

Next Generation Ecosystem Experiment (NGEE)

U.S. Department of Energy
Climate and Environmental Sciences

AGU Town Hall – December 8, 2011

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Terrestrial Ecosystem
SCIENCE



U.S. DEPARTMENT OF
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and Environmental Research



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ENERGY
LEADING BASIC RESEARCH
FOR A SUSTAINABLE FUTURE

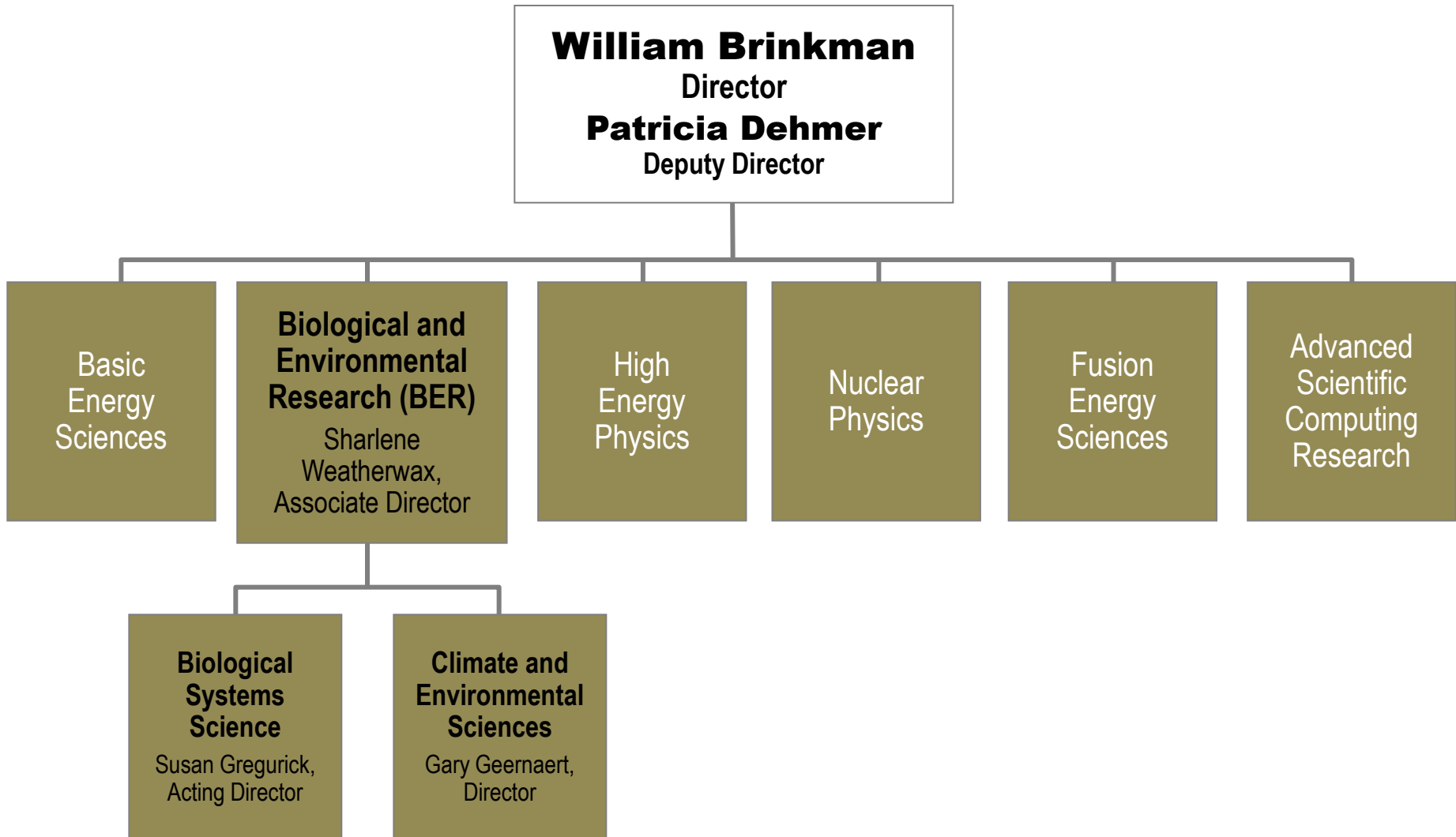
ENVIRONMENT
UNDERSTANDING CLIMATE CHANGE AND
IMPROVING THE ENVIRONMENT

INNOVATION
BUILDING RESEARCH INFRASTRUCTURE AND
PARTNERSHIPS THAT FOSTER INNOVATION

DISCOVERY
UNRAVELING NATURE'S
DEEPEST MYSTERIES

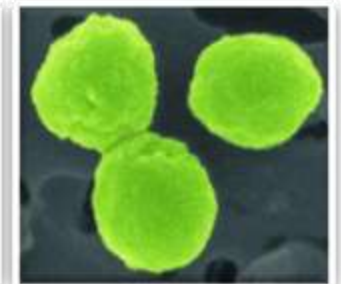
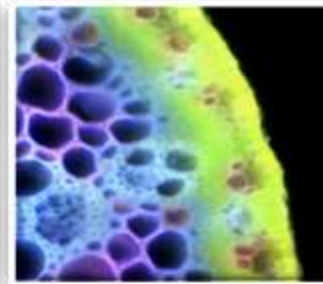
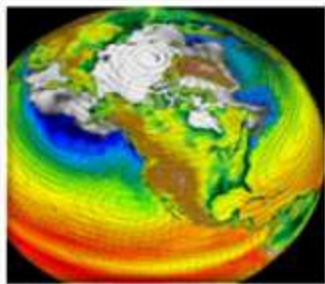
SCIENCE.DOE.GOV

Department of Energy Office of Science



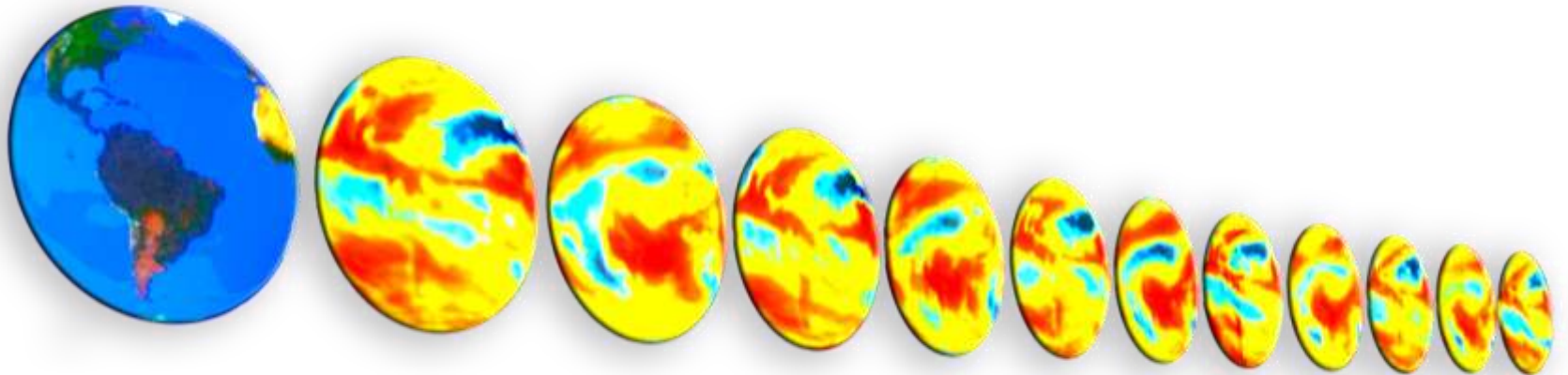
Biological and Environmental Research Mission

- To understand complex biological, climatic, and environmental systems across spatial and temporal scales.
- BER provides the foundational science to:
 - Support the development of biofuels as major, secure, and sustainable national energy resources
 - Understand the potential effects of greenhouse gas emissions on Earth's climate and biosphere and the implications of these emissions for our energy future
 - Predict the fate and transport of contaminants in the subsurface environment at DOE sites
 - Develop new tools to explore the interface of biological and physical sciences



Biological and Environmental Research Approach

- Understanding complex biological and environmental systems across many spatial and temporal scales:
 - From the sub-micron to the global
 - From individual molecules to ecosystems
 - From nanoseconds to millennia
- Integrating science by tightly coupling theory, observations, experiments, models, and simulations
- Supporting interdisciplinary research to address critical national needs
- Engaging national laboratories, universities, and the private sector to generate the best possible science



