

# Informational Webinar

## EARLY CAREER RESEARCH PROGRAM DE-FOA-0003450

Sharon Stephenson and the SC ECRP Working Group  
January 31, 2025

FOA Issue Date:	January 17, 2025
Submission Deadline for Pre-Applications:	February 18, 2025, at 5 PM Eastern Time
Pre-Application Response Date:	March 18, 2025, at 5 PM Eastern Time
Submission Deadline for Applications:	April 22, 2025, at 11:59 PM Eastern Time

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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 16<sup>th</sup> 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 States<sup>1</sup>. 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.
- ◆ SC PECASE candidates are selected from ECRP awardees.

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

# ECRP Background

- ◆ The ECRP invites applications in all areas supported by SC:
  - Advanced Scientific Computing Research (ASCR)
  - Basic Energy Sciences (BES)
  - Biological and Environmental Research (BER)
  - 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 Laboratories<sup>1</sup> & SC Scientific User Facilities<sup>2</sup> not at DOE Laboratories: Full-time, permanent, non-postdoctoral employees
- ◆ For the present competition, those who received doctorates on or after **January 1, 2014**, 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](mailto:SC.Early@science.doe.gov)

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

<sup>2</sup> <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.

# Program Statistics

- ◆ SC has made **1052** ECRP awards since 2010
  - 685 to universities and 367 to DOE national laboratories
- ◆ During the last few years, we have been receiving about ~1,000+ pre-applications and ~650+ full applications.
- ◆ Global (across all SC programs) success rate: **13%**
- ◆ In FY 2024, SC made **91** awards (62 to universities and 29 to national laboratories) for a total of ~**\$72M** (\$133M 5-year total) to **50** 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	FY24
ASCR	5	3	3	3	3	2	2	4	4	4	3	6	6	7	5
BES	18	24	21	26	10	17	16	19	29	24	25	27	31	35	35
BER	5	4	6	4	1	4	2	2	5	2	3	2	2	3	4
FES	4	4	1	2	1	2	4	4	2	4	3	2	5	4	4
HEP	10	8	8	7	3	4	3	4	7	7	9	9	6	4	7
NP	5	4	5	6	3	4	3	5	7	5	6	4	5	6	6
ARDAP	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
DOE IP	-	-	-	-	-	-	-	-	-	-	-	1	1	1	0
<b>Total</b>	<b>47</b>	<b>47</b>	<b>44</b>	<b>48</b>	<b>21</b>	<b>33</b>	<b>30</b>	<b>38</b>	<b>54</b>	<b>46</b>	<b>49</b>	<b>51</b>	<b>56</b>	<b>60</b>	<b>61</b>

  

Office	Number of Laboratory Awards														
FY	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
ASCR	2	2	3	2	2	3	2	3	2	4	4	4	5	3	3
BES	8	7	8	5	6	8	6	2	11	6	7	7	7	10	10
BER	3	3	3	3	3	1	5	5	3	5	4	4	3	5	3
FES	2	2	3	2	2	2	2	2	4	2	3	5	4	4	4
HEP	4	5	4	2	3	1	4	7	7	7	5	6	5	8	3
NP	3	3	3	3	1	2	3	2	3	3	3	6	3	3	6
ARDAP	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
DOE IP	-	-	-	-	-	-	-	-	-	-	-	0	0	0	1
<b>Total</b>	<b>22</b>	<b>22</b>	<b>24</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>22</b>	<b>21</b>	<b>30</b>	<b>27</b>	<b>26</b>	<b>32</b>	<b>27</b>	<b>33</b>	<b>30</b>

# Program Specific Information

- ◆ The next few slides, include program specific information
- ◆ It will be presented by the ECRP Program Office representatives:
  - ASCR: Carol Hawk
  - BES: Andrew Schwartz
  - BER: Tris West
  - FES: Nirmol Podder
  - HEP: Bill Kilgore
  - NP: Sharon Stephenson
  - ARDAP: Eric Colby / Roark Marsh
  - DOE IP: Ethan Balkin



