U.S. DEPARTMENT OF ENERGY | Office of Science

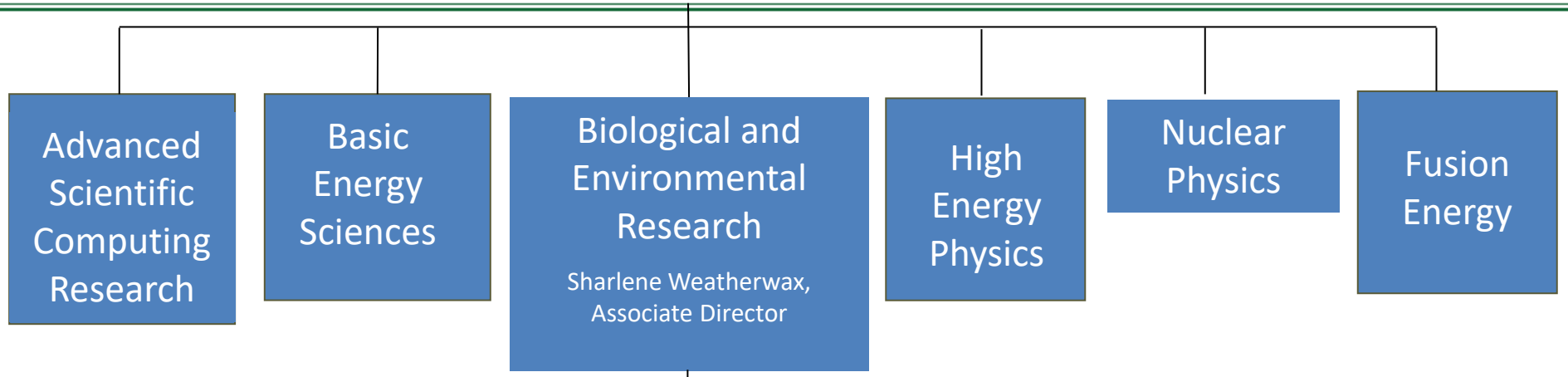
Addressing the NASEM Committee on: A Long-Term Strategy for Low-Dose Radiation Research in the United States

Todd Anderson, Ph.D.

Director, Biological Systems Science Division, Department of Energy, Office of Biological & Environmental Research

July 21, 2021

DOE Office of Science



Todd Anderson, Director

Biological Systems Science

- Genomic Science
  - Bioenergy Research Centers
- Biomolecular Characterization and Imaging Science
- Facilities & Infrastructure
  - Joint Genome Institute

Gary Geernaert, Director

Climate & Environmental Sciences

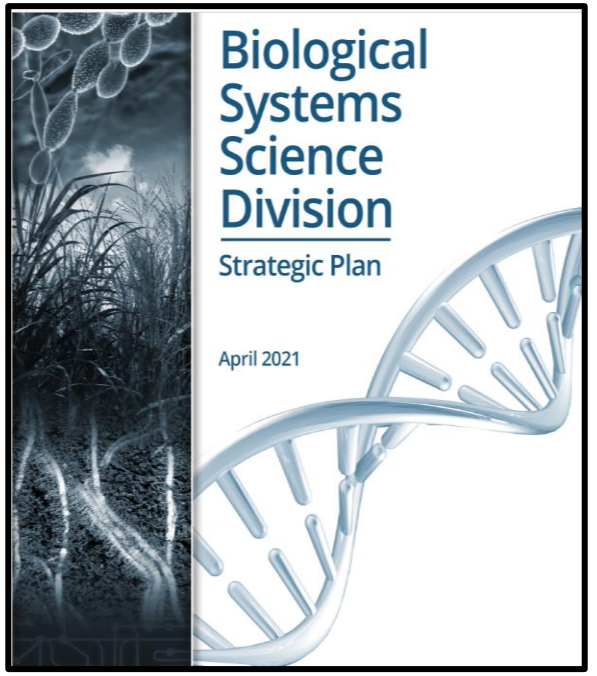
- Atmospheric System Research
- Environmental System Science
- Climate & Earth System Modeling
- Facilities & Infrastructure
  - Environmental Molec. Sciences Lab
  - ARM Climate Research Facility

