



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Informational Webinar

Advanced Scientific Computing Research

EXPRESS: 2023 Exploratory Research for Extreme-Scale Science

FOA Issue Date:	February 2, 2023
Submission Deadline for Pre-Applications:	March 8, 2023 at 5PM Eastern Time A Pre-Application is required.
Pre-Application Response Date:	March 22, 2023 at 5PM Eastern Time
Submission Deadline for Applications:	April 19, 2023 at 11:59 PM Eastern Time

This presentation summarizes the contents of the FOA. If there are inconsistencies between the FOA and this presentation or statements from DOE personnel, the FOA is the controlling document.

Office of Science at a Glance

FY 2023 Budget: \$8.1B



Largest Supporter of Physical Sciences in the U.S.



Funding at >300 Institutions, including 17 DOE Labs



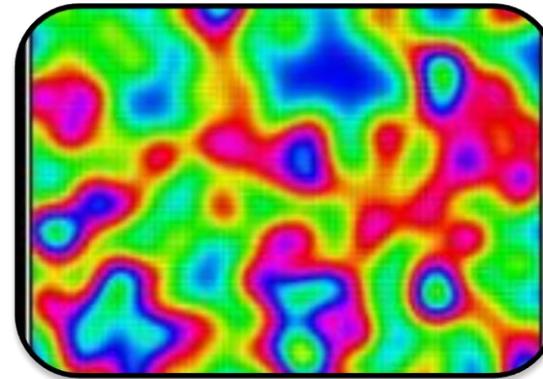
Nearly 29,000 Researchers Supported



Nearly 34,000 Users of 28 SC Scientific Facilities



~35% of Research Funding to Universities



Scientific Research



Facility Operations



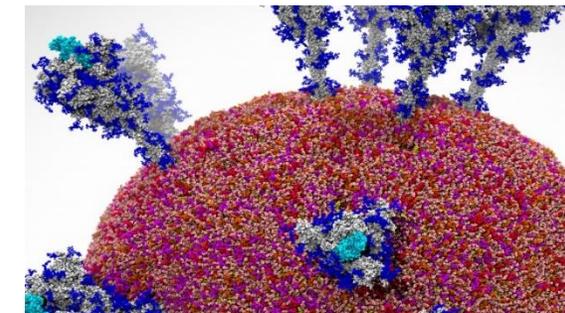
Projects/Other

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



Quantum Testbeds



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

ASCR EXPRESS: FY 2023 Topics

Basic research to explore potentially high-impact approaches in scientific computing and extreme-scale science.

▶ ASCR EXPRESS applications must be responsive to one of the specific topic areas below:

▶ **Modeling Future Supercomputing Systems** – Technical contact: Hal Finkel

Excerpt: “ ... Propose research to model supercomputing systems providing at least a serial computational clock rate of 20 GHz and that might plausibly be capable of providing at least 100 double-precision exaFLOPS while consuming no more than 20 megawatts (including the power for cooling).”

▶ **Programming Techniques for Computational Physics Systems** – Technical contact: Hal Finkel

Excerpt: “ ... Propose computer science research that aims to advance our understanding of how complex physical systems can be created whose evolution in time is described by a system of differential equations where those differential equations are produced by compilation of an expressive programming language.”

▶ **Quantum Algorithms across Models** – Technical contact: Thomas Wong

Excerpt: “... Research on converting quantum algorithms from one model of quantum computing to other models.”

ASCR EXPRESS: Award Information

▶ **Estimated funding**

- ▶ Up to \$10 million in current and future fiscal year funds will be used to support awards under this FOA.

▶ **Period of performance**

- ▶ 2 years

▶ **Anticipated award size**

- ▶ DOE National Laboratories: \$450,000 per year
- ▶ DOE National Laboratories: \$500,000 per year if partnering with a non-R1 minority serving institution (MSI) or an EPSCoR academic institution
- ▶ Non-R1 MSIs: \$250,000 per year
- ▶ EPSCoR academic institutions: \$250,000 per year
- ▶ All other applicants: \$200,000 per year

▶ **Expected number of awards**

- ▶ The exact number of awards will depend on the number of meritorious applications & availability of appropriated funds.

ASCR EXPRESS: Pre-application Requirements

- ▶ **A wide range of institutions are eligible to participate** (see FOA Section III)
- ▶ **Applicant institutions are limited to both:**
 - ▶ No more than a total of four pre-applications or applications as the lead institution in a single- or multi-institutional team
 - ▶ No more than one pre-application or application for each PI at the applicant institution.
- ▶ **Pre-applications are required and will be reviewed for responsiveness**
 - ▶ Pre-applications may also be reviewed for competitiveness
- ▶ **Only the lead institution, in single- or multi-institutional team, should submit a pre-application**
- ▶ **Pre-application components:**
 - ▶ Cover page
 - ▶ Estimated budget table
 - ▶ Machine-readable pdf listing individuals who should not be merit reviewers (see Section VIII of FOA)



ASCR EXPRESS: Merit Review Criteria

- ▶ Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following five criteria. The review criteria 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; and
 - Quality and Efficacy of the Promoting Inclusion and Equitable Research Plan.



ASCR EXPRESS: Program Policy Factors

The Selection Official may consider any of the following program policy factors in making the selection, listed in no order of significance:

- Potential for developing synergies and/or relation of the proposed research activities to other research efforts supported by ASCR, SC, and the DOE
- Availability of funds
- Relevance of the proposed activity to SC priorities
- Ensuring an appropriate balance of activities within SC programs
- Performance under current awards
- Institutional history of training and mentoring early-career researchers
- Ensuring opportunities to investigators not currently supported by DOE
- Commitment to sharing the results of research
- Promoting the diversity of supported investigators
- Promoting the diversity of institutions receiving awards
- Increasing participation of institutions historically underrepresented in the SC research portfolio
- Promoting principal investigators with a commitment to improving diversity, equity, and inclusion in the STEM community.



ASCR EXPRESS: Key Dates

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ASCR EXPRESS: Where to find more information

- ▶ FOA: <https://science.osti.gov/ascr/Funding-Opportunities>
- ▶ General questions about FOA: Steven.Lee@science.doe.gov
- ▶ Technical questions about FOA Topics #1 and #2: Hal.Finkel@science.doe.gov
- ▶ Technical questions about FOA Topic #3: Thomas.Wong@science.doe.gov
- ▶ Answers to common questions: <https://science.osti.gov/grants/Applicant-and-Awardee-Resources/>
- ▶ ASCR Workshop Reports: <https://science.osti.gov/ascr/Community-Resources/Program-Documents>