# ECRP Research Areas – Advanced Scientific Computing Research

- ◆ Multiscale Mathematics for the Modeling and Simulation of Complex Systems contact: Steven Lee, [Steven.Lee@science.doe.gov](mailto:Steven.Lee@science.doe.gov)
- ◆ Scalable Scientific Machine Learning, Data Analysis, and Reduction contact: William Spotz, [William.Spotz@science.doe.gov](mailto:William.Spotz@science.doe.gov)
- ◆ Systems -- Programming Models and Environments; Operating and Runtime Systems; Performance Portability and Co-design; Memory-Aware Systems contact: Hal Finkel, [Hal.Finkel@science.doe.gov](mailto:Hal.Finkel@science.doe.gov)
- ◆ Data Management, Visualization, and Analytics contact: Margaret Lentz, [Margaret.Lentz@science.doe.gov](mailto:Margaret.Lentz@science.doe.gov)
- ◆ Quantum Computing contact: Marco Fornari, [Marco.Fornari@science.doe.gov](mailto:Marco.Fornari@science.doe.gov), Kalyan Perumalla, [Kalyan.Perumalla@science.doe.gov](mailto:Kalyan.Perumalla@science.doe.gov)
- ◆ Quantum Networking contact: Kalyan Perumalla, [Kalyan.Perumalla@science.doe.gov](mailto:Kalyan.Perumalla@science.doe.gov), Marco Fornari, [Marco.Fornari@science.doe.gov](mailto:Marco.Fornari@science.doe.gov)
- ◆ Emerging Computing Technologies contact: Robinson Pino, [Robinson.Pino@science.doe.gov](mailto: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 and biosystems design of bioenergy-relevant microbes to enable production of next-generation biofuels, bioproducts, and biomaterials
  - contact Pablo Rabinowicz, [pablo.rabinowicz@science.doe.gov](mailto:pablo.rabinowicz@science.doe.gov)
- ◆ Understanding and predicting processes regulating fluxes of trace gases from terrestrial ecosystems
  - contact Brian Benscoter, [Brian.Benscoter@science.doe.gov](mailto:Brian.Benscoter@science.doe.gov)

# ECRP Research Areas – Fusion Energy Sciences

- ◆ Advanced and Long Pulse Tokamak Research
  - Contact Matthew Lanctot, [matthew.lanctot@science.doe.gov](mailto:matthew.lanctot@science.doe.gov)
- ◆ Spherical Tokamak Research
  - Contact Josh King, [josh.king@science.doe.gov](mailto:josh.king@science.doe.gov)
- ◆ Stellarator Research in Magnetic Fusion Energy Sciences
  - Contact Josh King, [josh.king@science.doe.gov](mailto:josh.king@science.doe.gov)
- ◆ Magnetic Fusion Energy Science Theory and Simulation
  - Contact Michael Halfmoon, [michael.halfmoon@science.doe.gov](mailto:michael.halfmoon@science.doe.gov)
- ◆ Measurement Innovation
  - Contact Curt Bolton, [curt.bolton@science.doe.gov](mailto:curt.bolton@science.doe.gov)
- ◆ Inertial Fusion Energy (IFE)
  - Contact Kramer Akli, [kramer.akli@science.doe.gov](mailto:kramer.akli@science.doe.gov)
- ◆ General Plasma Science Experiment and Theory
  - Contact Nirmol Podder, [nirmol.podder@science.doe.gov](mailto:nirmol.podder@science.doe.gov)
- ◆ Fusion Nuclear Science and Enabling R&D Programs for Fusion
  - Contact John Echols, [John.Echols@science.doe.gov](mailto:John.Echols@science.doe.gov)
- ◆ Materials Research for Fusion
  - Contact John Echols, [John.Echols@science.doe.gov](mailto:John.Echols@science.doe.gov)
- ◆ Artificial Intelligence and Machine Learning for Fusion Energy Sciences
  - Contact Michael Halfmoon, [michael.halfmoon@science.doe.gov](mailto:michael.halfmoon@science.doe.gov)

