and training students. All funding to EPSCoR institution; no funds to DOE national laboratories.
- Visit(s) by Lab scientist to EPSCoR states encouraged.
- Proposal originated by individual university PI or potentially a small group.
- Review criteria: Office of Science standard criteria and reviewers are also asked to assess, "Likelihood of success of the collaboration between the EPSCoR Applicant and the National Laboratory Partner"



Diversity, Equity, and Inclusion are Factors in EPSCoR Award Selections

- From FOA:
 - DOE is committed to promoting the diversity of investigators and institutions it supports, as indicated by the ongoing use of program policy factors (see Section V) in making selections of awards. To strengthen this commitment, DOE encourages applications led by Minority Serving Institutions (MSIs) that are underrepresented in the DOE portfolio and applications led by individuals from groups historically underrepresented in STEM.
- Program policy factors include the following:
 - Promoting the diversity of supported investigators and of institutions receiving awards
 - Increasing participation of institutions historically underrepresented in the SC research portfolio
- Emphasis on DEI in FY 2024 FOAs includes an explicit review criterion focused on Promoting Inclusive and Equitable Research (PIER) Plans



Program Office Engagement in DOE EPSCoR Awards

- DOE program offices provide co-funding* for EPSCoR awards
 - Concrete measure of DOE mission relevance
 - Promotes engagement of the PI in programmatic activities (e.g., PI meetings) and provides direction toward potential follow-on funding outside of EPSCoR
- Program office engagement
 - DOE program offices are involved in review of pre-applications and in identification of peer reviewers for applications
 - Partnering program offices are requested to invite and involve EPSCoR PIs/Co-PIs in program meetings that involve program PIs
 - Subsequent support after the completion of an EPSCoR award follows normal program competitive solicitation processes

* 10% total co-funding requested for awards under EPSCoR FOAs. Multiple offices may partner on co-funding.



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	 Understanding the plasma state and its interactions with materials to ultimately develop fusion as an energy source
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



Advanced Scientific Computing Research (ASCR)

- ASCR research lays the groundwork for scientific discoveries
 - **Applied Mathematics and Computer Science foundations** to advance the understanding of natural and engineered systems and to reveal scientific insight from high end simulations, models, and data.
 - **Advanced Computing** to prepare for the future of science based on emerging advanced computing technologies and microelectronics.
- ASCR facilities drive American global leadership in computing, data and networking
 - As we deploy the world's first **exascale supercomputers** and the Nation's most **advanced scientific network**, we continue to build a more integrated and open national research infrastructure for all.
- ASCR's investments and strategic partnerships enable scientific breakthroughs and advance America's economic competitiveness
 - ASCR's world-leading programs in **interdisciplinary research** enable scientific applications take full advantage of computing and networking capabilities that push the frontiers.
 - Unique models of partnerships accelerate the competitiveness of American computing technologies, advanced manufacturing, and high-tech companies - large and small.
- ASCR invests in people

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• **Computational Science Graduate Fellowship** - producing computational leaders since 1991.



Leadership Computing



Quantum Testbeds

Gordon Bell Prize researchers leverage modeling and AI to understand COVID mutations

Energy.gov/science

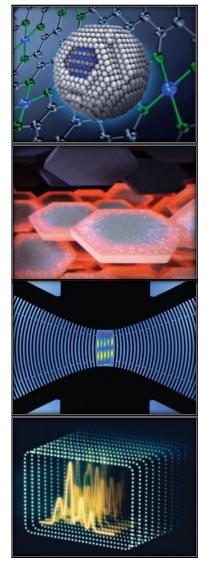


Basic Energy Sciences (BES)

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Science

- BES supports discovery science and use-inspired research to solve the challenges facing today's advanced technologies for energy, manufacturing, medicine, and national priorities. BES provides:
 - A vibrant community of academic and national laboratory researchers who focus on understanding materials and chemical sciences at the atomic and molecular scales
 - Cutting-edge scientific facilities with specialized, state-of-the-art instrumentation such as advanced x-ray light sources, neutron scattering sources, and nanoscale science research centers that are used by
- BES-supported discoveries drive U.S. leadership in science, sustain innovation across diverse technologies and improve economic and national security.
 - Foundational scientific understanding of chemical and materials processes starting at the level of electrons is essential for advancing energy, transportation, chemical, manufacturing, quantum information science, and microelectronics technologies.
 - Continuous progress in basic science is critical to sustaining U.S. innovation and competitiveness.
 - Some of the toughest challenges are being tackled by collaborative teams with diverse skills at the BES-supported Energy Innovation Hubs and Energy Frontier Research Centers.



