

PhD Position in Ecology of Microbial Systems



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Why studying microbial communities?

In the last decade, microbial communities have received increasing attention because of their essential role on our planet and on human health. **Microbial communities perform essential functions on Earth:** Microbial communities in the environment drive the cycling of elements by degrading organic matter, while microbial communities in our gut shape our health. Understanding how these communities' functions connects to a number of global challenges, which span from climate change to antibiotic resistance. Therefore, understanding how microbial communities function is an interesting and important research question.

What do we work on?

Our group is interested in microbial ecology. Microbial communities vary substantially across natural habitats, so we cannot study all communities in detail. To understand how these communities' function, we need to both study specific microbial communities—such as the gut microbiota, and to **find general principles of how microbial community properties emerge** in simple microbial communities. Our group focuses on these simple communities as models to investigate the activities and interactions of the community members.

A central question in our research is: **Can we predict the dynamics of microbial systems if we know how the individual cells interact?** We address this question with **single-cell experiments and mathematical modeling**. We measure how single cells interact inside microbial communities, often using microscopy and microfluidics. We model these communities as systems composed of parts - the cells - that interact in space. With these models, we elucidate how properties of microbial communities (e.g. collective metabolism, response to environmental fluctuations and stresses) arise from the interactions that we observe between the single cells.

Contact us if you know more and visit our website. We greatly value creativity and drive to learn new things. **We will design your PhD project based on your interest and skills.**

Some reads:

Short-range interactions govern the dynamics and functions of microbial communities

Alma Dal Co, Simon van Vliet, Daniel Johannes Kiviet, Susan Schlegel & Martin Ackermann
Nature Ecology & Evolution (2020)