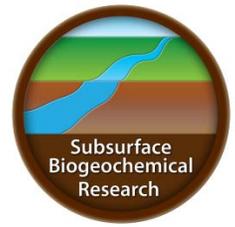




**Environmental System Science
Principal Investigator (PI) Meeting
May 1-2, 2018
Bolger Center, Potomac, MD**



Monday, April 30, 2018

- 8:00 am - 5:30 pm **ESS Working Group Meeting** (Ben Franklin Hall)
- 1:00 pm – 6:00 pm **Meeting Check In** (Franklin Building)
- 6:30 pm – 9:00 pm **E3SM Land Modeling Meeting** (Franklin Building: Room 4)

Tuesday, May 1, 2018

- 7:00 am - 8:30 am **Breakfast** (Franklin Building)
- 7:00 am -8:30 am **Meeting Check-In** (Franklin Building)
- 8:30 am - 9:55 am **Overview of Programs & Updates**
(Ben Franklin Hall) **Organizer: P. Bayer**
 - 8:30 am -8:35 am Welcome and Introductory Comments.....P. Bayer
 - 8:35 am - 8:45 am BER Programs.....S. Weatherwax
 - 8:45 am - 8:55 am CESD Programs & Strategic Directions.....G. Geernaert
 - 8:55 am - 9:05 am SBR Program Update.....D. Lesmes
 - 9:05 am - 9:15 am TES Program UpdateD. Stover
 - 9:15 am – 9:25 am User Facilities and BER Resources Update.....A. Swain
 - 9:25 am - 9:40 am ESS Data Archive Update.....D. Agarwal
 - 9:40 am - 9:55 am ESS Working Group Update.....D. Moulton
- 9:55 am - 10:10 am **Break**
- 10:10 am - 12:15 pm **Plenary Session I – Complexity and Innovation: Overcoming Community Challenges and Roadblocks**
(Ben Franklin Hall) **Organizer: D. Lesmes**
 - 10:10 am - 10:35 am Building Community Models of Disturbance and Vegetation Dynamics.....L. Kueppers (LBNL)
 - 10:35 am - 11:00 am Complexity and Innovation: Advancing Watershed System Science....T. Scheibe (PNNL)

- 11:00 am - 11:25 am Complexity and Innovation: Advancing Environmental Remote Sensing.....C. Miller (NASA-JPL)
- 11:25 am - 11:50 am Complexity and Innovation: Advancing CZ Science.....S. Brantley (Pennsylvania State University)
- 11:50 am - 12:15 pm Conflict, Coordination & Control: How Can We Discover the Risks and Resilience of Land-Energy-Water Systems?.....P. Reed (Cornell University)

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

1:00 pm – 2:00 pm Sage Advice for Students and Post-Docs (Room 4).....D. Stover

2:00 pm - 5:00 pm **Poster Session I** (Franklin Building: Rooms 1, 9A/B, and 21)

2:00 pm - 3:30 pm Poster Subsession A

3:30 pm - 5:00 pm Poster Subsession B

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

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

Session 1: Linking Above and Belowground Processes and Traits
(Room 18/19) Organizers: C. Iversen and T. Powell

Session 2: Impact of Natural Organic Matter on Water Quality and Biogeochemical Processes
(Room 17 A/B) Organizers: J. Barger and P Santschi

Session 3: Building Community Test Beds for Modeling Watershed Systems
(Room 15/16) Organizers: L. Condon and X. Chen

Session 4: Emerging Technologies for Characterizing & Monitoring Watershed & Terrestrial Systems
(Room 4) Organizers: R. Versteeg and S. Serbin

8:30 pm – 9:30 pm **Team Meetings**
NGEE-Arctic Leadership Team Meeting (Room 18/19) (15 people)
NGEE-Tropics Team Meeting (Room 17A/B) (~40 people)

Wednesday, May 2, 2018

7:00 am - 8:00 am **Breakfast** (Franklin Building)

8:30 am – 9:45 am **Plenary Sessions – II: Complexity and Innovation: The Human Dimension**
(Ben Franklin Hall) **Organizer: D. Stover**

8:30 am - 9:45 am Complexity and Innovation: Human Dimensions, Ethics, Integrity, and DiversityL. Gundersen

9:45 am - 10:00 am **Break**

10:00 am - 11:30 am **Concurrent Sessions - II** (Franklin Building)

