



Arctic Seminar Series
Thursday 27 October at 14.00-15.00
ARC meeting room, 1540-020, Roskilde: IO.19

Gerrit van den Engh
Center for Marine Cytometry, Washington, USA
Dynamics of phytoplankton populations
measured by flow cytometry



Ger van den Engh will present flow cytometric analyses of the Arctic spring bloom, the Pacific Ocean near Hawaii and the Oxygen Minimum Zone off the coast of Peru.

Flow cytometry, a technology originally developed for blood cell analysis, has been proven to be a useful tool for plankton analysis. Flow cytometers detect, inspect and measure every particle in a water sample, thus providing an accurate, quantitative census of its inhabitants.

Application of the technique has led to the discovery of *Prochlorococcus*, that is now recognized as one of the most abundant organisms in the tropical ocean but had not been detected by microscopy nor by any other technique. With the arrival of single-cell DNA technology, the measurement and separation of individual plankton particles has even become more important. Community-wide predictions of biochemical/physiological activities in an ecosystem can now be predicted based on an inventory of particles and their expressed genes.

Despite the importance of flow analysis for the study of microbial communities, the instruments that are being used differ little from the versions designed for biomedical research. This, despite the fact that the physical properties of microbes and phytoplankton are very different from those of blood cells.

I have spent the past 10 years adapting and optimizing flow cytometers for environmental plankton samples and have developed methods for integrating flow cytometry results with other environmental measurements.

Depth profiles generated in this manner show a surprising variation in plankton communities across even very small changes depth. Using examples from studies at a number of sites in the world, I will demonstrate that flow cytometric depth profiles are useful in understanding the factors that determine the composition and dynamics of plankton communities.