

Fall BERAC Meeting 2023

Todd Anderson, Ph.D.

Acting Associate Director, US DOE Office of Science
Biological and Environmental Research

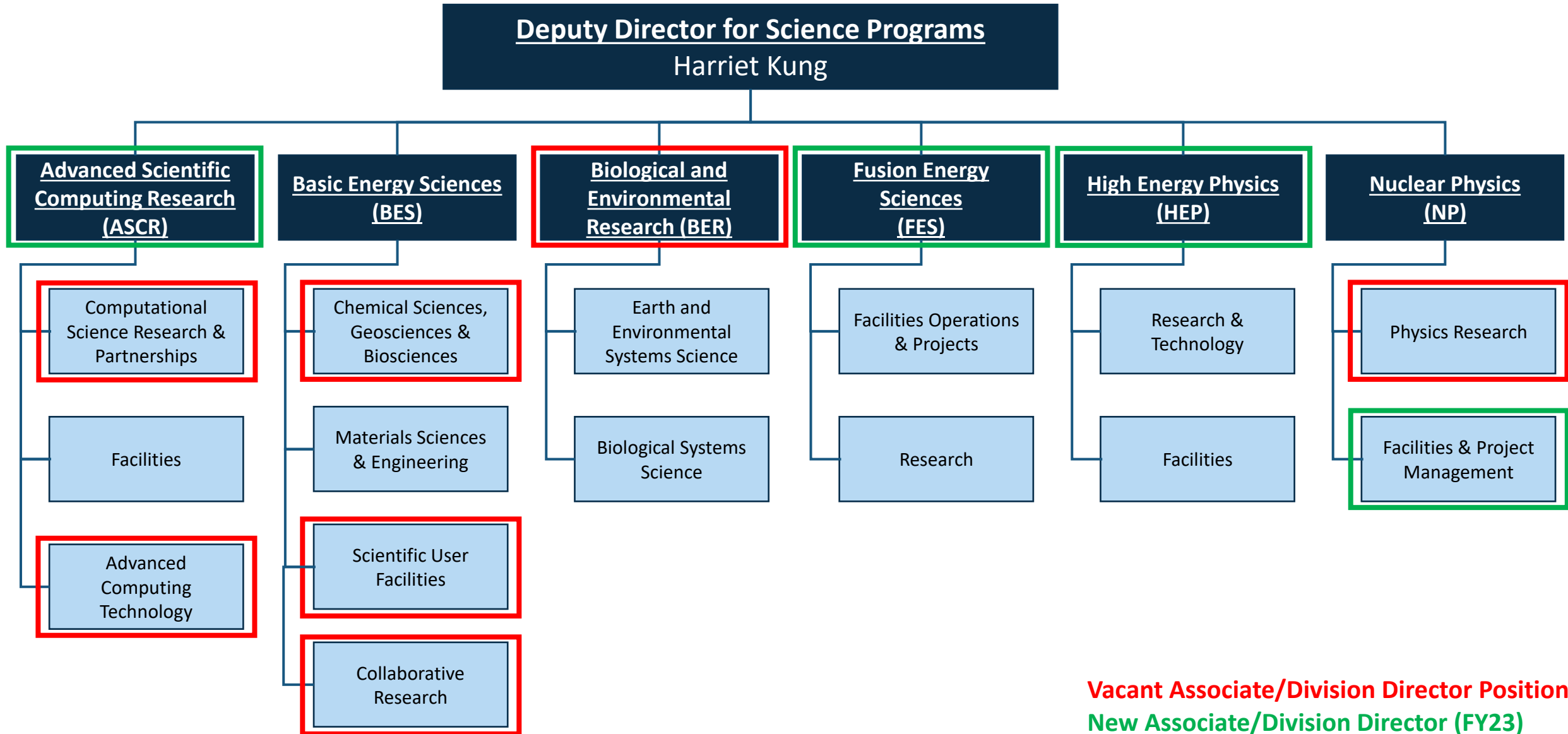


U.S. DEPARTMENT OF
ENERGY

Office of
Science

[Energy.gov/science](https://www.energy.gov/science)

Office of Science is Undergoing Leadership Changes



Vacant Associate/Division Director Positions
New Associate/Division Director (FY23)

