

Informational Webinar

EARLY CAREER RESEARCH PROGRAM DE-FOA-0003176

John Mandrekas and the SC ECRP Working Group
January 10, 2024

FOA Issue Date:	December 15, 2023
Submission Deadline for Pre-Applications:	January 30, 2024, at 5 PM Eastern Time
Pre-Application Response Date:	March 14, 2024, at 11:59 PM Eastern Time
Submission Deadline for Applications:	April 25, 2024, at 11:59 PM Eastern Time

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.*



U.S. DEPARTMENT OF
ENERGY

Office of
Science

The SC Early Career Research Program

- ◆ The Office of Science (SC) Early Career Research Program (ECRP), now in its 15th year, was established in FY 2010, with subsequent annual solicitations since then.
- ◆ The purpose of this program is to support outstanding scientists during their crucial early career years when many scientists do their most formative work, and to stimulate research careers in the areas supported by SC.
- ◆ SC's mission is to deliver the scientific discoveries and major scientific tools to transform our understanding of nature and advance the energy, economic, and national security of the United States¹. SC is the Nation's largest Federal sponsor of basic research in the physical sciences and the lead Federal agency supporting fundamental scientific research for our Nation's energy future.
- ◆ Diversity, Equity, Inclusion, and Accessibility (DEIA) is an important aspect of this program.
- ◆ SC PECASE candidates are selected from ECRP awardees.

¹ <https://www.energy.gov/science/office-science>

ECRP Background

- ◆ The ECRP invites applications in all areas supported by SC:
 - Advanced Scientific Computing Research (ASCR)
 - Biological and Environmental Research (BER)
 - Basic Energy Sciences (BES)
 - Fusion Energy Sciences (FES)
 - High Energy Physics (HEP)
 - Nuclear Physics (NP)
 - Isotope R&D and Production (DOE IP)*; and
 - Accelerator R&D and Production (ARDAP)*

*Added in FY 2021

Eligibility

- ◆ U.S. Academic Institutions: Assistant or untenured Associate Professors on the tenure track
- ◆ DOE National Laboratories¹ & SC Scientific User Facilities² not at DOE Laboratories: Full-time, permanent, non-postdoctoral employees
- ◆ To address special circumstances and challenges due to the COVID-19 pandemic, SC is extending the eligibility window for this competition for a second year, from 10 to **12 years** since receiving a Ph.D. for all applicants. SC intends to revert to the original 10-year eligibility window in subsequent competitions.
- ◆ For the present competition, those who received doctorates on or after **January 1, 2011**, are eligible.
- ◆ Extensions to eligibility will be considered for individuals who have had a major life event requiring an extended absence (three months or longer) from the workplace, including but not limited to active military service, an absence due to personal disability, or an absence covered by the Family Medical Leave Act.
- ◆ Principal Investigators may not participate in more than **three** SC ECRP competitions.
- ◆ For questions about eligibility, please contact SC.Early@science.doe.gov

¹ <https://www.energy.gov/national-laboratories>

² <https://science.osti.gov/User-Facilities/User-Facilities-at-a-Glance>

Awards and Funding Levels

◆ Awards to Institutions of Higher Education:

- The minimum request for awards to an Institution of Higher Education is **\$875,000** over five years. It was raised in FY 2023 to encourage these institutions to increase graduate student stipends (see *Living Wages* section in the FOA).

◆ Awards to DOE National Laboratories:

- The minimum request for awards to a DOE National Laboratory is approximately **\$2,750,000** over five years (raised by \$250K from FY 2023). These awards are encouraged to cover at least **50%** of the PI's salary.
- ◆ Awards supporting PIs at **SC User Facilities** that do not fall under these two broad categories must use the guidance for the DOE National Laboratories.
- ◆ Historically, the average ECRP award for both Institutions of Higher Education and DOE National Laboratories has been close to the minimum for each institutional type. Requests for awards larger than the historical average are possible with appropriate justification.