Session 5: Coupled C/N/P Cycles Across Scales

(Room 18/19) Organizers: J. Powers and F. Yang

Session 6: Water: Its Roles and Feedbacks on Ecology, Biogeochemistry, Land Surface Dynamics and Disturbance

(Room 17 A/B) Organizers: J. Rowland and M. Newcomer

Session 7: Modeling Microbial Processes - Advances, Challenges and Opportunities

(Room 15/16) Organizers: N. Hess and E. Brodie

Session 8: ESS-DIVE

(Room 4) Organizers: C. Varadharajan and D. Agarwal

11:30 am - 1:00pm **Lunch** (Osgood Building)

12:00 pm - 1:00 pm Research Opportunities with the Scientific User Facilities and Related Resources.
(Ben Franklin Building Lobby Area).....EMSL, JGI, KBase and
Synchrotron User Facility POCs

12:00 pm – 1:00 pm Ethics, Integrity, and Diversity Breakout (Room 4).....L. Gunderson

1:00 pm - 4:00 pm **Poster Session II** (Franklin Building: Rooms 1, 9A/B, and 21)

1:00 pm - 2:30 pm Poster Subsession C

2:30 pm - 4:00 pm Poster Subsession D

4:00 pm - 4:20 pm **Break**

4:20 pm - 5:40 pm **Plenary Session III – Complexity and Innovation: Overcoming Community Challenges and Roadblocks - “Doing Together What Would be Difficult or Impossible to Do Alone”**

(Ben Franklin Hall) **Organizer: D. Lesmes**

4:20 pm - 5:05 pm Early Career Lightning Talks (3 min each).....14 Presenters

5:05 pm - 5:35 pm Discussion

5:35 pm - 5:40 pm **Closeout/Announcements**

5:40 pm - 7:00 pm **Dinner** (Osgood Building)

7:00 pm **Adjourn**

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

Session 1: Linking Above and Belowground Processes and Traits

Room: 18/19

Organizers: Colleen Iversen (ORNL) and Tom Powell (LBNL)

Format: Lightning talks (5 min each)

Talk	Title	Speaker
	Session Introduction	Tom Powell (LBNL)
1	A Multi-Hypothesis Modeling Approach to Study Sub-Canopy Carbon Balance	Anthony Walker (ORNL)
2	Root Respiration In Response To Experimental Warming: Challenges of Scale	Molly Cavaleri (Michigan Technological University)
3	Scaling Up Individual-Level Variabilities in Hydraulic Traits to Earth System Models	Chonggang Xu (LANL)
4	Root and Microbial Responses to Elevated CO ₂ in Tropical Plant Seedlings	Kristine Cabuago, (University of Tennessee)
5	Forest Gap Dynamics Following Disturbances	Stuart Davies (Smithsonian Tropical Research Institute)
6	Modeling Tropical Forest Regeneration: Above- and Belowground Environmental Constraints	Lara Kueppers (University of California, Berkeley)
7	Deep Look into Deep Permafrost: Impact of Warming on Microbial Functions	Neslihan Taş (LBNL)
8	Arctic Shrub Expansion and Drivers of Plant Functional Trait Variation	Jennifer Fraterrigo (University of Illinois)
9	The Carbon-Nutrients Economy: Linking Soil, Microbes, Plants, and the Atmosphere	Josh Fisher (Jet Propulsion Laboratory)
10	Scaling Linkages For a Trait-Based Approach For Nutrient Cycling By Soil Microbes	Melanie Mayes (ORNL)
11	Remote Sensing of Mycorrhizal Distributions	Michala Phillips (University of California, Riverside)
12	Remote Sensing of the Spatial and Temporal Patterns of Arctic Plant Traits and Ecosystem Function	Shawn Serbin (BNL)
	Discussion	

Session 2: Impact of Natural Organic Matter on Water Quality and Biogeochemical Processes

Room: 17 A/B

Organizers: John Barger (SLAC) and Peter Santschi (Texas A&M University)

