



# Research into Earth's Microbiome at the EESA of Berkeley Lab

Microbes are the most **abundant** and **diverse** lifeform on Earth. In fact, there are as many microbes in a square meter of soil as there are stars in our galaxy. With better understanding of how microbes interact across all of Earth's compartments to **influence ecosystem functioning**, scientists can respond to environmental challenges in ways that address protecting our **fuel** and **food supplies**, **environmental security**, and **personal health**.

## EESA Research into Earth's Microbiome

EESA researchers are working to accurately predict how microbes impact terrestrial ecosystem function and enable translational ecology approaches that integrate fundamental discovery and multi-scale sensing and simulation capabilities into solutions for enhancing ecosystem function and health.

These scientists are at the forefront of fundamental advances to discover, measure, and simulate how microbial communities interact across trophic levels and with their environment. Such discoveries reveal how as catalysts for key biogeochemical processes microbes are, in effect, the engines sustaining Earth's biomes. We leverage interdisciplinary expertise in microbial biology and soil science, geophysics, remote sensing, and ecosystem ecology to the study of microbe behavior at the scale of single microbial genomes to entire ecosystems.

For more information, contact Eoin Brodie at [elbrodie@lbl.gov](mailto:elbrodie@lbl.gov) or Romy Chakraborty at [rchakraborty@lbl.gov](mailto:rchakraborty@lbl.gov).

## Berkeley Lab Earth-Microbiome Research At a Glance



EESA researchers discovered that as plants develop they craft their root microbiome, favoring microbes that consume very specific metabolites. Their study could help scientists identify ways to enhance the soil microbiome for improved carbon storage and plant productivity.

[bit.ly/2pVMYUP](https://bit.ly/2pVMYUP)



Scientists are conducting field and laboratory experiments and computational modeling to understand the role of microbial communities in stabilizing soil organic matter under different water availability conditions in tropical soils. The results of this project will increase our understanding of the effects that microbes have on the global geochemical and nutrient cycles.

[bit.ly/2OTIBJM](https://bit.ly/2OTIBJM)



An EESA study uses field experiments, laboratory studies, and DNA sequencing approaches to examine how microbial processes, biogeochemical transformations, and hydrology interact during permafrost thaw in Alaska to determine how these factors drive biogeochemical cycles in Arctic soils.

[bit.ly/2Lf57N](https://bit.ly/2Lf57N)

## Career Opportunities

For complete job descriptions visit [jobs.lbl.gov](https://jobs.lbl.gov)

### Environmental Microbiology Postdoctoral Scholar

LBNL Job Posting Number: 87030

### Plant-Microbe-Soil Interactions Postdoctoral Scholar

LBNL Job Posting Number: 88309

## ECOSENSE

EcoSENSE aims to develop and deploy advanced in-situ environmental observational networking and analysis approaches to quantify the interactions between key environmental processes and biological function within ecosystems.



## EESA Earth-Microbiome Research at AGU

Geophysical Quantification of Hydrological-Biogeochemical-Ecological Interactions across Scales: Progress and Opportunities

**Presentation:** B51D-01

**Presenters:** Susan Hubbard, Eoin Brodie, Romy Chakraborty

Hundreds and Thousands of Microbial Genomes. What to Do? How to Scale?

**Presentation:** B43C-02

**Presenter:** Eoin Brodie

Snowmelt Mediates Microbial Metabolic Potential and Soil Metabolite Profiles in a High Altitude Watershed

**Presentation:** B53B-04

**Presenter:** Pat Sorensen

Real-time Metabolic Responses to Changing Osmotic and Matric Potential

**Presentation:** B41I-2441

**Presenter:** Aizah Khurram

Thermal Acclimation of Soil Microbial Communities Declines with Depth

**Presentation:** B21I-2442

**Presenter:** Neslihan Tas

MicroTrait: Tools for Parameterization of Microbially-Explicit Trait-Based Models with Microbiome Data

**Presentation:** B43C-05

**Presenter:** Ulas Karaoz

Modeling the Size-dependence of Microbial Functional Traits in Soil

**Presentation:** B51G-2318

**Presenter:** Gianna Marschmann

Investigating the Rhizosphere of Brachypodium Distachyon Seedlings in Ecosystem Fabrications (EcoFABs)

**Presentation:** B51G-237

**Presenter:** Nameera Baig

Microbial Feedbacks on SOM Composition Under Recurring Drought

**Presentation:** B41I-2438

**Presenter:** Stephany Chacon

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