



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Biological and Environmental Research Update

**BER Advisory Committee (BERAC)
Fall Meeting
October 18, 2018**

*Sharlene Weatherwax
Associate Director*

BER Staff Changes

Dan Drell

Program Manager
Joint Genome Institute
(Retired September 2018)



Ashley Williamson

Program Manager
Atmospheric System
Research
(Retired June 2018)



Jessica Moerman

AAAS Fellow –
working with CESD
(Started September 2018)
Welcome!!!



Sujata Emani

AAAS Fellow –
working with BSSD
(Started September 2018)
Welcome!!!



BER Researchers Recognized



William D. Nordhaus

Sterling Professor of Economics
Yale University



2018 Nobel (Sveriges Riksbank) Prize
in Economic Sciences

*“for integrating climate change into
long-run macroeconomic analysis”*

BER Researchers Recognized (cont'd)



Timothy Donohue

Director, Great Lakes Bioenergy Research Center,
University of Wisconsin-Madison

**American Society for Microbiology -
Promega Biotechnology Research Award**



Jizhong Zhou

Professor, University of Oklahoma

**American Society for Microbiology -
Award for Environmental Research**

Steven J. Ghan

Pacific Northwest National Laboratory
Fellow of the American Geophysical Union



BER Researchers Recognized (cont'd)



Inez Y. Fung

Professor, UC Berkeley
**American Meteorological Society (AMS) -
Carl-Gustaf Rossby Research Medal**



Patrick Minnis

NASA Langley Research Center
AMS - Verner E. Suomi Technology Medal



Samson M. Hagos

Pacific Northwest National Laboratory
**AMS - Clarence Leroy Meisinger Award
(Early Career)**

