

**Title:**

Diatom Spines as Mediators of Bacteria-Diatom Interactions.

**Authors:**

Mathieu Forget, Roman Stocker.

**Institution(s):**

ETH Zürich

**Abstract (300 words maximum): :**

My research investigates the role of bacterial attachment in facilitating bacteria-phytoplankton interactions. This mechanism plays a crucial role in maintaining close spatial proximity between bacteria and phytoplankton over extended periods, thereby enabling the exchange of infochemicals and nutrients between these two fundamental components of marine ecosystems. Despite its importance in influencing biogeochemical cycles, the contribution of bacterial attachment to bacteria-phytoplankton interactions remains poorly understood.

Using the model association between the ubiquitous diatom *Thalassiosira weissflogii* and the bacterium *Marinobacter adhaerens*, we demonstrated that *M. adhaerens* colonizes the thin and numerous chitin fibers referred to as spines—that extend from *T. weissflogii* cells. We are examining the ecological significance of this interaction mechanism, focusing on the role of diatom surface properties in regulating bacterial attachment and how this process affects metabolite exchange between the two partners. Intriguingly, our findings indicate that *T. weissflogii* spines act as a "lethal net", capturing bacteria and triggering their lysis—potentially to access nitrogen from bacterial biomass.

This work reveals a previously unknown interaction mechanism, providing new insights into diatom-bacteria relationships and emphasizing the significance of bacterial attachment in nutrient cycling and ecosystem dynamics.