Polymicrobial communities

Microorganisms are inherently gregarious organisms. In terrestrial habitats such as soil, they are in constant interaction with one another. Therefore, these complex habitats form a coliseum for microorganisms to train and gain functional abilities including secondary metabolite production. We want to understand and in particular visualize how bacteria interact both with each other as well as with eukaryotes such as amoebal predators or algae. We use in particular fluorescence in situ hybridization (FISH) as a powerful imaging technique to understand polymicrobial associations. Since FISH requires little to no genetic modifications of the organisms involved, it is perfectly suited to image microbes that are genetically not accessible. We combine different FISH variants with time-lapse imaging to identify morphological changes and variations in the population dynamics within complex associations. FISH is not restricted to prokaryotes; we use it to image other micro-eukaryotes for instance amoebae, algae, and fungi within both a pro- and eukaryotic background. In particular, we focus on:

- microbial predator-prey associations of the amoeba *Dictyostelium discoideum* and various bacteria of the genus *Pseudomonas*;
- *Chlamydomonas*–bacteria interactions;
- bacteria–fungi interactions.