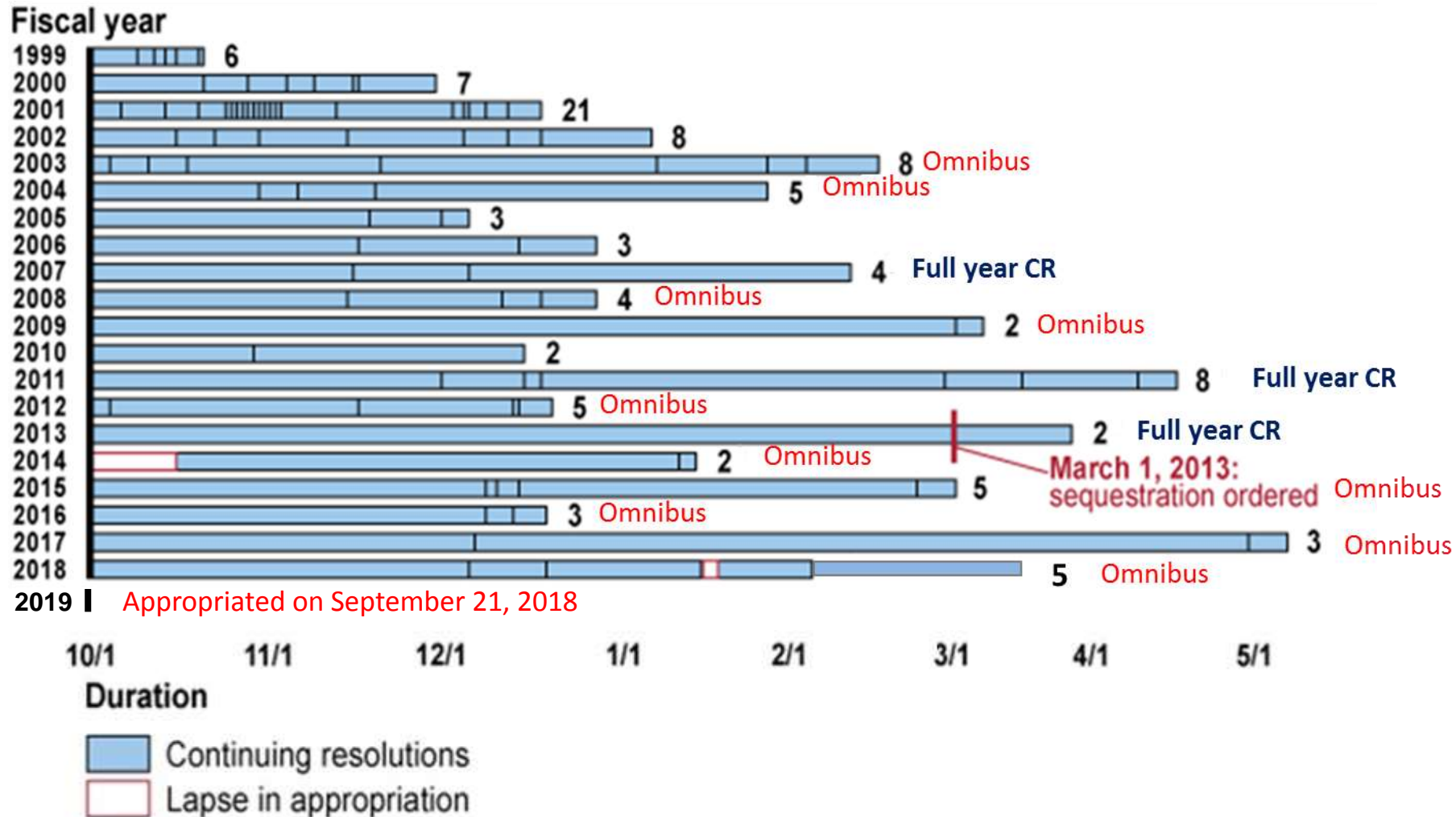


J. David Neelin

Professor, UC Los Angeles
AMS - Jule G. Charney Medal

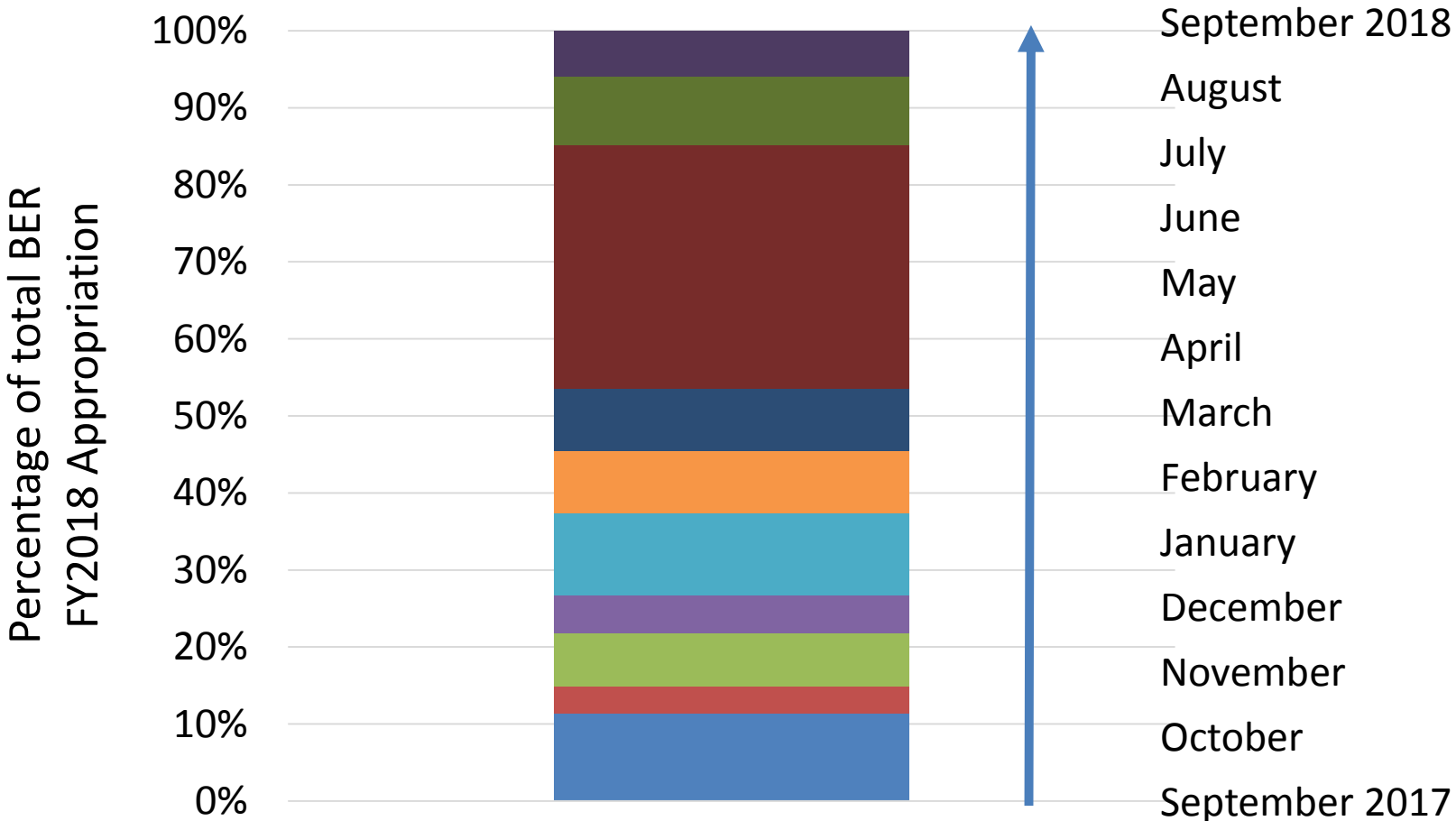
Budget: Duration and Number of Continuing Resolutions