Biological and Environmental Research (BER)

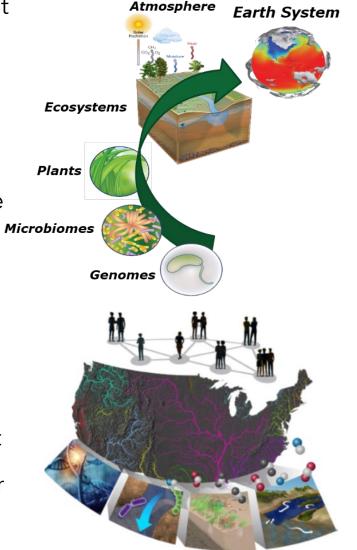
- BER research initiated the human genome project and pioneered research that led to climate and Earth system models.
 - The biology portfolio is using genomics to lay the groundwork for a thriving bioeconomy based on sustainable biofuels and bioproducts.
 - The Earth and environment portfolios are adopting AI, machine learning, and exascale-class computing to enhance predictability from local urban scales that include disadvantaged communities, to global scales, for a variety of **energy and environmental issues** of national importance.
- The better we understand how complex Earth and environmental systems work, and can predict their behavior, the more we can harness that knowledge to transform our lives.
 - Through insights gained from genome-enabled research of plants and microbes, BER is advancing the **understanding and design** of new biological systems for sustainable bioenergy and bioproduct production.
 - BER Earth and environmental research explores the science of the atmosphere, oceans, land systems, and cryosphere, how they combine with advanced analytics and DOE's fastest computers to **accurately model the Earth system**.
 - Both efforts are integral to a broad-based effort to sustain the Earth system as a habitable environment for humanity into the future.
- To enable these efforts, BER supports three DOE Office of Science user facilities with unique world-class scientific instruments and capabilities that are available to the research community.

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 DOE Joint Genome Institute (JGI), Atmospheric Radiation Measurement (ARM) user facility, Environmental Molecular Science Laboratory (EMSL)



Fusion Energy Sciences (FES)

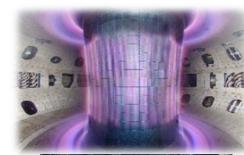
- FES supports research toward understanding the plasma state and its interaction with materials to ultimately develop fusion as an energy source that has the potential to provide limitless, carbonfree, clean energy.
- FES Program Priorities
 - Accelerate fusion development as a carbon-free energy source via **public-private partnerships**, consistent with the Administration's **Bold Decadal Vision** for commercializing fusion energy.
 - Support R&D Fusion Centers ("FIRE" Centers) to establish S&T basis of a Fusion Pilot Plant, aligned with the recent FESAC Long Range Plan recommendation.
 - Participate in ITER project to leverage engineering and study burning plasma science technology at power plant scale while expanding the Inertial Fusion Energy program.
 - Support discovery plasma science and technology and broaden participation in the FES program.
- FES invests in flexible U.S. fusion experimental facilities of various scales, international partnerships in fusion research leveraging U.S. expertise, large-scale numerical simulation for fusion, development of advanced fusion-relevant materials, LaserNetUS, midscale plasma science collaborative research facilities, etc.
- FES also invests in transformational technologies such as AI/ML, microelectronics, advanced manufacturing, and quantum information science.
- FES supports research in the following areas*

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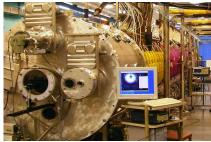
- **Burning Plasma Science**
 - Foundations Advanced Tokamak, Enabling Research and Development, Spherical Tokamak, and Theory & Simulation
 - Long Pulse Tokamak, Stellarator, Materials, and Fusion Nuclear Science
- Discovery Plasma Science
 - General Plasma Science, High Energy Density Laboratory Plasma, and Measurement Innovation

*as listed in the FY 2024 Office of Science Open call.









