Terrestrial Ecosystem Science

Environmental System Science
Virtual PI Meeting Webinars

May 19-20, 2020

Daniel B. Stover, Ph.D.

Welcome!

Dr. Jennifer Arrigo

Subsurface Biogeochemical Research

Dr. Xujing Davis

Earth and Environmental System Modeling

Dr. Jeff Stehr

Atmospheric Systems Research

Coming Soon!

Dr. Brian Benscoter
Florida Atlantic University

Earth & Environmental Systems Sciences Division
(FY 2020 Funding Levels)

Research Programs ($343 M)

- Atmospheric Sciences Research Area ($35 M)
  - Atmospheric Radiation Measurement User Facility ($70.1 M)
- Earth & Environmental System Modeling Research Area ($97 M)
- Environmental Systems Science Research Area ($122.6 M)
  - Terrestrial Ecosystem Science ($45.7 M)
  - Subsurface Biogeochemical Research ($31.9 M)
  - Environmental Molecular Sciences Laboratory Scientific User Facility ($45 M)
- Climate Data Informatics/Management ($8 M)

Terrestrial Ecosystem Science (TES) Program

Goal: The TES program seeks to improve the representation of terrestrial ecosystem processes in Earth system models, thereby improving the quality of Earth system and environmental model projections and providing the scientific foundation of solutions for DOE's most pressing energy and environmental challenges.

Approach: A model-inspired fundamental research approach focusing on processes and ecosystems that are:

- Globally/regionally significant;
- Climatic or environmentally sensitive;
- Insufficiently understood or inadequately represented in predictive models

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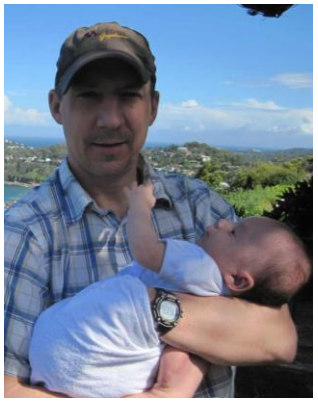
Collaborative interactions as an Environmental Systems Science group with the Subsurface Biogeochemistry Research (SBR) Program.

TES Program Update

- FY-16 ESS University Solicitation - $6.0M over 3 years
  - 219 pre-apps, 150 full applications, 16 awards
- FY-16 Early Career Research Program – Tropical Forest Ecology
  - 19 full proposals; 3 awards: Mayes (ORNL), McFarlane (LLNL) and Cusack (UCLA)
- FY-18 ESS University Solicitation - $5M over 3 years
  - 223 pre-apps, 130 full apps, 7 awards
- FY-19 TES University Solicitation –$5M over 3 years
  - 150 pre-apps, 91 full apps, 8 awards
- FY-20 ESS University Solicitation – ~$5M
  - Two TES science areas: Linking above and belowground processes and methane BGC
- Office of Science Graduate Student Research
  - Provides support for Ph.D. student to pursue parts of graduate research at DOE labs
- FY-19 Small Business Innovative Research
  - Automated rhizotron image analysis, 5 Phase I awards

New TES Awards

- Max Berkelhammer (Univ. of Illinois, Chicago)
  - "Water Foraging with Dynamic Roots in E3SM: The Role of Roots in Terrestrial Ecosystem Memory on Intermediate Time Scales" Exploratory Award



- Timothy Griffis (Univ. of Minnesota)
  - "Biophysical Processes and Feedback Mechanisms Controlling the Methane Budget of an Amazonian Peatland"

- Ashley Matheny (Univ. of Texas, Austin)
  - "Exploring Halophyte Hydrodynamics and the Role of Vegetation Traits on Ecosystem Response to Disturbance at the Terrestrial-Aquatic Interface"

- David Medvigy (Univ. of Notre Dame)
  - "Unraveling the Mechanisms of Below- and Aboveground Liana-Tree Competition in Tropical Forests"

New TES Awards

- Caitlin Hicks-Pries (Dartmouth College)
  - "Testing Mechanisms of How Mycorrhizal Associations Affect Forest Soil Carbon and Nitrogen Cycling"

- Ted Schuur (Northern Arizona Univ.)
  - "Coupled Long-Term Experiment and Model Investigation of the Differential Response of Plants and Soil Microbes in a Changing Permafrost Tundra Ecosystem"

- Bonnie Waring (Utah State Univ./Imperial College London)
  - "Leveraging Synthetic Root-Soil Systems to Quantify Relationships Between Plant Traits and the Formation of Soil Organic Matter"

Welcome to the TES family!

