



## Diversity and Function of Microorganisms in Nature (2p)

**Time:** 20-25/2-2006, **Place:** Lecture hall 6, Old Zoology Building, Evolutionary Biology Centre, Uppsala University.

**Course format:** The course is given in English and is based on lectures by invited specialists working on various fields of microbiology and microbial ecology. This is an intensive course with lectures and exercises running from 09.00 to ~ 20.00 every day (obviously with breaks for coffee, lunch and dinner). Students are expected to give a 10-min presentation of their own research during the first two days of the course. So far I have 25 confirmed participants and 7 more students who need to send me a final confirmation if they want to attend the course.

**Course organizer:** Stefan Bertilsson, Limnology/Department of Ecology and Evolution, Uppsala University, Norbyv. 20, SE-75236 Uppsala, Sweden, Tel: int+46-18-4712712, Fax: int+46-18-531134, E-mail: [stebe@ebc.uu.se](mailto:stebe@ebc.uu.se). The course is funded by the Faculty of Science and Technology, Uppsala University and is part of an ongoing Uppsala-based initiative in *Microbiomics* -Integration of technology development and biology to link population identity with function in complex microbial communities (Funded by Formas).

**Accommodation:** We advice those who need a place to stay during the course to reserve accommodation early. You may for example try Uppsala Vandrarhem City ([http://www.uppsala.com/org/org\\_pres.php3?nr=353804](http://www.uppsala.com/org/org_pres.php3?nr=353804)) or one of the alternatives presented on the Uppsala tourism website: (<http://www.uppland.nu/DynPage.aspx?id=1313>).

**Teachers:** Stefan Bertilsson (Uppsala University), German Jurgens (Helsinki University), Lasse Riemann (University of Kalmar), Dan Andersson (Uppsala University), Stina Drakare (Uppsala University), Sara Hallin (SLU), Janet Jansson (SLU), Mona Johansson (Uppsala University), Eva Lindström (Uppsala University), Magnus Rosenquist (SLU), Sara Sjöling (Södertörns Högsk.) Jan Stenlid (SLU), possibly a few additional speakers (to be confirmed).

**Aim of the course:** The course will provide students with an introduction to the complexity of microbial life in the environment as well as the molecular and ecological processes responsible for maintaining and regulating microbial diversity in nature. The course will be based on examples/cases from all three domains of life (bacteria, archaea, microeukaryotes) as well as viruses, with an emphasis on populations that are likely to exert a major influence on the functions and features of aquatic and terrestrial ecosystems. During the course, students will also be presented with recent advances and challenges in molecular-based techniques and tools to study the composition, diversity and function of microbes in nature.

**Schedule:***Monday 20/2*

- 9.00-9.45 Introduction and scope of the course (Stefan Bertilsson)
- 10.15-11.00 Fundamentals of microbial communities (Eva Lindström)
- 11.00-12.00 Linking microbial diversity and function: the nitrogen cycle (Sara Hallin)
- 13.00-13.45 Microbial control of carbon cycling in aquatic environments (Stefan Bertilsson)
- 13.45-14.30 Archaea – microbes coping with extreme environments (German Jurgens)
- 15.00-18.00 Student presentations
- 18.00-19.00 Take out dinner
- 19.00-20.00 Introduction to group exercise (Joint Project Proposal)

*Tuesday 21/2*

- 9.00-9.45 Molecular tools in microbial ecology: Sequence analysis and phylogeny (German Jurgens)
- 10.15-11.00 Bacterial genome stability (Dan Andersson)
- 11.00-12.00 Partnering molecular tools with applied bioinformatics (Magnus Rosenquist)
- 13.00-16.00 Student presentations
- 16.00-17.30 ARB - software environment for sequence data (German Jurgens)
- 17.30-18.30 Take out dinner
- 18.30-20.00 Group 1-ARB exercises / Group 2-Exercise-Joint Project Proposals

*Wednesday 22/2*

- 9.00-9.45 Virus-host dynamics in marine plankton (Lasse Riemann)
- 10.15-11.00 Molecular biology of marine bacteriophages (Lasse Riemann)
- 11.00-12.00 Parasitic lifestyles (Mona Johansson)
- 13.00-14.30 Exercise-Joint Project Proposals
- 15.00-16.00 Molecular approaches for studying plant-microbe interactions (Janet Jansson)
- 16.00-17.30 Group 1-Exercise-Joint Project proposal / Group 2-ARB exercises
- Dinner on your own, additional time for Group exercise-Joint Project Proposal

*Thursday 23/2*

- 9.00-10.00 Microbial biogeography (Eva Lindström)
- 10.30-11.00 Biogeography of marine bacterioplankton: in silico and in situ analyses (Lasse Riemann)
- 11.00-12.00 Journal club: Microbial biogeography
- 13.00-13.45 Metagenomics (Sara Sjöling)
- 13.45-14.30 Exploring and exploiting sediment microbial communities (Sara Sjöling)
- 15.00-17.00 Group exercise-Joint Project Proposal
- Dinner on your own, additional time for Group exercise-Joint Project Proposal

*Friday 24/2*

- 9.00-9.45 Protist diversity in aquatic environments (Mona Johansson)
- 10.15-11.00 *Prochlorococcus* -a microbial model of global significance (Stina Drakare)
- 11.00-12.00 Fungal diversity and function in terrestrial ecosystems (Jan Stenlid)
- 13.00-14.30 Group exercise-Joint Project Proposal
- 15.00-18.00 Presentations of Joint Project Proposals
- 19.00- Dinner out

*Saturday 25/2*

- 9.00-9.45 Single-cell approaches to microbial ecology (Stefan Bertilsson)
- 10.15-11.00 Linking identity and function with isotope tracers (Stefan Bertilsson)
- 11.00-11.45 Outlook: emerging tools in microbial ecology (Stefan Bertilsson+guests)
- 11.45-12.15 Concluding remarks, course evaluation