# ECRP Research Areas – High Energy Physics

- ◆ Energy Frontier Research: contact Abid Patwa
  - [abid.patwa@science.doe.gov](mailto:abid.patwa@science.doe.gov)
- ◆ Intensity Frontier Research: contact Brian Beckford
  - [brian.beckford@science.doe.gov](mailto:brian.beckford@science.doe.gov)
- ◆ Cosmic Frontier Research: contact Bryan Field, Manuel Bautista
  - [bryan.field@science.doe.gov](mailto:bryan.field@science.doe.gov), [manuel.bautista@science.doe.gov](mailto:manuel.bautista@science.doe.gov)
- ◆ Theoretical High Energy Physics Research: contact William Kilgore
  - [william.kilgore@science.doe.gov](mailto:william.kilgore@science.doe.gov)
- ◆ Accelerator Science and Technology R&D: contact Derun Li
  - [derun.li@science.doe.gov](mailto:derun.li@science.doe.gov)
- ◆ Detector Research and Development: contact Helmut Marsiske
  - [helmut.marsiske@science.doe.gov](mailto:helmut.marsiske@science.doe.gov)
- ◆ Computational Research in High Energy Physics: contact Jeremy Love
  - [jeremy.love@science.doe.gov](mailto:jeremy.love@science.doe.gov)
- ◆ Quantum Information Science in High Energy Physics: contact Zachary Goff-Eldredge
  - [zachary.goff-eldredge@science.doe.gov](mailto:zachary.goff-eldredge@science.doe.gov)

# ECRP Research Areas – Nuclear Physics

- ◆ Accelerator Physics R&D: contact Manouchehr Farkhondeh
  - [Manouchehr.Farkhondeh@science.doe.gov](mailto:Manouchehr.Farkhondeh@science.doe.gov)
- ◆ Computational Physics: contact Xiaofeng Guo
  - [Xiaofeng.Guo@science.doe.gov](mailto:Xiaofeng.Guo@science.doe.gov)
- ◆ Fundamental Symmetries: contact Paul Sorensen
  - [Paul.Sorensen@science.doe.gov](mailto:Paul.Sorensen@science.doe.gov)
- ◆ Heavy Ions: contact Ken Hicks
  - [Kenneth.Hicks@science.doe.gov](mailto:Kenneth.Hicks@science.doe.gov)
- ◆ Medium Energy NP: contact Gulshan Rai
  - [Gulshan.Rai@science.doe.gov](mailto:Gulshan.Rai@science.doe.gov) ,
- ◆ Nuclear Structure/Nuclear Astrophysics: contact Spiros Margetis
  - [Spyridon.Margetis@science.doe.gov](mailto:Spyridon.Margetis@science.doe.gov)
- ◆ Quantum Information Science: contact Gulshan Rai
  - [Gulshan.Rai@science.doe.gov](mailto:Gulshan.Rai@science.doe.gov)
- ◆ Theory: contact Astrid Morreale
  - [Astrid.Morreale@science.doe.gov](mailto:Astrid.Morreale@science.doe.gov)
- ◆ Nuclear Data: contact Keith Jankowski
  - [Keith.Jankowski@science.doe.gov](mailto: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](mailto:Eric.Colby@science.doe.gov) and [Roark.Marsh@science.doe.gov](mailto: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](mailto: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](mailto:April.Gillens@science.doe.gov)



# For more information

- ◆ The NOFO is the authoritative source for this competition:

<https://science.osti.gov/grants/FOAs/FOAs/2025/-/media/grants/pdf/foas/2025/DE-FOA-0003450-000002.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](mailto:SC.Early@science.doe.gov) for program rules or the Program Managers listed under each topical area in the NOFO for technical questions.