Format: Session and lightning talks

Talk	Title	Speaker
	Session Introduction	John Barger (SLAC)
1	Implications of Microbial Energetics for Carbon Fate in Floodplain Soils and Groundwater	Kristin Boye (SLAC)
2	Organic Carbon Speciation and Thermodynamics Regulate Hyporheic Zone Metabolism	Emily Graham (PNNL)
3	Effects of NOM on Mercury Methylation and Contaminant Metal Transformation	Baohua Gu (ORNL)
4	Microbial Pathways of Organic Carbon Utilization	Ted Flynn (ANL)
5	Radionuclide-Associated Moieties in Natural Organic Matter	Chen Xu (Texas A&M University Galveston)
6	Pop-up Talk: NOM Mineralization and Metal Cycling during Flood Plain Evolution	Hana Naughton (Stanford University)
7	Pop-up Talk: Colloidal Radionuclides in Wetlands	Dan Kaplan (SRNL)
8	Drought and Rewetting Effects on Soil Carbon Biogeochemistry	Vanessa Bailey (PNNL)
9	Group Discussion: Strategic Research Priorities, Science Challenges and Gaps that Need to be Addressed	

Session 3: Building Community Test Beds for Modeling Watershed Systems

Room: 15/16

Organizers: Laura Condon (Syracuse University) and Xingyuan Chen (PNNL)

Format: Lightning talks (5 min each), Group Discussion

Talk	Title	Speaker
1	Session Introduction	Laura Condon (Colorado School of Mines) and Xingyuan Chen (PNNL)
2	Summary of 2017 SBR Town Hall – Watershed Systems Breakout	Ken Williams (LBNL)
3	Land Model Benchmarking and Pathways to a Land Model Testbed	Forrest Hoffman (ORNL)
4	Lessons Learned from Continental Scale Hydrologic Model Development, Coupling and Intercomparison	Reed Maxwell (Colorado School of Mines)
5	Creating a Digital Watershed through Multiscale Model-Data Integration	Haruko Wainwright (LBNL)
6	Is Earth Science Living Up to its Potential in the Era of Big Data & Big Computer?	Patrick Reed (Cornell University)
7	Accommodating Niche User Needs through the PFLOTRAN Reaction Sandbox	Glenn Hammond (SNL)
8	Small Group Discussions (3 groups)	
9	Whole Group Discussion	

Session 4: Emerging Technologies for Characterizing & Monitoring Watershed & Terrestrial Systems

Room: 4

Organizers: Roelof Versteeg (Subsurface Insights, Inc.) and Shawn Serbin (BNL)

Format: Lightning talks (5 minutes each)

Talk	Title	Speaker
1	Session Introduction	Roelof Versteeg (Subsurface Insights, Inc)
2	Airborne Geophysical Remote Sensing of the Geologic Structure of Terrestrial Landscapes	Lyndsay Ball (USGS)
3	UAS Hyperspectral Imaging of Terrestrial Landscapes	Shawn Serbin (BNL)
4	Satellite LIDAR Imaging of Terrestrial Landscapes	Maria Hunter (Universidade Federal de Mato Grosso, Cuiabá, MT, Brazil)
5	Quantifying Distributed Exchanges of Groundwater with the Columbia River	Michael Gooseff (University of Colorado, Boulder)
6	Analytical Instrumentation for in-situ Biogeochemical Research	Donald Nuzzio (Analytical Instrument Systems, Inc.)
7	Near Surface Measurement of Solar Induced Chlorophyll Fluorescence in Amazonia	Joe Berry (Carnegie Institution for Science)
8	Dissolved Oxygen Sensor System for Real-time, In-situ Monitoring of Subsurface and Aquatic Environments	Ruby Ghosh (Opti O ₂ , Inc.)
9	Exometabolomics: Revealing Biogeochemical Hotspots with Depth and by Vegetation Type in Arctic Tundra Soils	Mallory Ladd (ORNL)
10	Mid-infrared Spectroscopy: Determining Soil Organic Matter Composition and Decomposability across the Permafrost Region	Roser Matamala (ANL)
	Discussion: Identification of Challenges and Opportunities	

10:00 am - 11:30 am **Concurrent Sessions - II** (Franklin Building)

Session 5: Coupled C/N/P Cycles Across Scales

Room: 18/19

Organizers: Jennifer Powers (University of Minnesota) and Frank Yang (University of Nevada, Reno)

Format: Session talks (10 minutes each)

