

# PlantLink Researcher in the spotlight

## Edith Hammer

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Edith Hammer is an associate senior lecturer within Molecular Ecology, Microbial Ecology and Evolutionary Genetics (MEMEG) at the Department of Biology, Lund University. She is among other things using synchrotron sources to look at soil systems.



### **-What is currently on top of your research agenda?**

To understand how microorganisms govern soil carbon storage. I am especially interested in the role of physical organic matter stabilization, i.e. whether carbon can “hide” from decomposers in the labyrinth system of soil aggregates. For this, we develop microfluidic “soil chips” in which we can simulate and manipulate physical structure at the micrometerscale, while being able to observe processes through the transparent system. In parallel, we “look” into real soil aggregates with synchrotron light.

### **-Tell us about your latest publication?**

In my latest publication “build your own soil”, a perspectives paper in ISME Journal, we want to inspire other soil ecologists about the many novel opportunities that microfluidic chips offer for soil science and microbial ecology. Even roots of plantlets can be grown in chip systems (to study e.g. root symbioses, microbiomes or root responses to controlled microconditions) – maybe inspirational to plant link researchers?!

### **-What led you into your particular field of research?**

Observations of mycorrhizal foraging on biochar particles, transporting biomass into remote and energy-compound -poor soil spaces. We believe that mycorrhizal fungi play a key role in this since they likely forage differently through the pore space than saprotrophs because they receive their energy from the host plant, and thus transport carbon into areas less attractive or reachable than other soil organisms.

### **-What are the implications of your research for the society?**

Soils contain more than twice the amount of carbon than atmosphere and biosphere together, and small changes in in- and outputs can sum up to large global climate effects. Identifying land use practices that increase soil carbon storage offers a great chance to mitigate greenhouse gas emissions.

### **-Finally, let’s say you got unlimited research funds; where would your research be five years from now?**

We would show the importance of microscale structure for diverse microbially mediated processes and develop a wide range of soil chips. We would expand our research questions on soil aggregation and the feedback effects of this habitat modification on carbon cycling; soil foodweb interactions, and a large-scale survey of mycorrhizal vs. saprotrophic fungal soil carbon sequestration, and engineer the systems so that we can do synchrotron spectroscopy on them to study biochemical responses.