



**TES/SBR Joint Investigators Meeting
May 5-7, 2014
Bolger Center, Potomac, MD**



Monday, May 5, 2014

7:00-8:30pm **Meeting Check In (Franklin Building)**

Tuesday, May 6, 2014

6:30-8:00am **Breakfast (Osgood Building)**

7:00-8:00am **Meeting Check In (Franklin Building)**

8:00-9:55am **Overview of Programs and Strategic Directions (Ben Franklin Hall)** **Bayer**

8:00-8:05am Welcome and Introductory Comments.....P. Bayer

8:05-8:20am BER Programs.....S. Weatherwax

8:20-8:35am CESD Programs & Strategic Directions.....G. Geernaert

8:35-8:55am Advanced Simulation Capability for Energy (ACME).....D. Koch

8:55-9:15am CESD Data/Modeling Efforts.....J. Hnilo

9:15-9:35am TES Program Goals, Objectives, Program Structure and Highlights.....D. Stover

9:35-9:55am SBR Program Goals, Objectives, Program Structure and Highlights.....D. Lesmes

9:55-10:15am **Break**

10:15-12:15pm **Plenary Session I – Mechanistic Modeling of Terrestrial Environments: “Bedrock to Atmosphere” (Ben Franklin Hall)** **Lesmes**

10:15-10:45am The GEWaSC Framework: A Genome-Enabled Approach to MultiScale Modeling of Complex Microbial, Biogeochemical and Hydrological Processes..... C. Steefel, E. Brodie

10:45-11:15am NGEE-Arctic: Migrating Knowledge across Scales to Improve Climate Prediction.....P. Thornton

11:15-11:45am Diagnosing Scaling Behavior of Groundwater with a Fully-Integrated, High Resolution Hydrologic Model Simulated over the Continental US: Watersheds to Continents.....R. Maxwell

11:45-12:15pm Multiscale Modeling of Land-Atmosphere Interactions in CESM.....S. Denning

12:15-2:00pm **Lunch (Osgood Building)**

12:30-2:00pm Working Group Sessions (Box Lunches)

Hg Working Group (Room 17).....T. Barkay, S. Brooks, N.Yee

Rads Working Group (Room 18/19).....S. Fendorf, N. Hess, B. Powell

2:00-5:00pm **Poster Session I (Franklin Building: Rooms 1, 20, 21, and 23)**

2:00-3:30pm Poster Subsession A

3:30-5:00pm Poster Subsession B

5:30-7:00pm **Dinner (Osgood Building)**

7:00-8:30pm **Concurrent Sessions - I (Franklin Building)**

Concurrent Session 1: SPRUCE (Ben Franklin Hall)

Stover

7:00-7:20pm The S1 Bog Carbon Cycle and Projected Warming Responses for the SPRUCE Experiment.....P. Hanson

7:20-7:40pm Coupling Peat Decomposition and Metagenomics to Incorporate Molecular Scale Processes into Climate Models.....J. Kostka

7:40-8:00pm Do all 'Bogs' have Similar Anaerobic Carbon Dynamics and Microbial Community Structure? Putting the SPRUCE Site in a Regional Perspective.....S. Bridgman

8:00-8:20pm Organic N cycling at SPRUCE.....K. Hofmockel

8:20pm Discussion

8:30pm Adjourn

Concurrent Session 2: Science Advances Enabled by EMSL Capabilities (Room 3)

Bayer/Hess

7:00-7:10pm An Overview of EMSL Science and an Example from Recent Structural Studies of the Major Pilin Protein from *Geobacter sulfurreducens*K. Mueller

7:10-7:20pm High-Resolution Molecular Profiling of Permafrost Soil Organic Carbon Composition and Degradation.....B. Gu

- 7:20-7:30pm Multi-System Analysis of Microbial Biofilms.....M. Marshall
- 7:30-7:40pm Pore-Scale and Continuum Simulation of Microfluidics Experiments on Reactive Transport and Multiphase Flow Conducted at EMSL.....A. Valocchi
- 7:40-7:50pm X-ray Tomographic Imaging of Hydraulic Modeling of Plant Roots.....C. Liu
- 7:50-8:00pm Connecting Soil Organic Matter (SOM) Residence Time with SOM Molecular Structure and the Soil Environment.....M. Torn
- 8:00-8:10pm Integrated Soil Organic C Analyses at EMSL Enable New Understanding of Soil C Protection Mechanisms.....V. Bailey
- 8:10-8:20pm Uranium Immobilization in an Iron- and Organic Matter-Rich Rhizosphere of a Native Wetland Plant.....D. Kaplan
- 8:20pm Discussion
- 8:30pm Adjourn

Concurrent Session 3: Inorganic Biogeochemistry (Room 17) **Lesmes**

- 7:00-7:20pm Electron Transfer and Atom Exchange Between Fe(II) and Structural Fe(III) in Clays.....M. Scherer
- 7:20-7:40pm Reactivity of Iron-Bearing Phyllosilicates with Uranium and Chromium Through Redox Transition Zones.....B. Burgos
- 7:40-8:00pm Dominant Mechanisms of Uranium-Phosphate Reactions in Subsurface Sediments.....J. Catalano
- 8:00-8:20pm Scaling of Molecular Processes to Quantify Biogeochemical Reaction and Transport of Uranium in Subsurface Systems.....P. O'Day
- 8:20pm Discussion
- 8:30pm Adjourn