**FY2019:
No CR!**

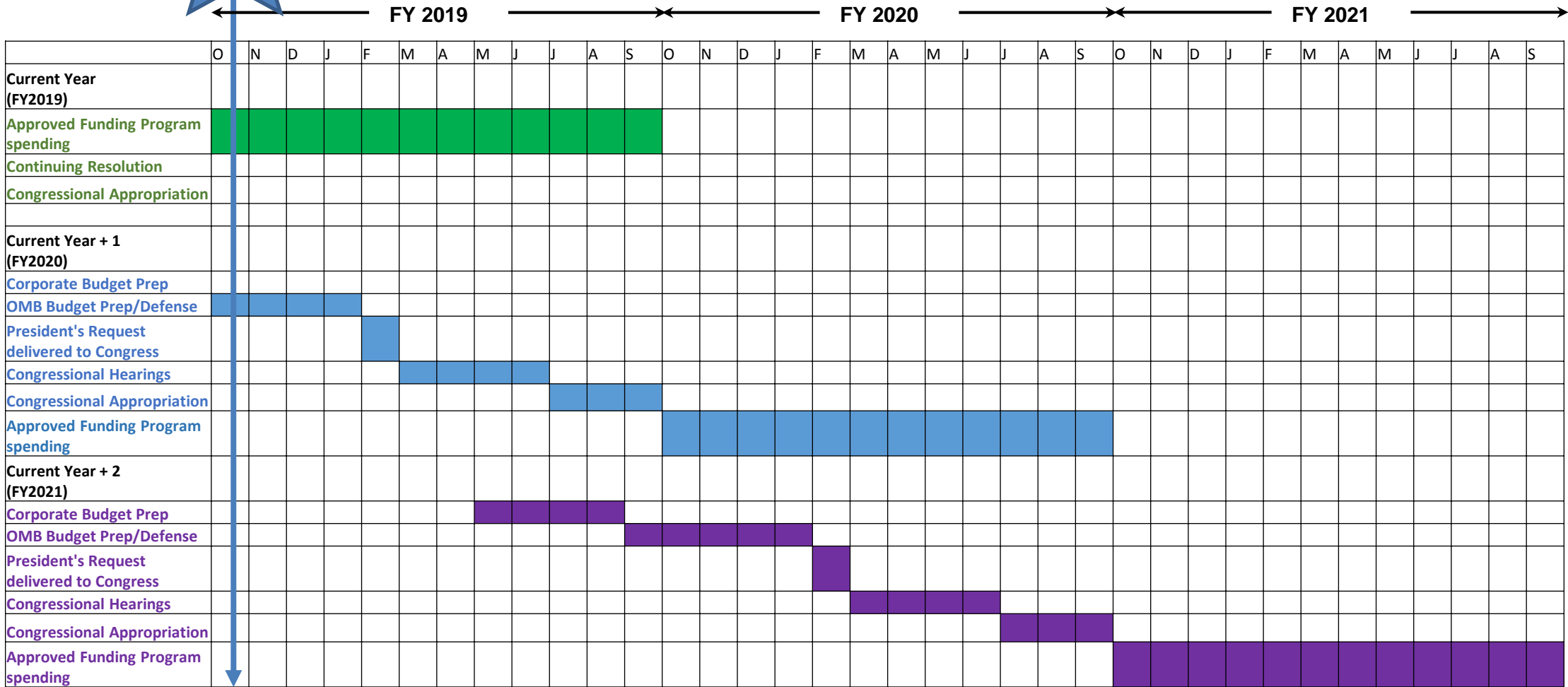


Source: Modified from GAO analysis of Congressional Research Service data. GAO-18-368T.

