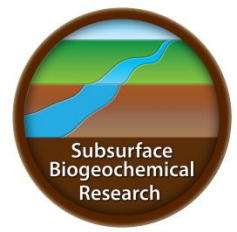




Environmental System Science  
Principal Investigator (PI) Meeting  
April 30 - May 1, 2019  
Bolger Center, Potomac, MD



**Monday, April 29, 2019 - Pre-meeting Activities**

8:00 am - 5:30 pm **ESS Working Group Meeting – Cyberinfrastructure** (Room 15/16; *invite only*)

1:00 pm – 6:00 pm **Meeting Check In** (Franklin Building Lobby)

Optional Meetings (open to all)

6:30 pm – 7:30 pm **ILAMB Soil BGC Working Group Meeting** (Franklin Building: Room 15/16)

7:00 pm – 8:00 pm **Modeling Microbial Dynamics Meeting** (Franklin Building: Room 4)

7:30 pm – 8:30 pm **E3SM Land Modeling Meeting** (Franklin Building: Room 15/16)

8:00pm – 9:00pm **Demystifying the Synchrotron Experience** (Franklin Building, Room 4)

**Tuesday, April 30, 2019 – Start of ESS PI Meeting**

7:00 am - 8:30 am **Breakfast** (Franklin Building)

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

8:30 am - 9:50 am **Overview of Programs & Updates**  
(Ben Franklin Hall) **Moderator: A. Swain**

8:30 Welcome and Introductory Comments .....A. Swain

8:35 BER Programs .....S. Weatherwax

8:45 CESD Programs & Strategic Plan .....G. Geernaert

8:55 TES Program Update .....D. Stover

9:05 SBR Program Update.....P. Bayer

9:15 am – 9:50 am **Complexity, Innovation, and Open Science: Building on ESS Scientific Advances**

9:15 Complexity and Innovation Update .....J. Moerman

9:20 Open Watersheds by Design Workshop Update.....J. Stegen

9:30 ESS-DIVE Update .....C. Varadharajan

9:40 Cyberinfrastructure Update.....D. Moulton

9:50 am - 10:10 am **Break**

10:10 am - 12:00 pm **Plenary Session I – ModEx Stories: Successes and Lessons Learned**

(Ben Franklin Hall) **Moderator: J. Moerman**

10:10 ModEx and permafrost hydrology: Lessons learned in NGEE-Arctic

..... S. Painter (NGEE-Arctic/TES)

10:30 Is it getting hot in here?..... M. Torn (LBNL/TES)

10:50 ModEx for advancing river corridor science along the Hanford Reach

..... X. Chen (PNNL/SBR)

11:10 Spatial and temporal nitrogen dynamics in mountainous systems..... N. Bouskill (LBNL/SBR)

11:30 What does information flow tell us about natural and model dynamics?

..... P. Kumar (U. Illinois)

11:55 Wrap-up and announcements ..... J. Moerman

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

*Optional Lunchtime Breakouts*

12:00 - 2:00 Research Opportunities with Light-Source Facilities (Reserved area in cafeteria)

..... Synchrotron User Facility POCs

12:00 - 1:00 ESS-DIVE Tutorial (Room 15/16) ..... D. Agarwaal/C. Varadharajan

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

1:00 - 2:00 Research Opportunities with User Facilities (Lobby)

..... Synchrotron User Facility POCs

2:00 pm - 5:00 pm **Poster Session I** (Franklin Building: Rooms 1, 9A/B, 21, and 22)

2:00 - 3:30 Poster Subsession A

3:30 - 5:00 Poster Subsession B

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

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

*SBR Town Hall* - Open Watersheds: Amplifying the Impact of SBR Science

(Room: Ben Franklin Hall) **Organizers: S. Emani /J. Moerman/ P. Bayer**

*TES Breakout A*: Linking Above and Belowground Processes

(Room 4) Organizers: R. Matamala and S. Serbin

*TES Breakout B: Terrestrial-Aquatic Interfaces*  
(Room 15/16) Organizers: V. Bailey and J. Keller

*TES Breakout C: Disturbance*  
(Room 17A/B) Organizers: N. McDowell and A. Walker

