Title: Using nanoSIMS to identify influence of light quality and intensity on the ecophysiology of a new picocyanobacterial isolate from the Baltic Sea.

Research Exchange: Student X from LNU to visit RA Foster lab at SU and Aurélien Thomen NanoSIMS 50L instrument housed at Chalmers/Göteborg for measurements.

Background: Unicellular picocyanobacteria are characterized by widespread distributions, small cell diameters (e.g <2.0 mm) and many are able to adapt to the prevailing light field by changing the ratio of their pigments. The pigments in cyanobacteria are called phycobiliproteins, and include phycoerythrin (PE), phycocyanin (PC), and allophycocyanin; these are housed in a multi-subunit phycobilisome (PBS). Recently, a novel group of brackish-adapted picocyanobacteria were discovered in a Baltic Sea metatranscriptome, and later isolated into culture, which contain a unique pigment composition (Larsson et al. 2014) (Fig 1).

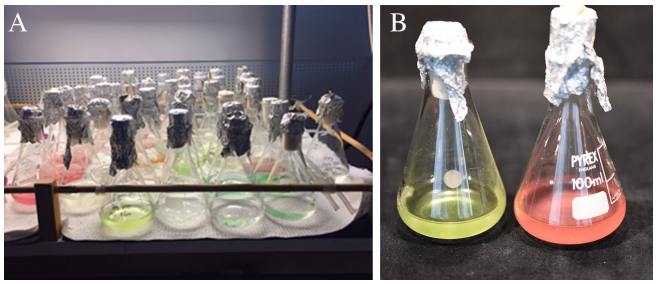

Fig 1. A. Baltic picocyanobacteria culture collection in Foster's Lab. B two strains: high PC rich (left), PE rich (right).

The primary goal of the proposed work is to measure the carbon fixation rates for the new picocyanobacterial isolate under varying light intensities by stable isotope experiments and nanoSIMS 50L measurements. The research exchange is necessary for completion of my PhD project and the Foster Lab has the expertise, materials, and equipment necessary for carrying out the experiments. The nanoSIMS 50L is necessary for the single cell uptake measures. Both Foster and Thomen are in support of my research exchange. An application for nanoSIMS analysis has already been submitted and approved.

Research Exchange Objectives: There are several objectives: 1) visit laboratory of RA Foster (SU) for assistance with experimental design, setting up and carrying out stable isotope labeling experiments and sample preparation for nanoSIMS analysis 2) preparation of bulk samples for necessary IRMS analysis prior to nanoSIMS analysis 3) visit to the nanoSIMS 50L instrument housed in Chalmers/Göteborg for analysis.

Budget: Estimated costs from internet searches and booking.com.
Train tickets round trip LNU to SU-…..X SEK
Accommodations: 5 days Stockholm…XSEK
Train tickets round trip LNU to Göteborg…X SEK
Accomodations: 4 days Göteborg….XSEK

Reference: Larsson, J., Celepli, N., Ininbergs, K., Dupont, C.L., Yooseph, S., Bergman, B. and Ekman, M., 2014. Picocyanobacteria containing a novel pigment gene cluster dominate the brackish water Baltic Sea. *The ISME Journal*, 8(9): 1892-1903