Funding Allotments throughout the Fiscal Year 2018



The DOE/SC Budget Cycle



SC FY2019 Appropriation summary

Office of Science					
FY 2019 SC External Control Table					
(B/A in thousands)					
	FY 2017	FY 2018	FY 2019		
	Enacted Approp.	Enacted Approp.	President's Request	Enacted Approp.	FY 2019 Enacted Approp. vs President's Request
ASCR.....	647,000	810,000	899,010	935,500	36,490
BES.....	1,871,500	2,090,000	1,850,000	2,166,000	316,000
BER.....	612,000	673,000	500,000	705,000	205,000
FES.....	380,000	532,111	340,000	564,000	224,000
HEP.....	825,000	908,000	770,000	980,000	210,000
NP.....	622,000	684,000	600,000	690,000	90,000
WDTS.....	19,500	19,500	19,000	22,500	3,500
SLI.....	130,000	257,292	126,852	232,890	106,038
S&S.....	103,000	103,000	106,110	106,110	.....
PD.....	182,000	183,000	180,000	183,000	3,000
SBIR/STTR (SC).....	.....	.....	.....	.....	.....
Subtotal, Science.....	5,392,000	6,259,903	5,390,972	6,585,000	1,194,028
SBIR/STTR (DOE).....	.....	.....	.....	.....	.....
Rescission of PY Bal ^a	-1,028	.....	.....	.....	.....
Total, Science.....	5,390,972	6,259,903	5,390,972	6,585,000	1,194,028

^a Rescission of PY funds in the amount -\$239K for FY 2012 and older; -\$239K for FY 2013; and -\$550K for FY 2014 - FY 2016.

BER Budget FY2019

	FY2017 (\$M) Enacted	FY 2018 (\$M) Enacted	FY 2019 (\$M) Appropriated
Biological Systems Science	\$306.7	\$351.4	\$367.8
Research	\$227.2	\$282.0	\$297.8
Facilities	\$79.5	\$69.4	\$70.0
Earth and Environmental Systems Sciences	\$305.3	\$321.6	\$337.2
Research	\$189.6	\$206.6	\$206.7
Facilities	\$115.7	\$115.0	\$130.5
TOTAL	\$612.0	\$673.0	\$705.00

FY2019 appropriation fully supports all three BER user facilities

FY19 Budget Directives for BER - Summary

- Prioritize the operation of BER user facilities. Specific funding levels provided for all 3 User Facilities and for replacement of the ARM aerial capability.
- Full funding of the Bioenergy Research Centers.
- Begin establishment of a national microbiome database.
- Continue to support model performance optimization of coupled systems for execution on high performance and exascale systems.
- Specific funding levels provided for multiple research activities in BSSD and CESD.

FY2020 Administration Research and Development Budget Priorities

R&D Priority Areas

1. Security of the American People
2. American Leadership in Artificial Intelligence, Quantum Information Sciences, and Strategic Computing
3. American Connectivity and Autonomy
4. American Manufacturing
5. American Space Exploration & Commercialization
6. American Energy Dominance
7. American Medical Innovation
8. American Agriculture

R&D Priority Practices

- A. Educating and Training and Workforce for the 21st Century Economy
- B. Managing and Modernizing R&D Infrastructure
- C. Maximizing Interagency Coordination and Cross-Disciplinary Collaboration




EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C.

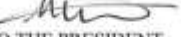


July 31, 2018

M-18-22

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: MICK MULVANEY 
DIRECTOR, OFFICE OF MANAGEMENT AND BUDGET

MICHAEL KRATSIOS 
DEPUTY ASSISTANT TO THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY

SUBJECT: FY 2020 Administration Research and Development Budget Priorities

The United States is a nation of thinkers, inventors, and entrepreneurs. Empowered by free-market capitalism and driven by bold ideas, Americans created an ecosystem of innovation that is the envy of the world, advancing science and technology and making the Nation prosperous and strong. America brought the miracle of electric light to people's homes, placed millennia of knowledge in people's pockets, and put men on the Moon and brought them safely back to Earth.

Building on a foundation of Federal research and development (R&D) investments, America will also be the nation that leads in today's emerging technologies, from artificial intelligence (AI) and quantum computing, to biotechnology, advanced wireless communications, and space commercialization.

Federal R&D dollars focused primarily on basic and early-stage applied research, paired with targeted deregulation, and investment in science, technology, engineering, and mathematics (STEM) education and workforce development, will strengthen the Nation's innovation base and position the United States for unparalleled job growth, continued prosperity, and national security.

This memorandum highlights the Administration's R&D priorities and provides guidance to agencies as they formulate their Fiscal Year 2020 budget submissions. This memorandum also details priority practices to effectively leverage R&D resources, including R&D workforce and infrastructure.