*TES Breakout D: ILAMB Soil C Demonstration and Tutorial*  
(Room 18/19) Organizers: F. Hoffman and R. Joseph

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 1, 2019**

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

8:30 am – 9:40 am **Plenary Session II: ModEx Stories: Communicating Complex Science with Clarity and Creativity**  
(Ben Franklin Hall) **Moderator: D. Stover**

8:30 - 9:40 Getting science seen, heard, and understood: The power of effective science communication .....O. Ambrogio (AGU)

9:40 am - 9:55 am **Break**

9:55 am – 11:55 am **Concurrent Sessions - II** (Franklin Building)

*TES Team Meeting/Town Hall*  
(Room: Ben Franklin Hall) **Organizer: D. Stover**

*SBR Breakout A - Reaction-Scale Open-Science Design Dash*  
(Room 15/16) Organizers: S. Emani and J. Stegen

*SBR Breakout B - Watershed-Scale Open-Science Design Dash*  
(Room 17 A/B) Organizers: K. Maher and D. Moulton

*SBR Breakout C - CONUS-Scale Open-Science Design Dash*  
(Room 4) Organizers: J. Moerman and D. Chadwick

11:55 am - 1:10pm **Lunch** (Osgood Building)

*Optional Lunchtime Breakout*

11:55 – 12:40 Science Communication Breakout (Room 4) .....O. Ambrogio (AGU)

1:10 pm - 4:00 pm **Poster Session II** (Franklin Building: Rooms 1, 9A/B, 21, and 22)

|                        |  |
|------------------------|--|
| 1:10 - 2:40            | Poster Subsession C  |
| 2:40 - 4:10            | Poster Subsession D  |
| 4:10 pm - 4:20 pm      | <b>Break</b>   |
| 4:20 pm - 5:40 pm      | <b>Plenary Session III – ModEx Stories &amp; ESS Looking Forward</b><br>(Ben Franklin Hall) <b>Moderator: P. Bayer</b> |
| 4:20 - 4:45            | SBR Breakout Session Report-outs   |
| 4:20                   | Open-Science Design Dash.....J. Stegen/K. Maher/ D. Moulton  |
| 4:40                   | Discussion   |
| 4:45 - 5:10            | TES Briefings  |
| 4:45                   | Second State of the Carbon Cycle Report (SOCCR2).....M. Mayes  |
| 4:55                   | Ameriflux: Year of Methane.....S. Biraud   |
| 5:05                   | Discussion   |
| 5:10 - 5:40            | ModEx Stories: Community Reflection on the Future of ModEx<br>.....S. Painter and K. Hofmockel                         |
| 5:40 pm - 5:45 pm..... | <b>Closeout/Announcements</b> .....P. Bayer  |

**Tuesday, April 30, 2019**

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

***SBR Town Hall: Open Watersheds: Amplifying the Impact of SBR Science***

Room: Ben Franklin Room

Co-Chairs: Kate Maher (Stanford), David Moulton (LANL), and James Stegen (PNNL)

| <b>Time</b> | <b>Talk</b>   | <b>Speaker</b>   |
|-------------|---|--|
| 7:00        | Introductory Remarks and Reflection   | Paul Bayer (DOE)   |
| 7:05        | Open Science Panel: Amplifying the Impact of SBR and CESD Science<br><u>Panelists</u> <ul style="list-style-type: none"> <li>Challenges and Successes of Taking the GCAM Model Open Source</li> <li>IDEAS-Watersheds and the ExaSheds Project</li> <li>Development of WHONDRS, an Evolving Community Resource</li> <li>The Design Process in Science</li> </ul> | Jessica Moerman (DOE)<br><br>Leon Clarke (PNNL, JGCRI)<br><br>David Moulton (LANL)<br><br>James Stegen (PNNL)<br><br>Kate Maher (Stanford Univ.) |
| 7:30        | The Design Process and Rationale  | Kate Maher (Stanford Univ.) and Sujata Emani (DOE)   |
| 7:40        | Example “Design Dash” Pitches <ul style="list-style-type: none"> <li>Reaction-Scale Challenge</li> <li>Watershed-Scale Challenge</li> <li>Cross-scale Challenge</li> <li>Cyberinfrastructure</li> </ul>   | James Stegen (PNNL)<br>Martin Briggs (USGS)<br>Eoin Brodie (LBNL)<br>Charuleka Varadharajan (LBNL)   |
| 8:00        | Introduction to Breakout Session “Design Dash”  | Kate Maher (Stanford Univ.)  |
| 8:15        | Questions and Group Discussion  |  |