Climate & Environmental Sciences Division

(FY 11 funding levels)

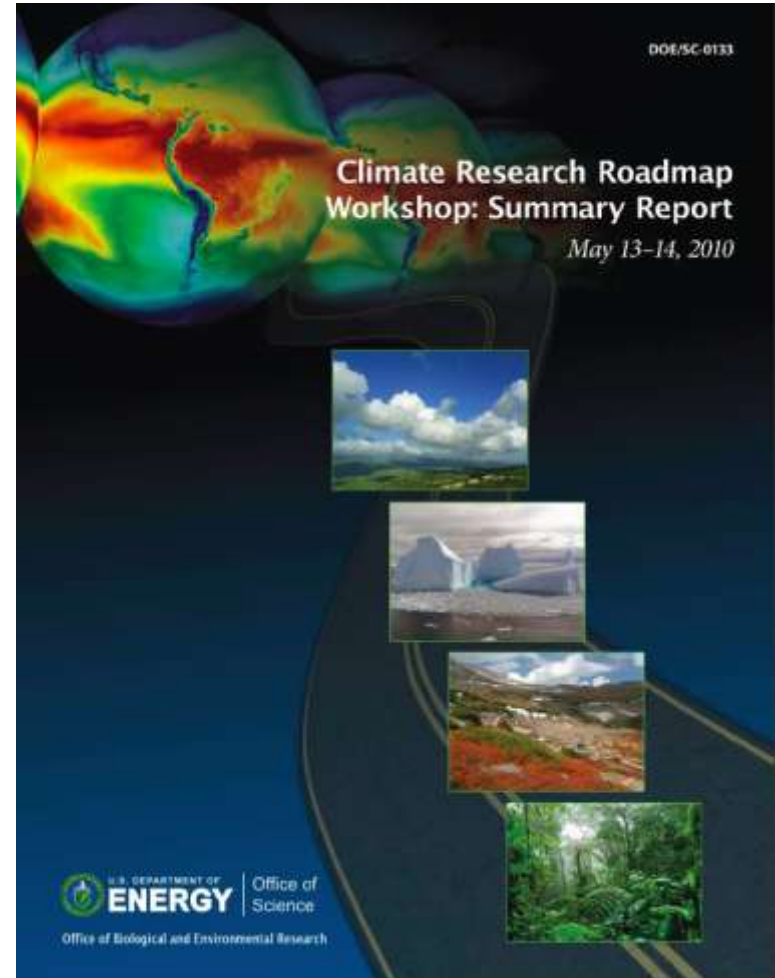
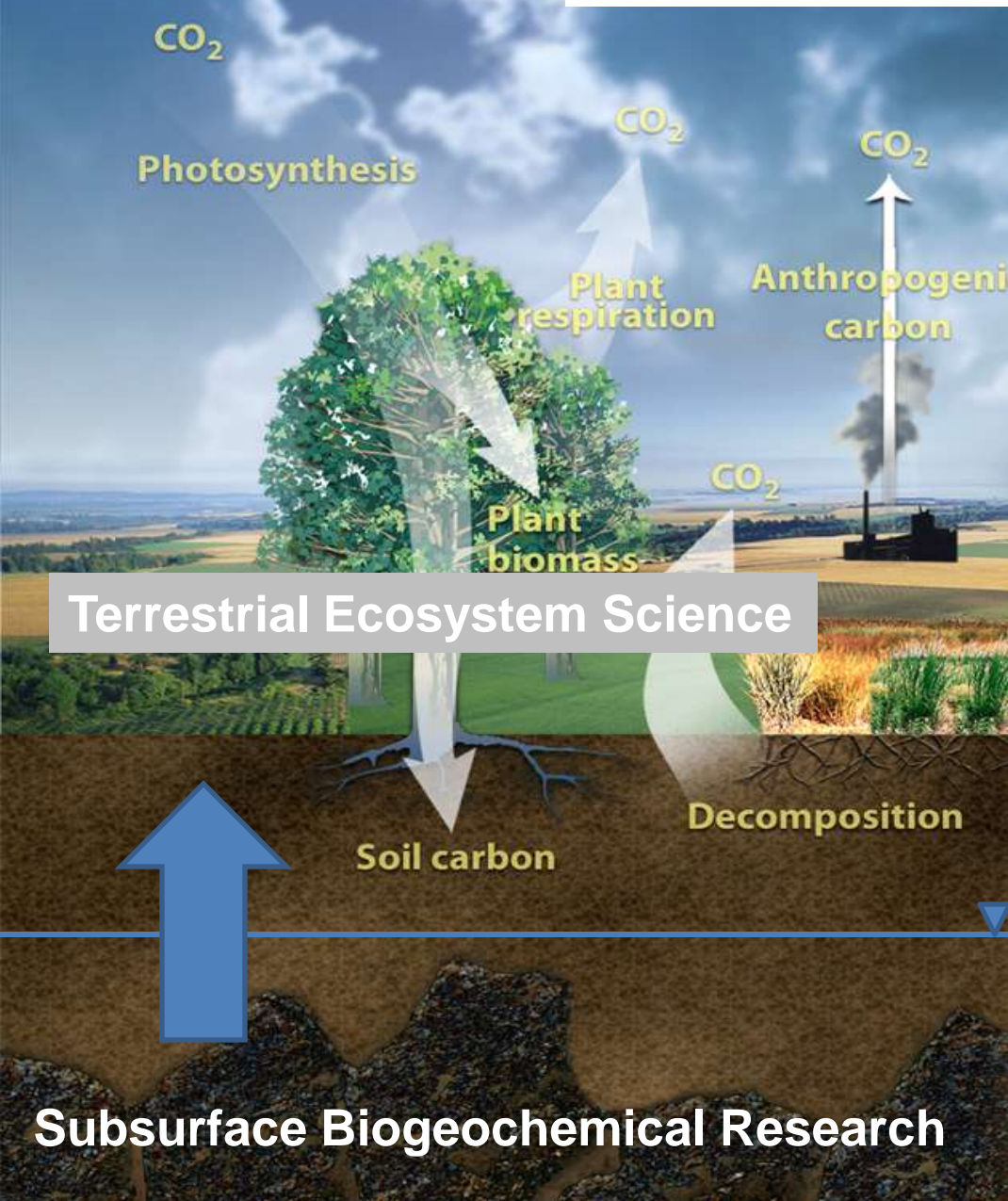
- Research Programs