Strategic Directions for Biological Systems Science

Overarching Goal

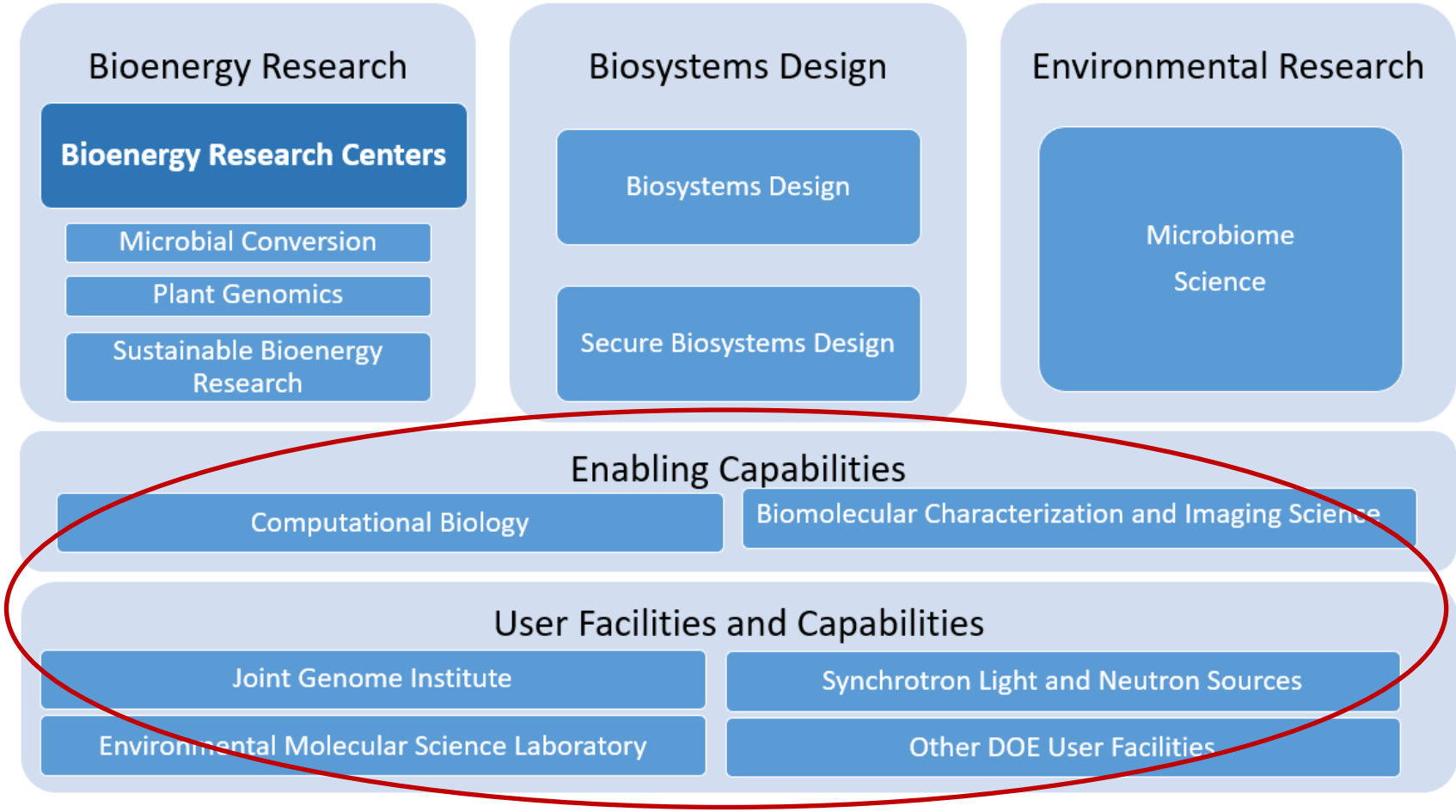
Provide the necessary fundamental science to understand, predict, manipulate, and design biological processes that underpin innovations for bioenergy and bioproduct production and to enhance the understanding of natural environmental processes relevant to DOE.

- What information is encoded in the genome sequence and how does this information explain the functional characteristics of cells, organisms, and whole biological systems?
- How do interactions among cells regulate the functional behavior of living systems and how can those interactions be understood dynamically and predictively?
- How do plants, microbes, and communities of organisms adapt and respond to changing environmental conditions (e.g., temperature, water and nutrient availability, and ecological interactions), and how can their behavior be manipulated toward desired outcomes?
- What organizing biological principles need to be understood to facilitate the design and engineering of new biological systems for beneficial purposes



BSSD Strategic Plan - April 2021

Biological Systems Science Division Research Portfolio



- Three main Research efforts:
  - Bioenergy
  - Biosystems Design
  - Environmental Research
- Range of large and small team projects and individual PI efforts.
- Supported by Enabling capabilities
- Access to JGI, EMSL and the DOE Light sources

Complemented by:

- Small Business Innovative Research (SBIR) awards
- Early Career awards
- SC Graduate Student Research
- EPSCoR (intermittent)

Resources Available within the Division/Office

User Facilities

JGI JOINT GENOME INSTITUTE
A DOE OFFICE OF SCIENCE USER FACILITY

JGI

EMSL

EMSL

BER Structural Biology Resources

https://berstructuralbioportal.org/

Computational Platforms

KBase
PREDICTIVE BIOLOGY
DOE Systems Biology Knowledgebase

KBase

nmdc
National Microbiome Data Collaborative

NMDC

NERSC

NERSC

Potential Interagency Connections

Environmental Protection Agency (EPA)
Nuclear Regulatory Commission (NRC)
National Aeronautics and Space Administration (NASA)

NIH- National Cancer Institute (NCI)
Radiation Research Program (RRP)

New NIH-DOE Memorandum of Understanding (MOU)
- Advanced computational analyses

MEMORANDUM OF UNDERSTANDING (MOU)

BETWEEN

THE DEPARTMENT OF ENERGY (DOE)

AND

THE NATIONAL CANCER INSTITUTE (NCI)

This Memorandum of Understanding (MOU) is made between the Department of Energy (DOE) and the National Cancer Institute (NCI) (the "Parties"), for the purpose of establishing a framework for collaboration between the Parties and for pursuing specific collaborative projects. The Parties intend to collaborate through steering committees, working groups, and project teams to develop strategic plans, set priorities, and leverage resources and expertise from multiple sources, including the private sector, toward the goal of collaborative development of a shared technology ecosystem and targeted applications that will bring advanced computing capability to biomedical research and produce a transformation across the continuum of cancer research and, ultimately, in patient care and outcomes. Future collaborative activities may involve additional parties and will be implemented through separate agreements, as needed. This MOU becomes effective on the latest date on which DOE and NCI execute this MOU (the "Effective Date"); other agencies may join after the Effective Date with the written consent of all Parties.

Thank you

https://science.osti.gov/ber

https://www.energy.gov/science/ber/biological-and-environmental-research