

**The Freshwater Microbial Ecology group at the Department of Ecology & Evolution,  
Uppsala University.**

*Senior group members:*

Stefan Bertilsson  
Alexander Eiler  
Silke Langenheder  
Eva Lindström  
Lars Tranvik  
Anneli Wendeborg (adjunct)  
+5 postdocs  
+7 PhD students

*Research questions:*

We know very little about which microorganisms occur in aquatic environments, their spatial and temporal distribution patterns and their functional capabilities and overall importance for the maintenance of ecosystem functioning. We address these shortcomings by research along two major lines of research: (1) Microbial diversity and role in ecosystems; (2) Microbial biogeography, speciation and adaptation in aquatic environments.

More specific research questions:

We study how microbial community composition and diversity are assembled and their relationship to the magnitude and stability of ecosystem services.

In laboratory and field experiments we study the functional and compositional resilience and resistance of microbial communities to disturbances (perturbations).

Several members of the group investigate the role of specific phylogenetic groups (Bacteria and Archaea) in specific biogeochemical processes (photosynthesis, dark carbon fixation, methanogenesis, methane oxidation, chitin degradation, hydrocarbon degradation).

We have a general interest in the natural history of abundant aquatic microbes and their biogeographic patterns.

Recently we have begun to look into both genetic and ecological mechanisms of diversification within the alphaproteobacterial clade SAR11. Here we focus on the freshwater clade but we are also interested into the mechanisms underlying the marine-freshwater transition.

*Field sites:*

We work mostly with planktonic organisms, but we also perform studies on sediments and aquifers.  
Lake Erken (Microbial Observatory, LTER site)  
Swedish Lakes (from Lake Torneträsk in Norrland to Lake Vättern; biogeography)  
Antarctic Lakes  
Rock pools (model system to study biogeography)  
Baltic Sea (transects and time series)  
Southern Ocean  
Arctic Ocean  
North Pacific Subtropical gyre (collaborations with HOT-team at Station ALOHA)  
Aquifers

*Methods:*

conventional methods (TRFLP, DGGE, clone library)

quantitative methods (FISH, QPCR)

454-tag pyrosequencing (16S rRNA gene, chitinase, peroxidase)

metagenomics (shot-gun sanger sequencing, 454-pyrosequencing; collaborations with Siv Andersson, Molecular Evolution, Uppsala University)

MAR(CARD)FISH

Magneto-FISH (Anneli Wendeberg)

single-cell genomics (Ramunas Stepanauskas, Bigelow Laboratory of Marine Sciences)

culturing approaches

biostatistics (multivariate statistics)

metagenome/genome annotations

PERL

mothur

R

ARB