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123 Huntington Street
New Haven, CT 06511
203.974.8500
Toll free: 1.877.855.2237
fax: 203.974.8502
caes@ct.gov
https://portal.ct.gov/caes

PRESS RELEASE

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MEDIA CONTACT:
Itamar Shabtai, Ph. D.
Assistant Scientist II
Department of Environmental Science and Forestry
123 Huntington Street
New Haven, CT 06511
(203) 974-8532
itamar.shabtai@ct.gov

The Environmental Molecular Sciences Laboratory (EMSL) Awards The Connecticut Agricultural Experiment Station Study of Soil Biogeochemical Hotspots

New Haven, CT- The Department of Energy Biological and Environmental Research Program has awarded Dr. Itamar Shabtai, soil scientist at the Connecticut Agricultural Experiment Station (CAES), with a competitive user facility award titled "***What goes around comes around: Exploring the cyclical nature of soil biogeochemical hotspots.***" This two-year award, given through the Facilities Integrating Collaborations for User Science program, will provide Dr. Shabtai and his team access to user facilities to study the interacting processes that emerge during root growth, death, and decomposition. Collaborating with Dr. Shabtai on this project are Dr. Angela Possinger (Virginia Tech), Dr. Roland Wilhelm (Purdue), and Dr. James O'Sullivan (Advanced Photon Source (APS) synchrotron).

The growth, death, and decay of plant roots substantially change soil physical structure, chemical composition, and the microbial community, which alters biogeochemical processes within soil zones influenced by living roots (the rhizosphere) and decomposing roots (the detritusphere). "Plant roots speed up many processes in root-adhering soil," said Dr. Shabtai, "and these hotspots have an outsized influence on the whole soil." This work will help to better understand the interacting physical, chemical, and microbiological changes that occur throughout the root life cycle.

Dr. Shabtai's team will focus on the root-soil interface of sorghum plants and study its chemical composition using resources at EMSL, the microbial communities with support from the Joint Genome Institute, and physical microstructure using X-ray beams at the APS. "This important mechanistic work will enable Dr. Shabtai's team to better understand how plant roots shape the soil and control overall nutrient cycling in our agricultural soils," said Dr. Jason C. White, Director of the CAES. Such insights will help improve plant-based soil health strategies, such as cover cropping and crop rotation.