New Office of Science Associate Director for BER

Starting Monday, October 23



Dr. Dorothy Koch

Dr. Dorothy Koch has been the Director of the NOAA Weather Program Office (WPO) since 2021. In addition to leading WPO, Dr. Koch is Ocean and Atmospheric Research (OAR) Weather Portfolio Steward and chair of NOAA's Modeling Board. Prior to joining NOAA, from 2010-2019, Dr. Koch worked for the Department of Energy (DOE) leading DOE's Earth System Modeling portfolio of laboratory and university research projects. She also served as the DOE Principal for the Subcommittee on Global Change Research (SGCR; 2015-2019), spearheaded the multi-agency USGCRP Climate Modeling Summit, and lead the climate chapter for the 2016 Earth Observation Assessment. Before DOE, Dr. Koch worked for 15 years at Columbia University and NASA's Goddard Institute of Space Studies (GISS) where she led the development of the GISS climate model's aerosol component and studied aerosol-climate interactions.

BERAC Researchers Recognized



Dr. Sonia Kreidenweis

Yorum J. Kaufman Outstanding Research and Unselfish Cooperation Award
by the Atmospheric Sciences section of the American Geophysical Union



Dr. Gemma Reguera

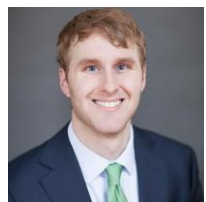
D.C. White Award for Interdisciplinary Research by the
American Society for Microbiology



Dr. Karen Seto

Lifetime member of the United States Council on Foreign Relations

2023 Early Career Research Program (ECRP) BER Selectees



PI Name	Institution	Division	Proposal Title
Steven Brus	ANL	EESDD	Assessing climate impacts on coastal-urban flooding through high-resolution barotropic and baroclinic ocean coupling
Jennifer Brophy	Stanford University	BSSD	Engineering continuous trait variation in bioenergy feedstocks to optimize growth on marginal lands
John Cahill	ORNL	BSSD	Elucidation and Validation of Genes Associated with Biological Nitrification Inhibition in Populus
Tirthanker Chakraborty	PNNL	EESDD	A Planetary-Scale Data-Model Integration Framework to Resolve Urban Impacts Across Scales and Examine Weather Extremes over Coastal U.S. Cities
Richard Fiorella	LANL	EESDD	Probing water cycle processes and extremes in coastal and urban environments using water isotope ratio tracers and numerical tags
Dan Lu	ORNL	EESDD	Integrating Machine Learning Models into E3SM for Understanding Coastal Compound Flooding
Julia Moriarty	Univ Colorado, Boulder	EESDD	Improving Predictability of Aqueous Coastal Biogeochemistry During Floods, Storms and a Warming Climate
Yutang Zheng	Univ Houston	EESDD	Using Kilometer-Scale E3SM to Investigate Air Pollution Impacts on Coastal Storms

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

2023 Office of Science Graduate Student Research (SCGSR) Program

BER awardees for 2023 SCGSR Solicitation 1

Graduate Student	Institution	Host Lab/Facility	Research Area	Collaborating DOE Lab Scientist
Dobson, Brianna	University of Colorado Boulder	BNL	Atmospheric System Research	Kuang, Chongai
Hessefort, Logan	Arizona State University	NREL	Computational Biology and Bioinformatics	Beckham, Gregg
Landy, John	Stony Brook University	LBNL	Regional and Global Model and Analysis	Rhoades, Alan
Niedek, Christopher	University of California-Davis	PNNL	Atmospheric System Research	Mei, Fan
Novak, Jessica	University of Maryland Baltimore County	NREL	Environmental Microbiology	Knott, Brandon
Schaefer, Sean Robert	University of New Hampshire	LLNL	Environmental Microbiology	Blazewicz, Steven
Schlichting, Dylan Russell	Texas A & M University	PNNL	Regional and Global Model and Analysis	Hetland, Robert
Soini, Steven Andrew	Florida Atlantic University	ORNL	Biomolecular Characterization and Imaging Science	Domingo, Neus
Sone, Bronte	University of Idaho	PNNL	Environmental Microbiology	Hofmockel, Kirsten
Sutton, Lucas Bowman	Rensselaer Polytechnic Institute	ORNL	Biomolecular Characterization and Imaging Science	O'Neill, Hugh