**SBR**  
Investigators:  
Please scan QR code to access and complete the Breakout Questionnaire by 7p Tuesday April 30th



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

***TES Breakout Session A: Linking Above and Belowground Processes***

Room: 4

Organizers: Roser Matamala (ANL) and Shawn Serbin (BNL)

Format: Lightning talks (10 min each)

| <b>Talk</b> | <b>Title</b>   | <b>Speaker</b>  |
|-------------|--|---|
|             | Session Introduction   | Roser Matamala (ANL) and Shawn Serbin (BNL)                     |
| 1           | Nitrogen acquisition in the tundra: linking belowground dynamics to aboveground traits           | Verity Salmon (ORNL)  |
| 2           | Vegetation-permafrost-hydrology-climate relationships along three hillslopes in the low Arctic   | Amy Breen (Univ. of Alaska, Fairbanks)                          |
| 3           | Ecosystem-type construct to link above and belowground properties across multiple spatial scales | Baptiste Dafflon (LBNL)   |
| 4           | Can't see the grassland for the trees: rooting dynamics in tallgrass prairie                     | Jesse Nippert (Kansas State Univ.)                              |
| 5           | Linking above and belowground plant traits in the Alaskan Arctic                                 | Jennifer Fraterrigo (Univ. of Illinois)                         |
| 6           | Estimating effective rooting depths via aboveground growth responses under droughts              | Rutuja Chitra-Tarak (Smithsonian Environmental Research Center) |

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

***TES Breakout Session B: Terrestrial-Aquatic Interfaces***

Room: 15/16

Organizers: Vanessa Bailey (PNNL) and Jason Keller (Chapman Univ.)

Format: Lightning talks (5 min each)

| <b>Talk</b> | <b>Title</b>  | <b>Speaker</b>  |
|-------------|---|---|
|             | Session goals and format  | Vanessa Bailey (PNNL) and Jason Keller (Chapman Univ.)      |
| 1           | Representing TAI in Earth System Models   | Ruby Leung (PNNL)   |
| 2           | The Role of Geomorphology in Coastal Terrestrial-Aquatic Interfaces   | Matt Kirwan (Virginia Institute of Marine Sciences)         |
| 3           | Oxygen and TAI: What Do We Really Know About Aerobic Biogeochemistry?   | Genevieve Noyce (Smithsonian Environmental Research Center) |
| 4           | Progress and Priorities for Understanding Terrestrial-Aquatic Interfaces: An Aquatic Biogeochemical Perspective | Nick Ward (PNNL)  |
| 5           | Requirements for Model-Based Knowledge Synthesis at Terrestrial-Aquatic Interfaces                              | Peter Thornton (ORNL)                                       |
| 6           | Facilitated Synthesis of Key Themes   | Vanessa Bailey (PNNL) and Jason Keller (Chapman Univ.)      |

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

***TES Breakout Session C: Disturbance***

Room: 17A/B

Organizers: Nate McDowell (PNNL) and Anthony Walker (ORNL)

Format: Lightning talks (5 min each)