BER participates in Interagency R&D Policy Coordination

OSTP/National Science and Technology Council (NSTC)

Committee on Science

Co-chairs: NIH, NSF

- Food and Agriculture
- Open Science*
- Quantum Information Science
- Physical Sciences*
- Opioid FTAC
- Biological Sciences
- Aquaculture*

Committee on Technology

Co-chairs: DOE, NIST

- Advanced Manufacturing*
- Material Genome Initiative
- Future of Transportation
- Nanotechnology* (NNI)
- Machine Learning/AI
- Biotechnology

Committee on Environment

Co-chairs: EPA, NOAA

- Polar Research*
- Global Change* (USGCRP)
- Water Availability & Quality
- Earth Observations
- Ocean Science*
- Environmental Health

Committee on S&T Enterprise

Co-chairs: DOE, NIST, NSF

- Networking IT R&D* (NITRD)
- Research Business Models*
- International S&T Coordination*
- Scientific Collections
- R&D Infrastructure
- Open Data
- Lab 2 Market

Committee on Homeland and National Security

Co-chairs: DHS, DoD

- Bio Defense R&D
- Space Weather/EMP
- Critical Minerals
- SCORE
- Space-based threats
- Rad/Nuclear Defense R&D
- Disaster Infrastructure
- Border Security
- Autonomous Threats
- Critical Infrastructure

Committee on STEM Education

Co-chairs: NASA, NSF

- FC-STEM*

*Congressionally Mandated

2018 BER Early Career Focus Areas

- **Systems-level design and engineering of microbial or plant systems for the production of biofuels and bioproducts**
 - Eukaryote or prokaryote photosynthetic or fermentative microbes that can synthesize biofuels and bioproducts
 - Oil- or lignocellulosic biomass-producing bioenergy crops that can be engineered for facilitated cell wall deconstruction and conversion into fuels and products

- **Atmospheric processes that impact the Earth's energy budget**
 - aerosol formation, growth, or removal
 - secondary organic aerosol processes
 - aerosol-cloud interactions
 - boundary layer processes that impact cloud formation, microphysical properties, or lifetime
 - convective cloud processes
 - ice or mixed phase microphysical processes
 - radiative transfer processes

2018 BER Early Career Awardees



Name	Institution	Topic Area	Title
Daniel Amador-Noguez	Univ. of Wisconsin-Madison	Plant and Microbial Systems	Genome-scale in vivo determination of Gibbs free energies in metabolic networks
Nanette Boyle	Colorado School of Mines	Plant and Microbial Systems	Enabling predictive metabolic modeling of diurnal growth using a multi-scale multi-paradigm approach
Susannah Burrows	PNNL	Atmospheric Processes	Building a comprehensive understanding of ice nuclei sources from the ground up: Establishing the impact of sea spray and agricultural soils
Naruki Hiranuma	West Texas A&M Univ.	Atmospheric Processes	Implications of aerosol physicochemical properties including ice nucleation at ARM mega sites for improved understanding of microphysical atmospheric cloud processes
Kolby Jardine	LBNL	Plant and Microbial Systems	O-acetylation and methylation engineering of plant cell walls for enhanced biofuel production
Kerri Pratt	Univ. of Michigan	Atmospheric Processes	Elucidating processes controlling arctic atmospheric aerosol sources, aging, and mixing states
ManishKumar Shrivastava	PNNL	Atmospheric Processes	Finding missing links associated with aerosol-cloud interactions: Aqueous and cloud-phase secondary organic aerosol formation
Philipp Zerbe	University of California, Davis	Plant and Microbial Systems	Improved biofuel production through discovery and engineering of terpene metabolism in switchgrass

2018 DOE Graduate Student Research Program (SCGSR) Award Recipients

Name	Graduate Institution	Host Lab	Research Area
Charlotte Marie DeWald	University of California – San Diego	PNNL	Atmospheric System Research
Elizabeth Ann Holman	California Institute of Technology	LBNL	Imaging and measurement for biological systems science
Emily Burt	University of Southern California	LBNL	Environmental Systems Science
Glade Arthur Dlott	Stanford University	PNNL	Soil Microbiology
Jessica Wedow	University of Illinois at Urbana-Champaign	PNNL	Plant Science for Sustainable Bioenergy
Jordan F. Russell	University of Georgia	NREL	Computational Biology and Bioinformatics
Morgan Elizabeth Barnes	University of California – Merced	PNNL	Environmental Systems Science
Teresa Eren Bilir	University of California – Berkeley	LBNL	Environmental Systems Science

2018 DOE SCGSR Program

The **Office of Science Graduate Student Research (SCGSR) Program** is managed by the Office of Workforce Development for Teachers and Scientists, and was developed to prepare graduate students for science, technology, engineering, or mathematics (STEM) careers important to the DOE Office of Science mission.