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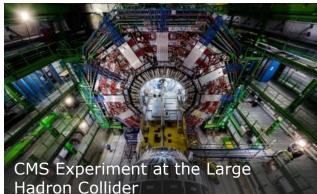
High Energy Physics (HEP)

- Particle physics explores what the world is made of and how it works at the smallest and largest scales.
 - It seeks new discoveries from the tiniest particles to the outer reaches of space: What is the Universe made of? What forces govern it? How did it become the way it is today?
 - Finding these answers requires the combined efforts some of the largest international scientific collaborations in the world, using some of the most sensitive detectors in the world, at some of the largest scientific machines in the world.
- The quest to understand our world inspires young minds, trains an expert workforce, and drives innovation that improves the nation's health, wealth, and security.
 - Particle physicists develop **new tools and technology** that in turn improve medical diagnosis, medicine development, national security, big data computing, and industrial manufacturing.
 - Advancing microelectronics, accelerators, and detectors together with Quantum Information Science and Artificial Intelligence provides opportunities for new insights and approaches.
- Five compelling, intertwined lines of inquiry show great promise for discovery over the next decade.
 - The **Higgs boson**, discovered in 2012, is a new tool for discovery.
 - The puzzling physics of ghostly, very low-mass **neutrinos** is being probed.
 - Experiments seek to identify the physics of **dark matter**.

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- Observations of the Universe aim to reveal the causes of cosmic acceleration, such as dark energy and inflation.
- Experiments also explore the unknown for new particles, interactions, and physical principles.







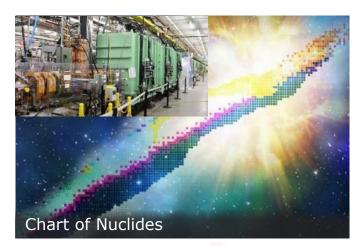
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Nuclear Physics (NP)

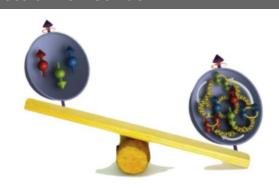
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- Nuclear physics seeks to discover, explore, and understand all forms of nuclear matter.
 - The aim is to understand why matter takes on the specific forms observed in nature: How did visible matter come into being and how does it evolve? How does subatomic matter organize itself and what phenomena emerge? Are the fundamental interactions basic to the structure of matter fully understood?
 - To accomplish its mission, NP stewards operations at multiple national accelerator user facilities.
- The quest to understand all forms of nuclear matter inspires brilliant scientific minds and benefits society in the areas of energy, commerce, medicine, and national security.
 - Students trained in Nuclear Physics are in **high demand**.
 - They bring expertise in nuclear science, accelerator physics, real-time signal processing, high-performance computing, cryogenics, quantum simulators, quantum sensors, AI/ML, lasers, atomic traps, nuclear technology, and particle detection technologies.
- To maintain U.S. leadership, NP builds advanced instrumentation and new tools such as the Facility for Rare Isotope Beams (FRIB) and the future Electron-Ion Collider (EIC).
 - FRIB will uniquely afford access to eighty percent of all isotopes predicted to possibly exist in nature, including over 1,000 **never produced on Earth**.
 - The EIC will provide unprecedented ability discover how the mass of everyday objects is dynamically generated by the interaction of quarks and gluons inside protons and neutrons.







Isotope R&D and Production (DOE IP)

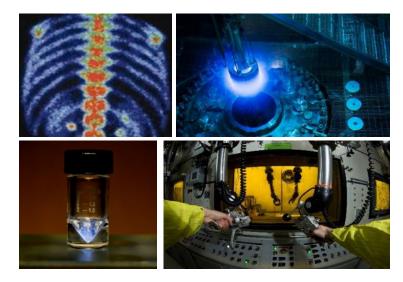
- Isotopes have unique properties that make them useful in medicine, nuclear batteries, clean energy, basic research, and national security.
 - Isotopes of an element have the same number of protons, electrons, and same chemical properties but **differ in the number of neutrons**.
 - Stable and very long-lived unstable isotopes exist in nature and can be enriched, or extracted and purified based on their mass. Short-lived unstable (or radioactive) isotopes are created in nuclear reactors and particle accelerators.
- DOE IP researches and develops **new isotope production techniques** of critical radioactive and stable isotopes for the nation.
 - Radioactive and stable isotopes are required for advancement in basic research (including QIS), medical applications (diagnostic imaging, cancer therapies, infectious diseases), commercial applications (energy exploration), national security (threat detection, nuclear forensics), space exploration (long lived power sources), and other applications.
 - As the only Mission Essential Function within the Office of Science, part of DOE IP's mission is to ensure robust domestic isotope supply chains to reduce U.S. dependency on foreign supply to maintain national preparedness.
- Leveraging the reactor, accelerator, enrichment and isotope processing expertise at the DOE national labs and universities, IP scientists are delivering isotopes for **medical research** on new **diagnostic and therapeutic applications**.