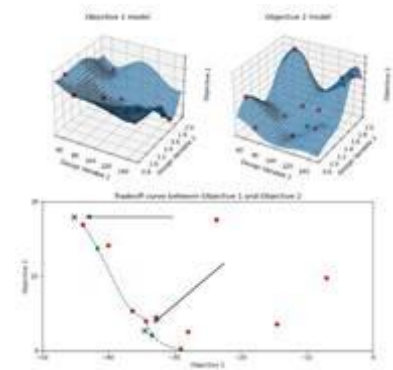
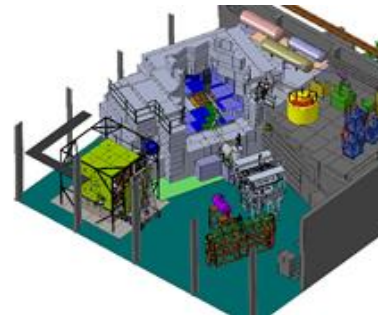
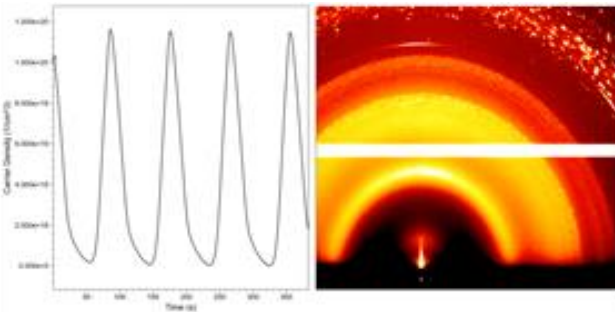
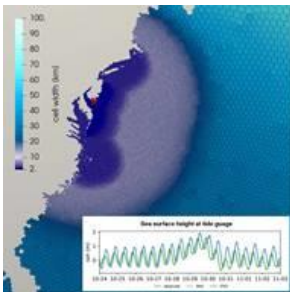
2023 Office of Science Graduate Student Research (SCGSR) Program

BER topic areas for SCGSR 2023 Solicitation 2:

- Computational Biology and Bioinformatics
- Biomolecular Characterization and Imaging Science
- Plant Science for Sustainable Bioenergy
- Environmental Microbiology
- Environmental System Science
- Atmospheric System Research
- Earth System Model Development: Computational Climate Modeling
- Regional and Global Model and Analysis

Now Available !

Applications Due
November 8, 2023
at 5:00PM ET



<https://science.osti.gov/wdts/scgsr>

FY 2023 BER Priorities

- ✓ Support four Bioenergy Research Centers (BRCs) to initiate new cross-BRC collaborative research on clean energy challenges and in Genomic Science.
- ✓ Continued efforts within the Urban Integrated Field Laboratories, the NVCLs, and the Climate Resilience Centers.
- ✓ Expansion of the cross-SC BRaVE initiative and RENEW effort to include both BER Divisions
- ✓ Launch Energy Earthshot Research to address key biological research challenges at the interface of currently supported basic research and applied research.
- ✓ Launch Funding for Accelerated, Inclusive Research (FAIR) and ACCELERATE.
- ✓ Improve the representation of physical, biogeochemical and human processes to enhance the predictability of Earth system models.
- ✓ Expand and enhance E3SM activities to utilize advanced software and AI/ML for running on future DOE exascale computer architectures.
- ✓ Continue investments in coastal science with efforts in Chesapeake Bay, Puget Sound, and the Great Lakes region.

FY2023 – SC New Initiatives

- ➔ SC Energy Earthshots
- ➔ Accelerate Innovations in Emerging Technologies (ACCELERATE)
- ➔ Funding for Accelerated, Inclusive Research (FAIR)
- ➔ Established Program to Stimulate Competitive Research (EPSCoR)

Expanding and Diversifying the Science Community

SC Outreach Strategy Goals

- Increase SC engagement with the scientific communities and communities underrepresented in the SC portfolio.
- Establish greater coordination within projects (PIER plans) and across the SC offices to improve SC's outreach.

Reaching a New Energy Sciences Workforce (RENEW)

Build research foundations and provide training opportunities for undergraduate and graduate students, postdoctoral researchers, and faculty at institutions historically underrepresented in the SC research portfolio.

Funding for Accelerated, Inclusive Research (FAIR)

Build research capacity, infrastructure, and expertise at institutions historically underrepresented in the SC portfolio, including minority serving institutions (MSIs) and emerging research institutions (ERIs).