SCGSR Topics for Biological and Environmental Research (BER) in the second (current) solicitation of 2018 include:

- (a) Computational Biology and Bioinformatics
- (b) Novel in Situ Imaging and Measurement Technologies for Biological Systems Science
- (c) Plant Science for Sustainable Bioenergy
- (d) Soil Microbiology
- (e) Environmental Systems Science
- (f) Atmospheric System Research
- (g) Earth System Modeling

**Applications are due
November 15, 2018**

New BERAC Charge

Committee of Visitors (COV) to review BER processes for programmatic funding in the Climate and Environmental Sciences (CESD) Division

 Department of Energy
Office of Science
Washington, DC 20585

OCT 15 2018

Dr. Gary Stacey
Endowed Professor of Plant Sciences and Biochemistry
National Center for Soybean Biotechnology
271E Bond Life Sciences Center
University of Missouri
Columbia, MO 65211


Dear Dr. Stacey:

By this letter I am charging the Biological and Environmental Research Advisory Committee (BERAC) to assemble a Committee of Visitors (COV) to assess the processes used by the Climate and Environmental Sciences Division (CESD) within BER to manage CESD research programs and its user facilities, the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL) and the Atmospheric Radiation Measurement (ARM) Climate Research Facility.

The COV should provide an assessment of the processes used to solicit, review, recommend and monitor proposals for research submitted to CESD programs for FY2015 – FY2018. This includes funding at national laboratories and universities and other activities handled by the program during this time period. It should also assess the quality of the resulting scientific portfolio, including its breadth and depth and its national and international standing. Additionally, the COV should also assess the division's management and oversight of the ARM and EMSL user facilities for the same time period. Specifically, I would like the panel to consider and provide an evaluation of the following:

1. For both the DOE national laboratory projects and university grants, assess the efficacy and quality of the processes used by CESD programs during the past three years to:
a) solicit, review, recommend and document application and proposal actions, and
b) monitor active awards, projects and programs.
2. Within the boundaries defined by DOE missions and available funding, comment on how the award process has affected: a) the breadth and depth of the portfolio elements and, b) the national and international standing of the portfolio elements.
3. For the ARM and EMSL user facilities, assess the division's management and oversight of these facilities, including facility operations tracking and review, user proposal solicitation, review and recommendation procedures.

For CESD research programs, topics to be investigated can include but are not limited to: the selection of an adequate number of qualified reviewers who are free from bias and/or conflicts of interest; use of the Office of Science merit review criteria; adequacy of documentation; characteristics of the award portfolio; usefulness of program reports on previously funded research; quality of the overall technical management of the program; relationships between award decisions, program goals and the DOE mission; significant impacts and advances that

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COV review and are demonstrably linked to DOE's program or recommendations of the previous COV review.

to all program documentation completed during the period, proposals, review documents and other requests. COV discretion, a representative sample of the program portfolio to suggest a sample of actions, including new, renewed and void, awards and deobligations. In addition, COV members through a random selection process.

COV have significant expertise across all covered areas within the program and are not to rely upon any person alone. A second requirement is that no member receives no direct research support from DOE. A third requirement is that all members receive no direct support from DOE, for example, application or proposals under review, progress reports or other review will not participate as a COV member for members of a COV, may be selected from a previous COV. A member of BERAC. The organization should be balanced and include reviewers from academic, DOE national laboratories, other organizations, and other appropriate institutions. The BERAC chair should balance factors including, institution, geographic region, and expertise. The BERAC chair should constitute an exceptional group of internationally recognized experts in the program areas within the CESD as programs. Additional guidance on COV reviews within the program is available at <http://science.energy.gov/berac-committees-of-visitors/>

did quarter of FY2019 (Summer 2019) in Cincinnati, Ohio. The report by BERAC should be held no later than the Fall of 2019. The acceptance of the full BERAC membership, the COV report is to be presented to me, as the Acting Director, Office of Science.

For this charge, please contact Gary Geernaert, 301-903-3281 or geernaert@oos.doe.gov.

Sincerely,

J. Stephen Hinkley
Deputy Director for Science Programs
Office of Science

Thank you!