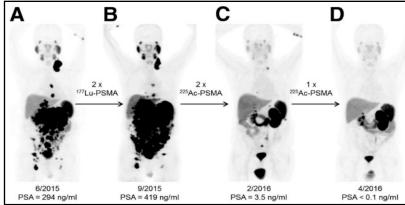
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• Applications include targeted cancer therapy research using short lived radioisotopes such as actinium-225, astatine-211, cerium-134, lead-203 and lead-212.



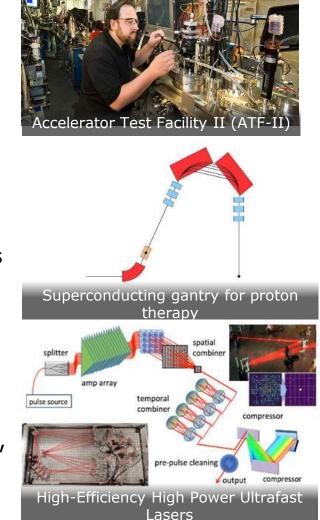


Effective response of a prostate cancer patient to ²²⁵Ac-PSMA-617 treatment

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Accelerator R&D and Production (ARDAP)

- ARDAP supports fundamental accelerator science and technology development of relevance to many fields
 - Cross-cutting basic R&D for science
 - High power ultrafast laser technology
 - New accelerator technology for scientific facilities
 - Develop innovative solutions to critical problems outside of the DOE Office of Science
 - Compact accelerators for medicine and security
 - High power accelerators for environmental and industrial applications
 - Broaden and strengthen the community
 - Awards support multi-institutional R&D teams
 - Public-private partnerships to develop domestic technology companies
 - Facilitate access to national lab accelerator R&D capabilities
- For more information, contact <u>Eric.Colby@science.doe.gov</u>, (301)-903-5475





The DOE Technology Office Research Portfolio

Office of Energy Efficiency and Renewable Energy (EERE)	https://www.energy.gov/eere/office-energy-efficiency- renewable-energy
Office of Fossil Energy and Carbon Management (FECM)	https://www.energy.gov/fecm/office-fossil-energy-and-carbon- management
Office of Nuclear Energy (NE)	https://www.energy.gov/ne/office-nuclear-energy
Office of Electricity (OE)	https://www.energy.gov/oe/office-electricity
Office of Cybersecurity, Energy Security and Emergency Response (CESER)	https://www.energy.gov/ceser/office-cybersecurity-energy-security- and-emergency-response
Office of Environmental Management (EM)	https://www.energy.gov/em/office-environmental-management



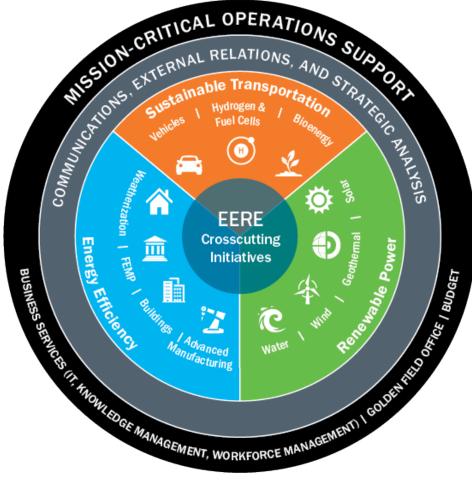
Office of Energy Efficiency and Renewable Energy (EERE) -Mission

- The mission of EERE is to accelerate the research, development, demonstration, and deployment of technologies and solutions to equitably transition America to net-zero greenhouse gas emissions economy-wide by no later than 2050, while creating good paying jobs for the American people – with a particular focus on workers and communities who have been most negatively impacted by the energy transition, and those historically underserved by the energy system and overburdened by pollution.
- EERE is organized into four sectors—each managed by a Deputy Assistant Secretary (DAS).
 - Office of Sustainable Transportation

