

## **How modelling can stimulate our understanding of ecophysiology of diazotrophic cyanobacteria**

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Recently we have applied physiological cell flux models to field and laboratory data on various experiments with diazotrophic cyanobacteria, mostly with *Crocospaera*. In my talk I will show how relatively simple modelling of existing data can provide new mechanistic and quantitative information about ecophysiology of diazotrophs.

Specifically, I plan to provide few examples on: i) how the ability to fix nitrogen even in the presence of ammonium gives *Crocospaera* competitive advantage over non-nitrogen-fixing phytoplankton; ii) how heterogeneous rates of N<sub>2</sub> fixation in unicellular diazotroph populations confer them an energetic advantage and allow to expand their ecological niche; iii) how *Crocospaera* uses different O<sub>2</sub> management strategies to maintain microanaerobic environment for N<sub>2</sub> fixation; iv) the importance of C transfer from the host diatom to symbiotic heterocyst-forming diazotrophs and its role in supporting the required growth and N<sub>2</sub>-fixing activity of the diatom-diazotroph association.