

## ESR 4 – SINGLE CELL TRANSCRIPTOMICS FOR ECOLOGICAL AND METABOLIC NICHE-MAPPING OF UNCULTURED MICROEUKARYOTES

<b>Research project</b>	Aquatic ecosystems host large microeukaryote diversity that remains metabolically and ecologically unresolved. Many lineages of unicellular eukaryotes are known only from their environmental rRNA sequences without any associated information about function or dependencies on other microorganisms. Recent development in single cell genomics and transcriptomics offers the tools to address this gap in knowledge and within this project we will adapt and develop methods and workflows for single cell genome and transcriptome analysis for uncultured freshwater and marine microeukaryotes and their associated bacteria. These tools will be applied to experimental incubations where assemblages of microeukaryotes from freshwater, brackish and marine waters are exposed to contrasting redox conditions, light stress and organic compounds. The cellular level transcriptome responses to such environmental driver variables will be used for niche-mapping of major uncultured lineages and analysis of metabolic interactions and dependencies among microeukaryotes and their associated microflora.
<b>Supervisor</b>	<u>Name:</u> Stefan Bertilsson <u>Email:</u> <a href="mailto:stebe@ebc.uu.se">stebe@ebc.uu.se</a> <u>Website:</u> <a href="http://www.ieg.uu.se/limnology/people/stefan-bertilsson/">http://www.ieg.uu.se/limnology/people/stefan-bertilsson/</a>
<b>Host institution</b>	Uppsala University (UU) Uppsala, Sweden
<b>PhD program</b>	Four year fully funded graduate training leading to a PhD in Biology from Uppsala University
<b>Expected results</b>	<u>Technology &amp; Innovation:</u> A fully operational workflow for replicated microfluidic single cell genome and transcriptome analysis of aquatic microeukaryotes and associates bacteria. Tailored methods to efficiently lyse and extract DNA and mRNA from major microeukaryotic lineages. <u>Science:</u> Differential expression profiles in uncultured aquatic microeukaryotic lineages in response to environmental drivers such as solar radiation, organic compounds and redox conditions. Niche mapping of uncultured aquatic microeukaryotic lineages and analysis of metabolic interactions and dependencies among microeukaryotes and their associated microflora..
<b>Planned secondments</b>	FGT - Month 15 (2 m) - Method development for microfluidic sorting & lysis of microeukaryotes UNEXE - Month 22 (3 m) - Cross-comparison of different microfluidic devices for single cell sorting CSIC-ICM - Month 28 (3 m) - Experimental studies of marine microeukaryotes
<b>Required profile</b>	Graduate in biology or related field. Special weight will be given to earlier experience in microbiology, DNA and RNA-based analyses and single cell methods.
<b>Special conditions</b>	The postgraduate training comprises four years of full time studies. The position can be combined with up to 20 % of teaching assistantship, which will then prolong the position accordingly. More information about postgraduate studies at Uppsala University and formal requirements are available at <a href="http://www.teknat.uu.se">http://www.teknat.uu.se</a> .