Office of

Science

- Office of Renewable Power
- Office of Energy Efficiency
- Office of Operations



Office of Carbon Management -- FY2024 early-stage R&D priorities

Point-source Carbon Capture

- Advanced solvents, sorbents, membranes, oxyfuel and chemical looping
- Secondary emissions modeling, measurement, and mitigation
- Reactive capture
- Mobile capture

CO₂ Transport and Storage

- CO₂ transport via rail and ship
- Well integrity and mitigation
- Monitoring, verification, and accounting
- Storage complex efficiency and security
- Mineralization

Clean Hydrogen

- Flexible feedstocks for advanced gasification: microwave, low-cost oxygen, etc.
- Advanced turbines: aimed to fire 100% hydrogen or ammonia
- Advanced materials: high-temperature alloys

Office of

Science

• Reversible solid oxide fuel cell: conversion efficiency, stability, flexibility

CO₂ Conversion

- Mineralization: CO₂ use in cement and concrete
- Biological uptake: light exposure; microalgae culture
- Catalytic: electrolyzer performance, benchmarking, reactive conversion

Carbon Dioxide Removal (CDR)

- Cost reduction for direct air capture
- Marine CDR
- Biomass Carbon Removal and Storage
- Reactive capture and conversion
- Enhanced mineralization/weathering
- Monitoring, reporting and verification

Cross-cutting

- Application of artificial intelligence to materials synthesis, accelerated realtime decision-making
- Simulation-based engineering
- Advanced sensors and controls
- Life-cycle analysis and techno-economical analysis

Office of Electricity (OE)

- Leads national efforts to develop next-generation tools for the electricity delivery system ensuring a **reliable**, **resilient**, and **secure electric grid** in the U.S. and providing global technology leadership.
- Focused on software, hardware, and modeling that addresses systems integration, security, policy and other crosscutting issues.
- Drives electric grid modernization and improving grid operations through **research**, **demonstrations**, **analytics**, **facilitation**, and **partnerships**.

Grid Systems & Components

- Advanced, Modular, Flexible Transformers
- Cables and Conductors
- Solid State Power Substations
- High-Voltage Direct Current (HVDC)/Medium-Voltage Direct Current (MVDC) Systems
- Power Floor Controllers (PFC)
- Solid-State Components
- Advanced Materials
- Robotics/Autonomous Vehicles
- Microgrids
- Applied Grid Transformation Solutions (AGTS)

Grid Controls & Communications

- Advanced Grid Modeling
- Sensors and Data Analytics
- Transmission Reliability Planning/Operations
- Observability/Controllability
- Advanced Distribution Management System (ADMS)
- Transactive Energy
- Buildings/Electric Vehicle (EV) Grid Integration
- Transmission-Distribution (T-D) integration
- North American Energy Resilience Model (NAERM)
- SecureNet

Energy Storage

- Energy Storage Technology and Materials
- Energy Storage Safety and Reliability
- Energy Storage Policy, Valuation,
- Environmental Justice

Office of Environmental Management: Addressing the Nuclear Weapons Legacy

Nuclear Facility Decommissioning



Soil and Water Cleanup Liquid Radioactive Waste Processing & Disposition

The Case of the Ca





Solid Radioactive Waste Treatment, Storage & Disposal





Nuclear Materials & Spent Nuclear Fuel Management





Checklist for avoiding common errors: Pre-Applications (not a comprehensive list of all FOA requirements) – 1

- A Pre-Application is required and should be submitted by the date indicated on the cover of this FOA (January 17, 2024 at 5:00 PM ET).
 - Late submissions of pre-applications are rarely accepted (see Sec. IV.F.4 of the FOA)
- Institutions are limited to submit a maximum of 2 pre-applications in each of the program areas listed on page 3 of the FOA.
 - The PI on a pre-application may be listed as a senior/key personnel on submissions from other institutions without limitation.
- Tables: FOA requires a table listing "individuals who should not serve as reviewers" be submitted in tabular format, preferably as Microsoft Excel files
 - More info on List of Individuals Who Should Not Serve as Reviewers in FOA Sec. VIII.A.10.
 - A link leading to a collaborator template is available: <u>https://science.osti.gov/grants/Policy-and-Guidance/Agreement-Forms</u>. This is also listed in the FOA sec. VIII.A.10.