Talk	Title	Speaker
<u>Session 1: Overview of Scaling Questions and Approaches</u>		
1	Quantifying Hydrology-driven Biogeochemical Dynamics across Scales at the East River, CO Watershed	Susan Hubbard (LBNL)
<u>Session 2: Molecular-scale Level Understanding and Microscale Processes</u>		
2	Phosphorus Speciation in Airborne Particulate Matter: Feeding Mountain Ecosystems?	Peggy O'Day (University of California, Merced)
3	Coupled Metabolic and Mineral Controls on Organic Matter Turnover across Spatiotemporal Gradients	Marco Keiluweit (University of Massachusetts, Amherst)
<u>Session 3: Plot Scale Studies and Field Observation</u>		
4	Process-Data-Models of C-N-P in Leaves-Roots-Soil	Rich Norby (ORNL)
5	Synchrony and Scale: Coupled Biogeochemical Cycles in Terrestrial Ecosystems	Sasha Reed (US Geological Survey)
<u>Session 4: Large-scale Modeling</u>		
6	Incorporating the Nitrogen and Phosphorus Cycles within Global Land Models	Nicholas Bouskill (LBNL)
7	Global C-N-P Cycles Modeling and Benchmarking	Qing Zhu (LBNL)
	Group Discussion	

Session 6: Water: Its Roles and Feedbacks on Ecology, Biogeochemistry, Land Surface Dynamics and Disturbance

(Room 17 A/B) Organizers: Joel Rowland (LANL) and Michelle Newcomer (LBNL)

Format: Session Talks

Talk	Title	Speaker
1	Session Introduction	Michelle Newcomer (LBNL) and Joel Rowland (LANL)
2	Weathered bedrock: a poorly understood hydrologic reservoir and biogeochemical reactor	Daniella Rempé (University of Texas)
3	Case Studies for the influence of water on belowground carbon biogeochemistry	Karis Mcfarlane (LANL)
4	Forest ecosystem responses and resilience to drought in the Central forest-grassland transition zone	Jeffrey Wood
5	Towards a better representation of the role of vegetation in governing surface-atmosphere water flux dynamics across timescales	Charles Koven (LBNL)
6	Group Discussion	

Session 7: Modeling Microbial Processes - Advances, Challenges and Opportunities
 (Room 15/16) Organizers: Nancy Hess (PNNL) and Eoin Brodie (LBNL)
 Format: Session (10 minutes) and lightning talks (3 minutes)

Talk	Title	Speaker
	Session Introduction	Nancy Hess (PNNL) and Eoin Brodie (LBNL)
1	KBase Tools for Integrating Environmental Metagenomes and Metabolite Data Together into Mechanistic Models of Environmental Metabolism	Chris Henry (ANL)
2	Metabolic Network Modeling Approach for Characterizing Biogeochemical Function in the Hyporheic Zone	Hyun-Seob Song (PNNL)
3	Flash Talk: Genome-Informed Microbial Modeling	Eric King (LBNL)
4	Flash Talk: Microbial Nutrient Cycling Traits	Melanie Mayes (ORNL)
5	Flash Talk: Modeling Microbial Temperature Responses	Rose Abramoff (LBNL)
6	Flash Talk: Microbial Biomass in Charge	Petr Capek (PNNL)
7	Flash Talk: Metabolomic Mapping of Microbiology	Emily Graham (PNNL)
8	Flash Talk: Constraints on Carbon Oxidation	Scott Fendorf (Stanford University)
9	Flash Talk: Coupled Wetland Hydrobiogeochemical Cycles	Ken Kemner (ANL)
	Roundtable Discussion	

Session 8: Environmental System Science: Data Infrastructure for a Virtual Ecosystem (ESS-DIVE)

Room: 4

Organizers: Charu Varadharajan (LBNL) and Deb Agarwal (LBNL)

Format: Hands-on demonstration and tutorial

Talk	Title	Speaker
1	ESS-DIVE tutorial	Charu Varadharajan (LBNL)

**Plenary Session III – Complexity and Innovation: Overcoming Community
 Challenges and Roadblocks - “Doing Together What Would be Difficult or Impossible
 to Do Alone”**
 (Ben Franklin Hall) **Organizer: D. Lesmes**

4:20 pm - 5:05 pm Early Career Lightning Talks (3 min each).....11 Presenters
 5:05 pm - 5:35 pm Discussion

Talk	Title	Speaker
1		Nick Bouskill (LBNL)
2		James Stegen (PNNL)
3		Kelly Wrighton (OSU)
4		Jennifer Powers (University of Minnesota)
5		Colleen Iversen (ORNL)
6		Joel Rowland (LANL)
7		Shawn Serbin (BNL)
8		Baptiste Dafflon (LBNL)
9		Haruko M. Wainwright (LBNL)
10		Laura Condon (Syracuse University)
11		Ethan Coon (ORNL)
	Discussion	