

Research area of interest

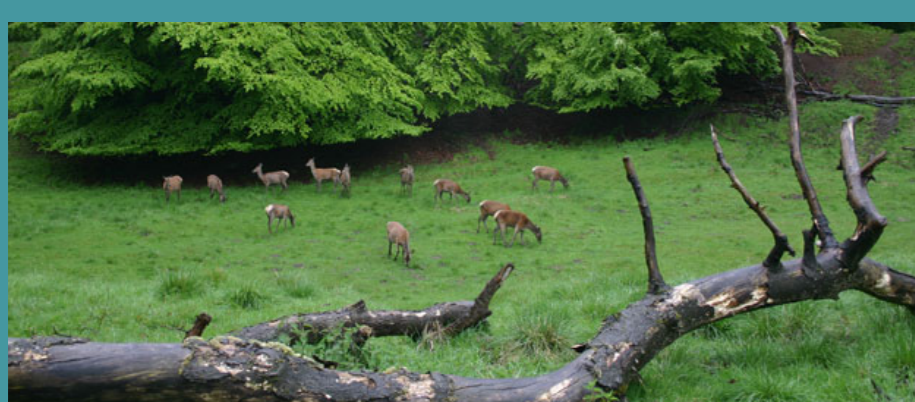
Systems: Agricultural soil, Watershed areas, Wastewater, Permafrost soil.

Studies include genome analyses and phenotypic characterisations of the eco-physiology of selected microbes, representing different groups of denitrifiers and other nitrogen transforming organisms; analyses of gas kinetics of denitrifier communities in response to oxygen depletion and other environmental controllers; abundance and diversity of the relevant functional genes and transcripts in natural environments; and field flux studies of N₂O and methane emissions.

Processes: N-cycle (denitrification, nitrification, DNRA), C-cycle (methane, CO₂, biochar)

Organisms: Mainly bacteria

Members of research group



Lars Bakken (professor)
Åsa Frostegård (professor)
Jan Mulder (professor)
Peter Dörsch (senior scientist)
Binbin Liu (scientist)
Linda Bergaust (Post doc)
Hanna Silvennoinen (Post doc)
Jing Zhu (post doc)
Shahid Nadeem (scientist)
Daniel Mania (PhD student)
Zhi Qu (PhD student)
Junaid Hassan (PhD student)
Simon Weldon (PhD student)
Alfred Obia (PhD student)
Longfei Yu (PhD student)
Natalie Lim (PhD student)
Daniel Todt (PhD student)
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Rannei Tjåland (technician)
Lars Molstad (technician)
Trygve Fredriksen (technician)
Else Marie Aasen (technician)
Kari Lovise Bøthun (MS cstudent)
Bushra Muzamil (MSc student)
Duan Chuqing (MSc student)

Methods

Quantification and sequence analyses of functional genes and transcripts in soils and wastewaters

Whole genome sequencing of bacteria

Bioinformatics

Detailed gas kinetics analyses (NO, N₂O, N₂, CH₄, O₂, CO₂) of complex microbial communities (soils, wastewater, extracted cells) and pure cultures

Microbial community composition analyses (PLFA, DGGE)

Resources

Fieldsites: Agricultural field trials in Norway, Sweden, Germany and Finland

454/Illumina: We are about to buy a MiSeq instrument

Incubation robotics for analyses of gas kinetics

Real-time PCR

Nitrite analyzer (special construction)

Anaerobic chamber

Five key publications

Bergaust, L., Mao, Y., Bakken, L.R., Frostegård, Å. 2010. Denitrification response patterns during transition to anoxic respiration and post-transcriptional effects of suboptimal pH on nitrous oxide reductase in *Paracoccus denitrificans*. *Appl. Environ. Microbiol.* 76:6387-6396.

Liu B., Mørkved P. T., Frostegård Å. and Bakken L. R. 2010. Denitrification gene pools, transcription and kinetics of NO, N₂O and N₂ production as affected by soil pH. *FEMS Microbiol. Ecol.* 72:407-417.

Frostegård, Å, Tunlid A. and Bååth, E. 2011. Use and misuse of PLFA measurements in soils. *Soil Biol. Biochem.* 43: 1621-1625. "Citation classic" series of highly cited papers.

Bakken L. R., Bergaust L., Liu B., Frostegård Å. 2012. Regulation of denitrification at the cellular level – a clue to understanding of N₂O emissions from soils. *Royal Soc. London B.* 367: 1226-1234.

Liu B., Mao Y., Bergaust L., Bakken LR and Frostegård Å. 2013. Strains in the genus *Thauera* exhibit remarkably different denitrification regulatory phenotypes. *Environ. Microbiol.* In Press.