Promoting Inclusive and Equitable Research Plan

- ◆ A requirement started last year for all SC proposals is the submission of a **Promoting Inclusive and Equitable Research** (PIER) plan.
- ◆ The PIER plan reflects the SC commitment to Diversity, Equity, Inclusion, and Accessibility (DEIA).
- ◆ Reviewers will have to answer an additional merit review criterion on the “Quality and Efficacy of the Plan for Promoting Inclusive and Equitable Research.”
- ◆ Additional information on the PIER plan is included in the FOA and in <https://science.osti.gov/grants/Applicant-and-Awardee-Resources/PIER-Plans>

Program Statistics

- ◆ SC has made **961** ECRP awards since 2010
 - 624 to universities and 337 to DOE national laboratories
- ◆ During the last few years, we have been receiving about ~1,000+ pre-applications and ~600+ full applications.
- ◆ Global (across all SC programs) success rate: **14%**
- ◆ In FY 2023, SC made **93** awards (60 to universities and 33 to national laboratories) for a total of ~**\$68M** (\$135M 5-year total) to **47** universities and **12** national laboratories in **27** different states.
- ◆ Abstracts of all ECRP awards can be found in:
<https://science.osti.gov/early-career>

Award History

Office	Number of University Awards													
FY	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23
ASCR	5	3	3	3	3	2	2	4	4	4	3	6	6	7
BES	18	24	21	26	10	17	16	19	29	24	25	27	31	35
BER	5	4	6	4	1	4	2	2	5	2	3	2	2	3
FES	4	4	1	2	1	2	4	4	2	4	3	2	5	4
HEP	10	8	8	7	3	4	3	4	7	7	9	9	6	4
NP	5	4	5	6	3	4	3	5	7	5	6	4	5	6
ARDAP	-	-	-	-	-	-	-	-	-	-	-	0	0	0
DOE IP	-	-	-	-	-	-	-	-	-	-	-	1	1	1
Total	47	47	44	48	21	33	30	38	54	46	49	51	56	60

Office	Number of Laboratory Awards													
FY	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23
ASCR	2	2	3	2	2	3	2	3	2	4	4	4	5	3
BES	8	7	8	5	6	8	6	2	11	6	7	7	7	10
BER	3	3	3	3	3	1	5	5	3	5	4	4	3	5
FES	2	2	3	2	2	2	2	2	4	2	3	5	4	4
HEP	4	5	4	2	3	1	4	7	7	7	5	6	5	8
NP	3	3	3	3	1	2	3	2	3	3	3	6	3	3
ARDAP	-	-	-	-	-	-	-	-	-	-	-	0	0	0
DOE IP	-	-	-	-	-	-	-	-	-	-	-	0	0	0
Total	22	22	24	17	17	17	22	21	30	27	26	32	27	33

Program Specific Information

- ◆ The next few slides, include program specific information
- ◆ It will be presented by the ECRP Program Office representatives:
 - ASCR: Ashley Predith
 - BES: Andrew Schwartz
 - BER: Tris West
 - FES: John Mandrekas
 - HEP: Bill Kilgore
 - NP: Spiros Margetis
 - ARDAP: Eric Colby / Roark Marsh
 - DOE IP: Ethan Balkin

ECRP Research Areas – Advanced Scientific Computing Research

- ◆ Extreme-Scale Algorithms for Scientific Computing
contact Steve Lee, Steven.Lee@science.doe.gov
- ◆ Multiscale Mathematics for the Modeling and Simulation of Complex Systems
contact William Spotz, William.Spotz@science.doe.gov
- ◆ Systems -- Programming Models and Environments; Operating and Runtime Systems; Performance Portability and Co-design
contact Hal Finkel, Hal.Finkel@science.doe.gov
- ◆ Data Management, Visualization, and Analytics
contact Margaret Lentz, Margaret.Lentz@science.doe.gov
- ◆ Quantum Computing
contact Claire Cramer, Claire.Cramer@science.doe.gov
- ◆ Emerging Computing Technologies: Neuromorphic Computing
contact Robinson Pino, Robinson.Pino@science.doe.gov