Checklist for avoiding common errors: Pre-Applications (not a comprehensive list of all FOA requirements) – 2

- The FOA also require that applicants list the relevant DOE program office and the relevant program staff person in that office (on cover page)
- Submit Pre-applications via PAMS at <u>https://pamspublic.science.energy.gov</u>, not via <u>www.grants.gov</u> (due January 17, 2024, 5pm ET)
- Pre-applications must include a clear and concise description of the objectives and technical approach of the proposed research.
- Pre-Applications are evaluated on the basis of responsiveness to FOA objectives, scientific and technical merit, appropriateness of the proposed research approaches and likelihood of scientific impact.
- Pre-Applications are utilized to help in the selection of potential reviewers.



Checklist for avoiding common errors: Applications (not a comprehensive list of all FOA requirements)

- Tables: FOA requires a table of collaborators and conflicts of interest with the pre-application; please also include the updated version with the application. Refer to Section VIII.A.10 in FOA for details.
- Budget: For multi-institutional projects, the lead institution must request a larger percentage of the budget than each of the other institutional partners.
- Biographical sketch and list of current/pending support
 - Required for each senior/key personnel; follow instructions in FOA, including the use of the NSF format.
 - Ensure complete list of activities regardless of source of funding.
 - Do not attach a list of individuals who should not be used as merit reviewers as part of the bio sketch.
- Submit application via <u>www.grants.gov</u>, not PAMS (due February 28 by 11:59pm ET)
- Late submissions of applications are rarely accepted (see Sec. IV.F.4 of the FOA)



Merit Review (see Section V of the FOA)

Applications are subject to **scientific merit review** (peer review) and will be evaluated against the following **criteria** which are listed in decreasing order of significance, though their importance is comparable:

- Scientific and/or Technical Merit of the Project
- Appropriateness of the Proposed Method or Approach
- Competency of Applicant's Personnel and Adequacy of Proposed Resources
- Reasonableness and Appropriateness of the Proposed Budget
- Quality and Efficacy of the Promoting Inclusive and Equitable Research (PIER) Plan
- Likelihood of Success of the Collaboration between the EPSCoR Applicant and the National Laboratory Partner



EPSCoR State-National Laboratory Partnerships FOA: Key Dates

- **Pre-Application due date:** January 17, 2024, by 5:00PM Eastern Time
 - Pre-applications must be submitted via the DOE Portfolio Analysis and Management System (PAMS) at <u>https://pamspublic.science.energy.gov</u>
- Pre-Application response date: January 31, 2024
- Application due date: February 28, 2024, by 11:59PM Eastern Time
 - Applications must be submitted via <u>www.grants.gov</u>
- DOE anticipates that **award selection** will be completed by the end of June 2024 and that awards will be made in Fiscal Year 2024



Where to find more information

- FOA: <u>https://science.osti.gov/-/media/grants/pdf/foas/2024/DE-FOA-0003201.pdf</u>
- The **Department of Energy** (<u>https://Energy.gov</u>) and various programs:
 - **Office of Science** <u>https://science.osti.gov/</u>
 - Office of Cybersecurity, Energy Security and Emergency Response <u>https://www.energy.gov/ceser/office-cybersecurity-energy-security-and-emergency-response</u>
 - **Office of Electricity** <u>https://www.energy.gov/oe/office-electricity</u>
 - Office of Energy Efficiency and Renewable Energy -<u>https://www.energy.gov/eere/office-energy-efficiency-renewable-energy</u>
 - Office of Environmental Management <u>https://www.energy.gov/em/office-environmental-management</u>
 - Office of Fossil Energy and Carbon Management <u>https://www.energy.gov/fecm/office-fossil-energy-and-carbon-management</u>
 - Office of Nuclear Energy <u>https://www.energy.gov/ne/office-nuclear-energy</u>
- This webinar is being recorded; slides and the recording will be posted on the FOA page listed above
- Questions about the FOA: Please send an email with your question(s) to <u>tim.fitzsimmons@science.doe.gov</u>



Questions & Answers

- Please submit questions using Zoom Q&A window, which should be accessible at the bottom of your zoom window.
- If your question is not answered today, or you have additional questions about the presentation, please submit to:
 - <u>Tim.Fitzsimmons@science.doe.gov</u>
- **Disclaimer**: This presentation summarizes the contents of the FOA. Nothing in this webinar is intended to add to, take away from, or contradict any of the requirements of the FOA. If there are any inconsistencies between the FOA and this presentation or statements from DOE personnel, the FOA is the controlling document.