- Climate and Earth System Modeling (~\$78)
- Atmospheric Systems Research (~\$28M)
- Environmental Systems Science
 - Terrestrial Ecosystem Science (~\$29M)
 - Subsurface Biogeochemical Research (~\$49M)

- Facilities

- Atmospheric Radiation Monitoring (ARM) Climate Research Facility (~\$45M)
- Environmental Molecular Sciences Laboratory (~\$50M)

Environmental System Science



Terrestrial Ecosystem Science

Foundational science to improve our predictive understanding of terrestrial ecosystems in the context of a changing climate

Observations

Manipulations

Large-scale, long-term field studies

Process modeling with ties to earth-system models

Funding to universities and national laboratories



Terrestrial Ecosystem Science

- funding information

Roughly 50:50 university:lab funding ratio

Annual University solicitations

- Typical awards of \$350,000/year for 3 years

Ameriflux support

- Maintaining many AmeriFlux sites
- AmeriFlux network infrastructure
- CDIAC data center

Ongoing triennial review of National Lab programs

More information at: <http://tes.science.energy.gov/>

Next Generation Ecosystem Experiment

- Goal: development of a process-rich ecosystem model, extending from bedrock to the top of the vegetative canopy, in which the evolution of Arctic ecosystems in a changing climate can be modeled at the scale of a high resolution Earth System Model (ESM) grid cell (i.e., approximately 30x30 km grid size)
- Approach
 - Collaborative effort among DOE National Laboratories and universities
 - Interdisciplinary, multi-scale approach to advance predictive understanding through coupled modeling and process research across multiple scales
 - Opportunities for leveraging through external collaboration (DOE and other agencies)



Today's Town Hall presentations

Why the Arctic?

- Dr. Larry Hinzman
University of Alaska - Fairbanks

Modeling gaps and opportunities

- Dr. Peter Thornton
Oak Ridge National Laboratory

NGEE

- Dr. Stan Wullschleger
Oak Ridge National Laboratory



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