Established Program to Stimulate Competitive Research (EPSCoR)

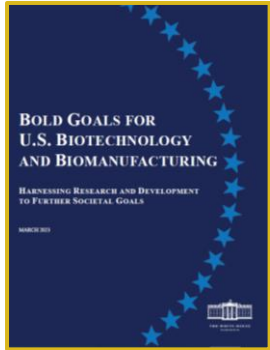
Enhance the capabilities of designated states and territories to conduct sustainable and nationally competitive energy-related research.

Climate Resilience Centers (CRCs)

Extend DOE climate science, capabilities, and research by supporting Historically Black Colleges and Universities (HBCUs), non-R1 MSIs, and ERIs to address regional resilience needs and impacts on natural, socioeconomic, and/or built systems and their intersections.

Bioeconomy Executive Order Updates

In September 2022, President Biden signed [Executive Order \(EO\) 14081 on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy](#).



[Harnessing Biotechnology and Biomanufacturing Research and Development \(R&D\) to Further Societal Goals](#)

- Five sections on bold goals that highlight the possibilities available with the power of biology.
- Broad vision for the U.S. bioeconomy and what can be achieved with concerted action from industry, academia, nonprofits, the Federal Government, and other organizations.
- DOE led the *Biotechnology and Biomanufacturing R&D to Further Climate Change Solutions* section

Additional reports with DOE/BER involvement to be released soon:

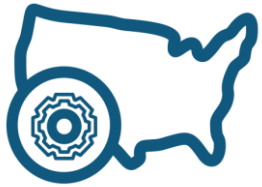
- **Vision, Needs, and Proposed Actions for the Data for the Bioeconomy Initiative**
 - DOE Office of Science involved
- **Building a Vibrant Domestic Biomanufacturing Ecosystem**
 - DOE/DOC/DOD co-leading report
- **Measuring the Bioeconomy**
 - DOE Office of Science involved
- **Reducing Risk by Advancing Biosafety and Biosecurity**
 - DOE Office of Science involved



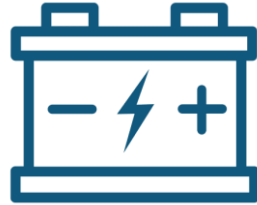
DOE providing input on other reports:

- Bioeconomy Workforce
- Bioeconomy Infrastructure Resilience
- International Engagement

Energy Earthshots Initiative



**Floating Offshore
Wind**



**Long Duration
Storage**

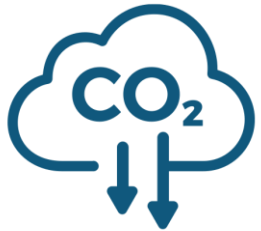


**Enhanced
Geothermal**



Oct 2023

**Affordable Home
Energy**



Carbon Negative



Hydrogen



Industrial Heat



May 2023

**Clean Fuels and
Products**

- Atmospheric CO2 removal
- Biological/abiotic sequestration
- Reactions and kinetics
- Measurement and validation

- Reduced carbon intensity
- Reduced heating footprint
- Alternatives to thermal heating
- Heat recovery and re-use
- Alternate production processes