| <b>Talk</b> | <b>Title</b>   | <b>Speaker</b>   |
|-------------|--|--|
|             | Session Introduction   | Nate McDowell (PNNL) and Anthony Walker (ORNL)                 |
| 1           | Drought Impacts: Responses to El Niño in Panama and Experimental Drought in Australia                                  | Alex Pivovarovoff (Univ. of California, Los Angeles)           |
| 2           | How will Drought Affect Tropical Soil Carbon Cycling and Storage?  | Daniela Cusack (Univ. of California, Los Angeles)              |
| 3           | Extreme Temperature Shifts Induce Both Acute and Chronic Stress in Temperate Trees                                     | Jeff Warren (ORNL)   |
| 4           | Interactions Between Climate Warming and Fire Will Drive Expansion of High-Latitude Deciduous Vegetation               | Zelalem Mekonnen (LBNL)  |
| 5           | Tropical Forest Degradation Modulates Flammability and Response to Moderate Droughts in the Amazon                     | Marcus Longo (Jet Propulsion Lab)                              |
| 6           | Tree Damage and Mortality Following Hurricane Maria  | Michael Keller (US Forest Service)                             |
| 7           | Hurricane Disturbance and Tropical Forest Recovery in a Warmer World   | Tana Wood (US Forest Service)                                  |
| 8           | From One to Millions Trees: Winds as Recurrent and Predictable Drivers of Tree Mortality in Tropical Forest Ecosystems | Robinson Negron-Juarez (LBNL)                                  |
| 9           | Lightning is Directly Responsible for One Third of Large Tree Mortality on Barro Colorado Island, Panama               | Helena Muller-Landau (Smithsonian Tropical Research Institute) |
| 10          | Impact of Landuse Change on Soil Carbon and Radiocarbon Profiles in Lowland Tropical Forest                            | Karis McFarlane (LLNL)   |

|    |  |                    |
|----|--|--------------------|
| 11 | Exploring the Complex Interactions Among Forest Disturbance and Regeneration, Carbon and Water Cycle Dynamics in the Tropics Using FATES | Maoyi Huang (PNNL) |
|    | Discussion   |                    |

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

**TES Breakout Session D: Model Benchmarking and ILAMB Tutorial**

Room: 18/19

Organizers: Forrest Hoffman (ORNL) and Renu Joseph (DOE)

Format: Talks/Tutorial

| Talk | Title  | Speaker                |
|------|--|------------------------|
|      | Session Introduction   | Forrest Hoffman (ORNL) |
| 1    | Benchmarking and Parameter Sensitivity of FATES Predictions of Ecosystem Structure and Function at Barro Colorado Island, Panama | Charles Koven (LBNL)   |
| 2    | Harmonized High-Resolution Estimates of Soil Organic Carbon Stocks and Its Uncertainties in the Permafrost Region                | Umakant Mishra (ANL)   |
|      | Discussion   | Forrest Hoffman (ORNL) |
| 3    | ILAMB Tutorial   | Nathan Collier (ORNL)  |

**Wednesday, May 1, 2019**

9:55 am – 11:55 am **Concurrent Sessions - II** (Franklin Building)

**TES Team Meeting/Town Hall**

(Room: Ben Franklin Hall) Organizer: D. Stover

| Time  | Talk  | Speaker   |
|-------|---|---|
| 9:55  | Program Updates and Strategic Planning  | Dan Stover (DOE)  |
| 10:05 | A Hidden World of Scientific Stories'   | Colleen Iversen (ORNL)  |
| 10:40 | Field Safety: A Necessary Ingredient of Success   | Bob Bolton (University of Alaska, Fairbanks)                            |
| 11:00 | Early Career Award Updates (Lightning Talks) <ul style="list-style-type: none"> <li>• Drying Effects on Root Dynamics and Soil Carbon Storage in Tropical Soils</li> <li>• A Comprehensive Framework for Modeling Emissions from Tropical Soils and Wetlands</li> <li>• Constraining Soil Carbon Turnover Times in Tropical Forests with Radiocarbon Measurements and Modeling</li> </ul> | Daniela Cusack (UCLA)<br>Melanie Mayes (ORNL)<br>Karis McFarlane (LLNL) |
| 11:15 | Closing Thoughts and Group Discussion   | Dan Stover (DOE)  |

9:55 am – 11:55 am **Concurrent Sessions - II** (Franklin Building)

**SBR Breakout Sessions: Open-Science Design Dash**

| Room   | Session                                  | Facilitators               |
|--------|--|----------------------------|
| 15/16  | Reaction-Scale Open-Science Design Dash  | S. Emani and J. Stegen     |
| 17 A/B | Watershed-Scale Open-Science Design Dash | K. Maher and D. Moulton    |
| Rm 4   | CONUS-Scale Open-Science Design Dash     | J. Moerman and D. Chadwick |