New Awards/Honors/Recognitions

2019 AGU Fellows

- Ted Schuur, Northern Arizona Univ.
- Jayne Belnap, USGS

ESA Fellows

- Jennifer Powers (Univ. of Minnesota)

AAAS Fellows

- Ben Bond-Lamberty (PNNL)

Geochemical Society Fellows

- Baohua Gu (ORNL)

NGEE-Arctic Data & Safety Awards

- Vladimir Romanovsky (UAF), David Graham (ONRL), Amy Breen (UAF) and Verity Salmon (ORNL)

National Academy of Engineers

- Susan Hubbard, LBNL

ESA Soil Ecology Sec. Leadership

- Lydia Zeglin, Kansas State Univ. (Vice-Chair)

SSSA Soil Biology Div. Leadership

- Vanessa Bailey, PNNL (Chair-Elect)

ORNL Sci. Communicator of the Year

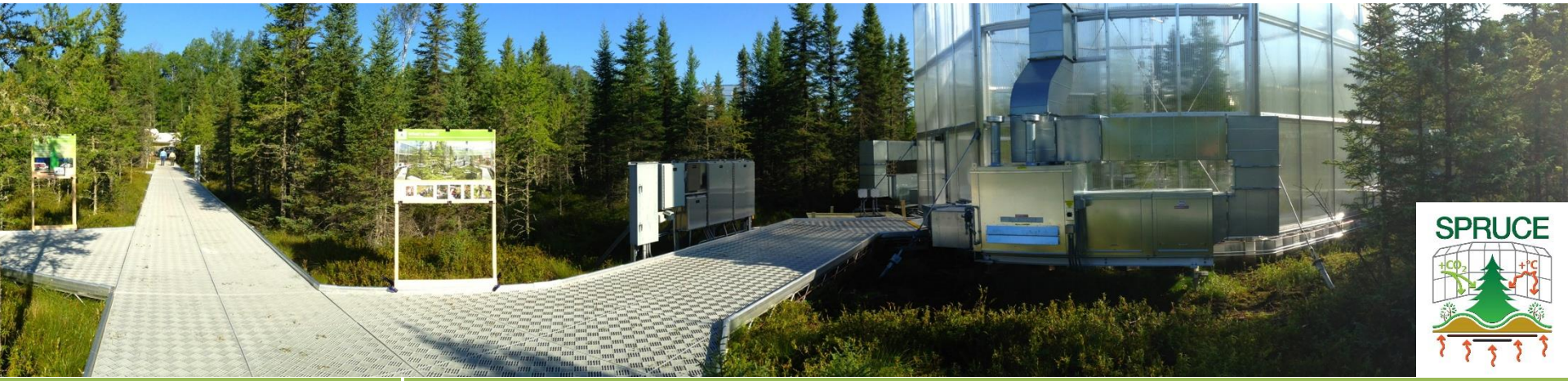
- Colleen Iverson (ORNL)

BES Haldane Prize Finalist

- Daniel Winkler (USGS)

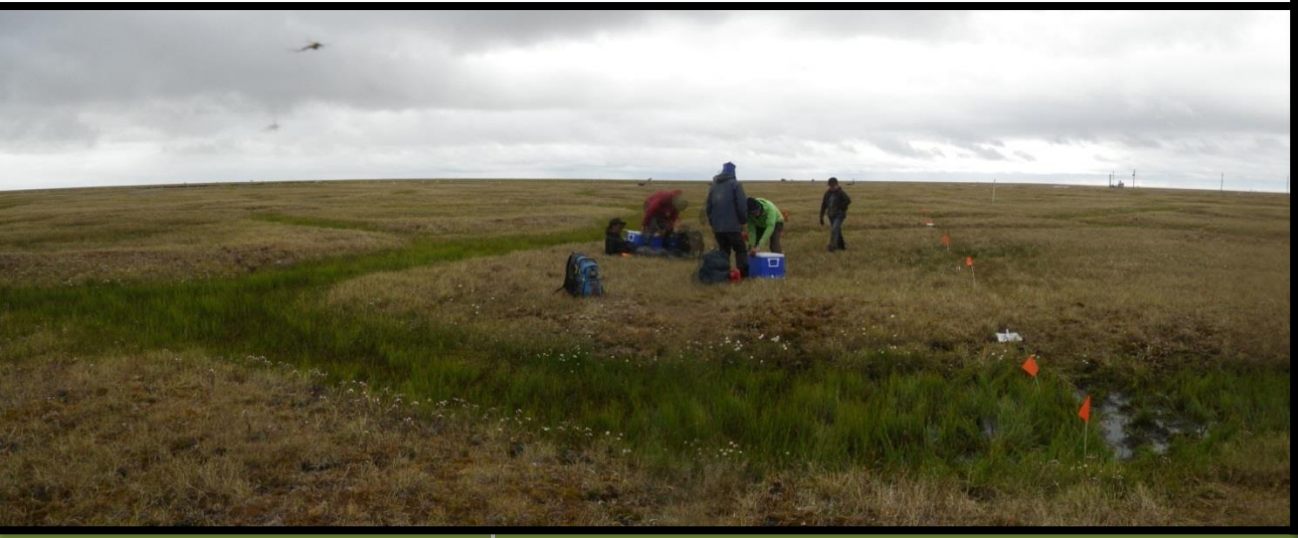
TES Program Update

- Next Generation Ecosystem Experiments (NGEE) Arctic
  - Successful Phase III renewal
- Next Generation Ecosystem Experiments (NGEE) Tropics
  - Successful Phase II review
- ORNL TES SFA (inc. SPRUCE)
  - Successful SFA Triennial Review