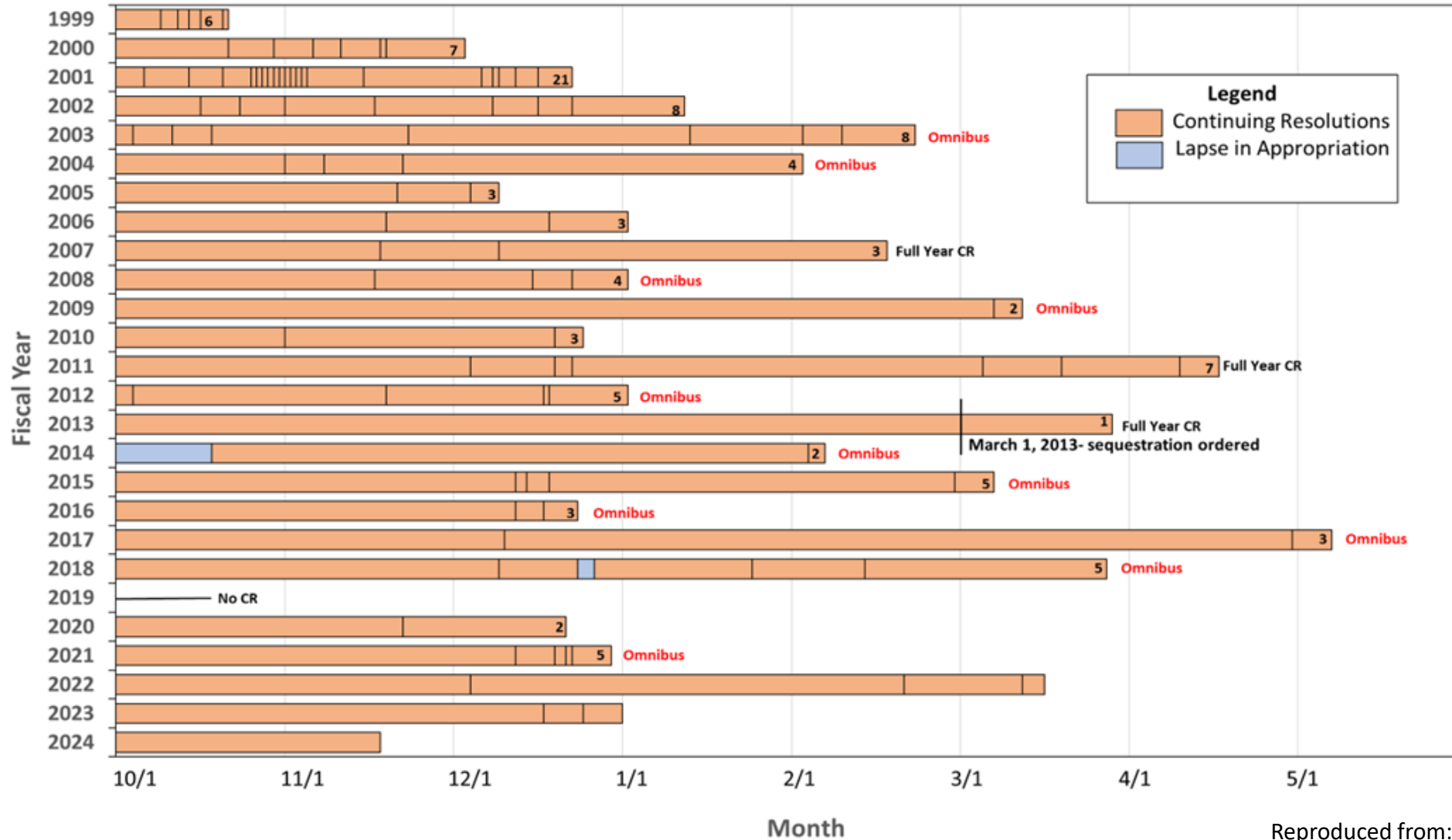
- Materials, modeling, and control
- Interactions with environment
- Transmission, cogeneration, and storage

FY 2024 BER Priorities

- Climate science with an increased investment in Urban Integrated Field Laboratories (Urban IFLs), the network of climate centers affiliated with HBCUs and MSIs.
- Energy Earthshot Research Centers and complementary Energy Earthshot Research activities to address innovative clean energy production and carbon management practices at the interface between basic research and applied research relevant to BER science.
- Bioenergy Research Centers (BRCs) initiatives for new cross-BRC collaborative research on clean energy challenges and in Genomic Science.
- Initiatives in Established Program to Stimulate Competitive Research (EPSCoR), Reaching a New Energy Sciences Workforce (RENEW), and Funding for Accelerated, Inclusive Research (FAIR) to build stronger programs with underrepresented institutions and regions, including investing in a more diverse and inclusive workforce for BER science.
- BRaVE effort to work on multidisciplinary research and national emergency challenges, including low dose radiation.
- Investments in AI/ML to improve Earth and environmental system predictability.
- Representation of physical, biogeochemical, and human processes to enhance the predictability of climate, Earth, and environmental systems.
- Leveraging genomic science of microbes, plants, and complex biological systems for a sustainable bioeconomy.



Budget: Duration and Number of Continuing Resolutions by Fiscal year



Reproduced from: GAO-18-368T, GAO Analysis of Congressional Research Service data.

BUDGET OF THE U.S. GOVERNMENT

FISCAL YEAR 2024

OFFICE OF MANAGEMENT AND BUDGET



FY 24 - President's Budget Request

Biological and Environmental Research

	FY22 ENACTED	FY23 ENACTED	FY24		
			President's Request	House Mark	Senate Mark
BSSD	405,000	463,685	476,500	424,750	474,500
EESD	410,000	445,000	445,200	392,250	456,241
TOTAL	815,000	908,685	931,700	827,000	940,741

* All in thousands of dollars

THANK YOU!