Concurrent Session 4: Hydrobiogeochemistry (Room 18/19) **Hirsch/Kuperberg**

- 7:00-7:20pm Methane Oxidation in Boreal Peatlands: A Joint Field, Laboratory and Modeling Investigation.....R. Neumann
- 7:20-7:40pm Microbial Dynamics in Arctic Tundra Soils: The Interplay of Plants, Soils, and Extreme Climate.....M. Wallenstein

- 7:40-8:00pm Strikingly Different Form of Organic Carbon in Soils of Temperate and Permafrost Soils: Implications for Carbon and Metal Cycling.....S. Myneni
- 8:00-8:20pm Fate of Uranium During Transport Across the Groundwater-Surface Water Interface.....P. Jaffe
- 8:20pm Discussion
- 8:30pm Adjourn

Wednesday, May 7, 2014

- 6:30-8:00am **Breakfast (Osgood Building)**
- 8:00-9:00am **Plenary Session II (Ben Franklin Hall)** **Hirsch**
- 8:00-8:30am Model-Data Synthesis of Ecosystem Responses to Elevated CO₂: From Deserts to Temperate Forests of the U.S.....A. Walker
- 8:30-9:00am Integrating Microbial Ecology with Hydro-Biogeochemistry.....J. Stegen
- 9:00-12:00pm **Poster Session II (Franklin Building: Rooms 1, 20, 21, and 23)**
- 9:00-10:30am Poster Subsession C
- 10:30-12:00pm Poster Subsession D
- 12:00-1:30pm **Lunch (Osgood Building)**
- 1:30-3:00pm **Plenary Session III – Plant Genomics to Ecosystem Function (Ben Franklin Hall)** **Lesmes**
- 1:30-2:00pm The Challenges and Opportunities for Extending Plant Genomics to Climate Research and Modeling.....D. Weston
- 2:00-2:30pm Hydraulic Redistribution of Water through Plant Roots - Implications for Carbon Cycling and Energy Flux at Multiple Scales.....Z. Cardon
- 2:30-3:00pm Multiscale Modeling of Ecosystem Structure and Function.....G. Katul
- 3:00-4:30pm **Concurrent Sessions – II (Franklin Building)**
- Concurrent Session 5: Disturbances and Responses in Terrestrial Ecosystems (Ben Franklin Hall)* **Stover**
- 3:00-3:20pm B4WarmED: Warming X Rainfall Manipulation Shifts Integrated Soil and Plant Community Processes in a Boreal Ecotone Experiment.....P. Reich

- 3:20-3:40pm Carbon and Energy Balance Consequences of Widespread Mortality in Pinon-Juniper Woodlands.....M. Litvak
- 3:40-4:00pm Resistance and Resilience of a Grassland Ecosystem to Climate Extremes.....M. Smith
- 4:00-4:20pm Deconvolving Local Versus Regional Controls over Plant and Ecosystem Responses to Climate Change in Pacific Northwest Prairies.....L. Pfeifer-Meister
- 4:20pm Discussion
- 4:30pm Adjourn

Concurrent Session 6: Arctic (Room 4)

Kuperberg

- 3:00-3:20pm Geophysical Evidence for Surface-Subsurface Interactions in Arctic Tundra.....S. Hubbard
- 3:20-3:40pm Geomorphological Controls on Water and Terrestrial Ecosystem Processes within Ice-Rich Polygonal Landscapes.....C. Wilson
- 3:40-4:00pm Multi-Disciplinary Research Targets Improved Representation of Arctic Ecosystems in Earth System Models.....D. Graham
- 4:00-4:20pm The Impact of Permafrost Carbon Loss on the Carbon Balance of an Experimentally Warmed Tundra Ecosystem.....T. Schuur
- 4:20pm Discussion
- 4:30pm Adjourn

Concurrent Session 7: Environmental Microbiology (Room 3)

Bayer

- 3:00-3:20pm Diversity and Metabolic Potential of the Terrestrial Subsurface Microbiome and its Influence on Biogeochemical Cycling.....J. Banfield
- 3:20-3:40pm Omics and Geochemistry: the ENIGMA 100-Well Survey.....T. Hazen
- 3:40-4:00pm Hg(0) Oxidation by Anaerobic Bacteria.....N. Yee
- 4:00-4:20pm Sulfur-Mediated Electron Shuttling during Bacterial Iron Reduction.....T. Flynn
- 4:20pm Discussion
- 4:30pm Adjourn

Concurrent Session 8: “Building Better Modeling Tools for Practitioners” (Room 18/19) Lesmes

3:00-3:15pm Experiment-Inspired Software Design and Ecosystem Modular Testing for CLM DevelopmentD. Wang

3:15-3:30pm Expanding the Role of Reactive Transport Modeling within the Biogeochemical Sciences.....L. Li

3:30-3:45pm Lighting Talks.....Multiple Presenters

3:45-4:30pm Discussion

4:30pm Adjourn

4:30-5:30pm **Plenary Session IV – How Science Informs Policy (Ben Franklin Hall) Kuperberg**

4:30-4:45pm Science & Policy – An Investment Perspective.....J. Bucknall, World Bank

4:45-5:00pm Science & Policy – A Diplomatic Perspective.....D. Reidmiller, U.S. Dept of State

5:00-5:15pm Science & Policy – A Research Funding Perspective.....K. Barrett, NOAA

5:15-5:30pm Science & Policy – A Scientific Perspective.....P. Duffy, USGCRP

5:30-5:45pm **Closeout/Announcements**

5:45-7:00pm **Dinner (Osgood Building)**

7:00pm **Adjourn**

7:00-8:30pm **Optional Team Meetings (Franklin Building)**

Team Meetings

NGEE-Arctic (Ben Franklin Hall).....S. Wullschleger

SPRUCE (Classroom 18/19).....P. Hanson