TES Program Update

- AmeriFlux Management Project
  - Renewal proposal currently under review
  - Successful engagement with NEON
  - Highlighted a “Year of Methane” network campaign
- ANL TES SFA
  - Soil Carbon Response to Env. Change
  - Currently under review
- Initial planning for a series of post-NGEE workshops

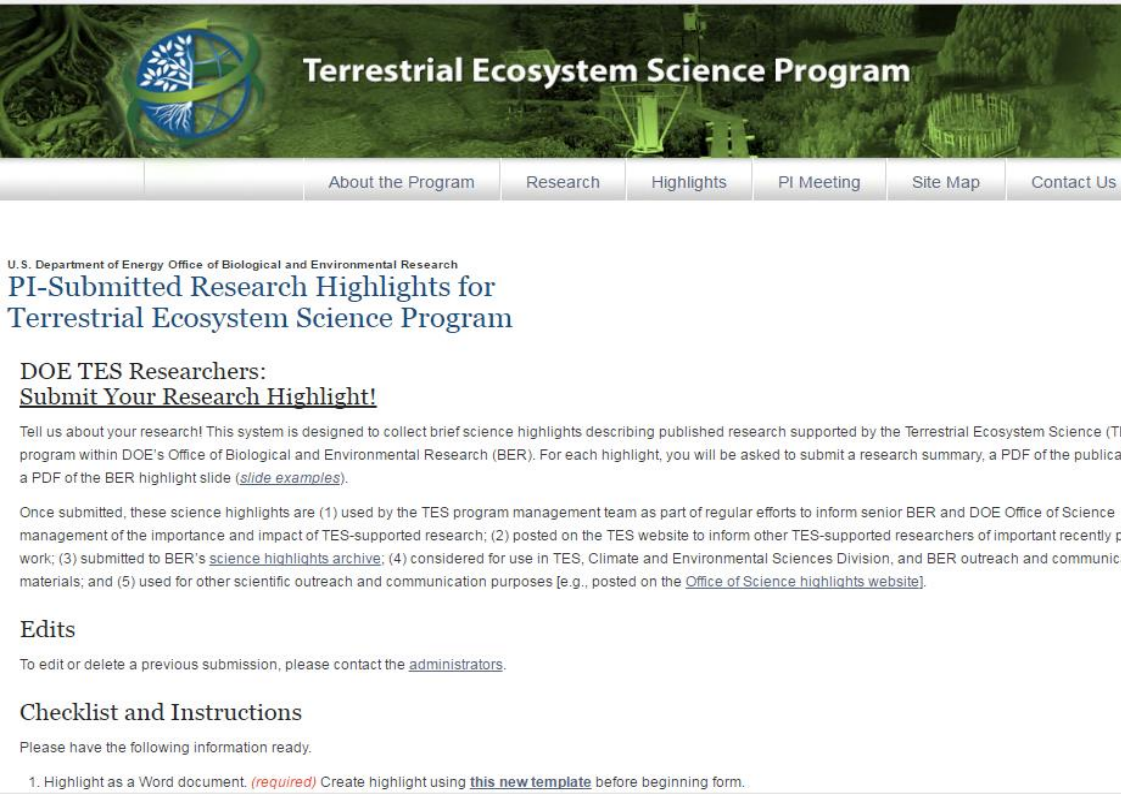


TES Program Update

- Coastal System Science
  - Congressionally directed
  - $20M new pilot effort led by PNNL
  - Comprised of 2 components:
    - A field study targeting pilot field studies in the Chesapeake Bay and Lake Erie (led by ESS), and
    - A regional model study that will examine the integrate Great Lakes Region (led by EESM)
  - The field study will seek to achieve a systems-level understanding of the BGC functioning of coastal ecosystems through observational and field-based experimental research, which can then be captured in coupled process models and in a representative, scalable, flexible and process-rich coastal ecosystem modeling framework.
  - Proposal due to BER in August