ECRP Research Areas – Basic Energy Sciences

Chemical Sciences, Geosciences, and Biosciences

- ▶ Atomic, Molecular, and Optical Sciences
- ▶ Gas Phase Chemical Physics
- ▶ Computational and Theoretical Chemistry
- ▶ Condensed Phase and Interfacial Molecular Science
- ▶ Quantum Information Science in CSGB
- ▶ Catalysis Science
- ▶ Separation Science
- ▶ Heavy Element Chemistry
- ▶ Geosciences
- ▶ Solar Photochemistry
- ▶ Photosynthetic Systems
- ▶ Physical Biosciences

Materials Sciences and Engineering

- ◆ Materials Chemistry
- ◆ Biomolecular Materials
- ◆ Synthesis and Processing Science
- ◆ Experimental Condensed Matter Physics
- ◆ Theoretical Condensed Matter Physics
- ◆ Physical Behavior of Materials
- ◆ Mechanical Behavior and Radiation Effects
- ◆ Quantum Information Science in MSE
- ◆ X-Ray Scattering
- ◆ Neutron Scattering
- ◆ Electron and Scanning Probe Microscopies

Scientific User Facilities

- ▶ Accelerator and Detector Research
- ▶ Instrumentation and Technique Development for BES User Facilities

- Many of the core research areas rotate topics on an annual basis. Read the FOA carefully for this year's focus.
- The following overarching research priorities are relevant to multiple core research areas:
 - Clean Energy
 - Critical Materials/Minerals
 - Fundamental Science to Transform Manufacturing
 - Artificial Intelligence and Machine Learning (AI/ML)

ECRP Research Areas – Biological and Environmental Research

- ◆ Systems Biology Enabled Microbiome Research to Facilitate Predictions of Interactions and Behavior in the Environment
 - contact Pablo Rabinowicz, pablo.rabinowicz@science.doe.gov
- ◆ Southeast U.S. Atmospheric Processes through use of Observations from the Third Atmospheric Radiation Measurement (ARM) Mobile Facility (AMF3) Bankhead National Forest (BNF) Atmospheric Observatory
 - contact Shaima Nasiri, Shaima.Nasiri@science.doe.gov

ECRP Research Areas – Fusion Energy Sciences

- ◆ Advanced and Long Pulse Tokamak Research
 - Contact Matthew Lanctot, matthew.lanctot@science.doe.gov
- ◆ Spherical Tokamak Research
 - Contact Josh King, josh.king@science.doe.gov
- ◆ Stellarator Research in Magnetic Fusion Energy Sciences
 - Contact Samuel Barish, sam.barish@science.doe.gov
- ◆ Magnetic Fusion Energy Science Theory and Simulation
 - Contact Michael Halfmoon, michael.halfmoon@science.doe.gov
- ◆ Measurement Innovation
 - Contact Curt Bolton, curt.bolton@science.doe.gov
- ◆ High-Energy-Density Plasma Science / Inertial Fusion Energy
 - Contact Kramer Akli, kramer.akli@science.doe.gov
- ◆ General Plasma Science Experiment and Theory
 - Contact Nirmol Podder, nirmol.podder@science.doe.gov
- ◆ Fusion Nuclear Science, Materials Research, and Enabling R&D Programs for Fusion:
 - contact Guinevere Shaw, guinevere.shaw@science.doe.gov
- ◆ Artificial Intelligence and Machine Learning for Fusion Energy Sciences
 - Contact Michael Halfmoon, michael.halfmoon@science.doe.gov