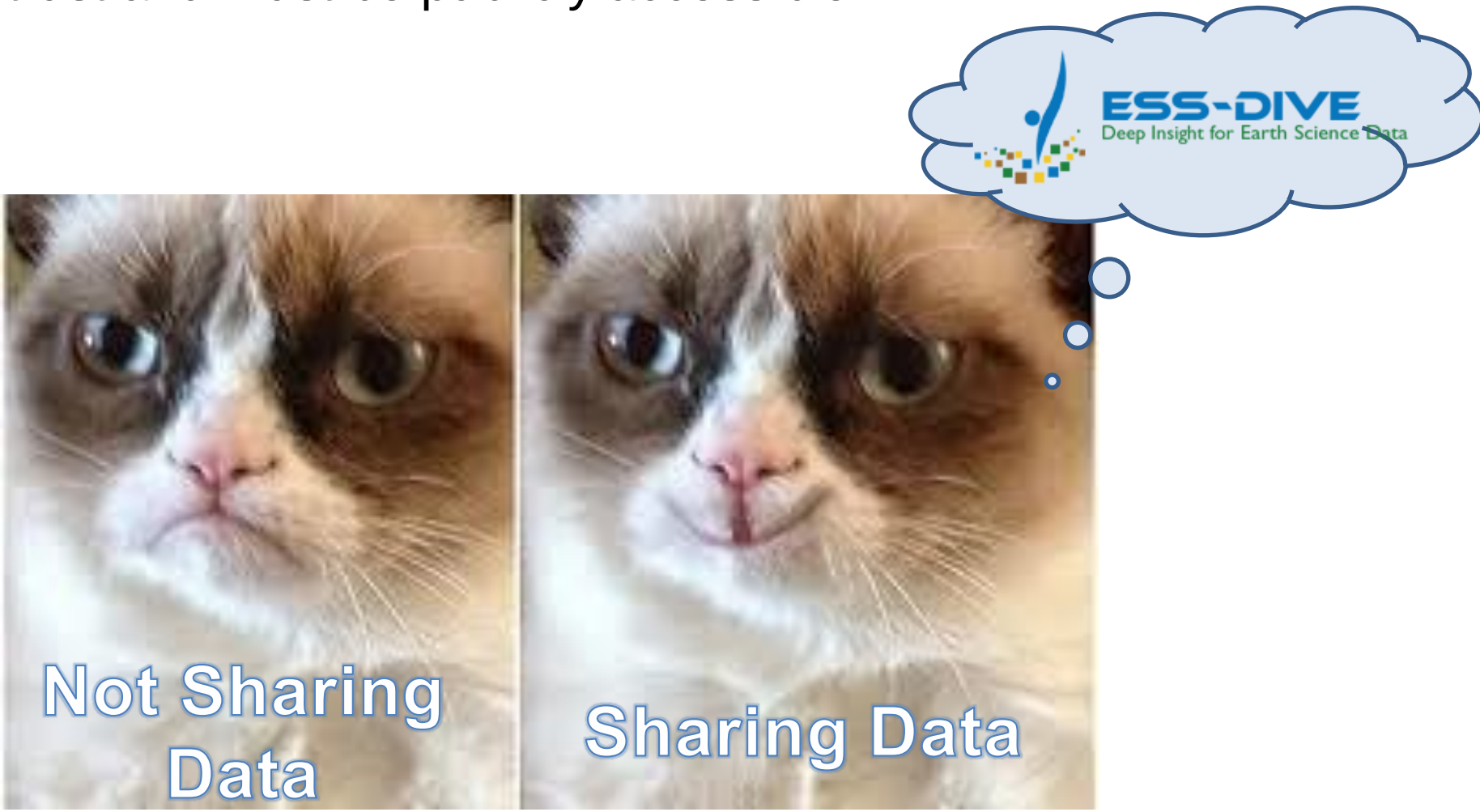
Science Highlights

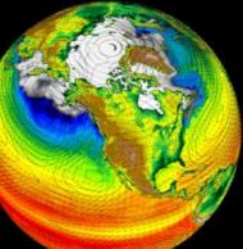
- An important way to communicate scientific accomplishments to program managers, BER, the Office of Science and the public.
- Please submit highlights as the publication as accepted for publication
  - Using the Highlight template (please don't just copy and past the abstract!!)
  - Include the publication
  - A summary powerpoint slide

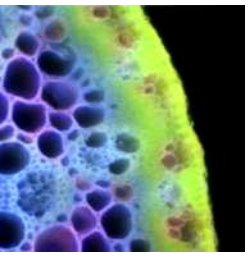
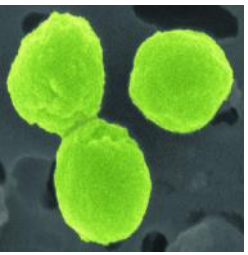


And Don’t Forget Data!!!

- Data management plans are required
- Research data obtained through public funding are a public trust and must be publicly accessible.





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Questions?