ECRP Research Areas – High Energy Physics

- ◆ Energy Frontier Research: contact Abid Patwa
 - abid.patwa@science.doe.gov
- ◆ Intensity Frontier Research: contact Brian Beckford
 - brian.beckford@science.doe.gov
- ◆ Cosmic Frontier Research: contact Bryan Field, Kathy Turner
 - bryan.field@science.doe.gov, kathy.turner@science.doe.gov
- ◆ Theoretical High Energy Physics Research: contact William Kilgore
 - william.kilgore@science.doe.gov
- ◆ Accelerator Science and Technology R&D: contact Derun Li
 - derun.li@science.doe.gov
- ◆ Detector Research and Development: contact Helmut Marsiske
 - helmut.marsiske@science.doe.gov
- ◆ Computational Research in High Energy Physics: contact Jeremy Love
 - jeremy.love@science.doe.gov
- ◆ Quantum Information Science in High Energy Physics: contact Glen Crawford
 - glen.crawford@science.doe.gov

ECRP Research Areas – Nuclear Physics

- ◆ Accelerator Physics R&D: contact Manouchehr Farkhondeh
 - Manouchehr.Farkhondeh@science.doe.gov
- ◆ Computational Physics: contact Xiaofeng Guo
 - Xiaofeng.Guo@science.doe.gov
- ◆ Fundamental Symmetries: contact Paul Sorensen
 - Paul.Sorensen@science.doe.gov
- ◆ Heavy Ions: contact Ken Hicks
 - Kenneth.Hicks@science.doe.gov
- ◆ Medium Energy NP: contact Gulshan Rai / Spiros Margetis
 - Gulshan.Rai@science.doe.gov , Spyridon.Margetis@science.doe.gov
- ◆ Nuclear Structure/Nuclear Astrophysics: contact Sharon Stephenson
 - Sharon.Stephenson@science.doe.gov
- ◆ Quantum Information Science: contact Gulshan Rai
 - Gulshan.Rai@science.doe.gov
- ◆ Theory: contact Astrid Morreale
 - Astrid.Morreale@science.doe.gov
- ◆ Nuclear Data: contact Keith Jankowski,
 - Keith.Jankowski@science.doe.gov

ECRP Research Areas – Accelerator R&D and Production

ARDAP will support early career scientists and engineers who can **bridge the gap between basic research and industrial production** of particle accelerator technology in one or more of the following cross-cutting areas:

- Manufacture of **superconducting accelerator technologies**, including SRF accelerators, high-field magnets, SC undulators, and cryogenic systems;
- Development of software that leverages high-performance computing architectures and data science techniques to **design and control accelerators**;
- Engineering and manufacture of high-brightness **particle sources and high-power targets**;
- Engineering and production of high-power, high-efficiency **radiofrequency (RF) power sources** and high average power **ultrashort pulse laser systems**;
- Development of **advanced materials for particle accelerators** (e.g., permanent magnet materials, superconducting materials, high-field insulating materials);
- Development of **high-performance, multi-scale software** capable of predicting the performance of macroscopic, realistic materials (e.g., high temperature superconductors, RF breakdown) based on first principles.

For more information: Eric.Colby@science.doe.gov and Roark.Marsh@science.doe.gov

ECRP Research Areas – Isotope R&D and Production

- ◆ Targetry and Isotope Production Research: contact Ethan Balkin (Ethan.Balkin@science.doe.gov)
- ◆ Nuclear and Radiochemical Separation, Purification, and Radiochemical Synthesis: contact Ethan Balkin
- ◆ Biological Tracers, Imaging, and Therapeutics: contact Ethan Balkin
- ◆ Isotopic Enrichment Technology: contact April Gillens, April.Gillens@science.doe.gov

For more information

- ◆ The FOA is the authoritative source for this competition:
 - <https://science.osti.gov/fes/-/media/grants/pdf/foas/2024/DE-FOA-0003176.pdf>
- ◆ A Frequently Asked Questions (FAQ) document will also be available with answers to most common questions.
- ◆ If you still have questions, you can contact SC.Early@science.doe.gov for program rules or the Program Managers listed under each topical area in the FOA for technical questions.