

# UniCat Colloquium

## PROF. KATRINA FOREST

University Wisconsin-Madison

### *Chemical Biology of a Novel Fresh Water Photoheterotrophy*

Freshwater lakes harbor complex microbial communities, often dominated by a cosmopolitan lineage of actinobacteria called *acl*. Based on single-cell genome and metagenome sequences, it is thought that members of *acl* might bolster heterotrophic growth using phototrophy. Ultimately, we seek to determine whether *acl* indeed takes advantage of the potential light-harvesting capability encoded in its actino-opsin genes (*actR*). Analysis of *acl* transcripts from the eutrophic Lake Mendota demonstrated that *actR* is among the most highly-transcribed genes across all *acl* clades and that transcripts for machinery to produce retinal and complex carotenoids were also synthesized. Heterologous expression of *acl* genes predicted to be crucial for the actinorhodopsin pathway produced lycopene, retinal, and ActR. ActR expressed in *E. coli* was able to covalently bind retinal, forming a rhodopsin which pumps protons in response to light. It remains to be discovered the extent to which this ability plays a role in the metabolism of *acl* in its natural environment, but the relatively recent recognition that freshwater bacteria may use this ancient form of light harvesting has opened new ways to consider carbon and energy cycling in Earth's fresh water.

**Wednesday, September 06, 2017 at 5:15 PM**

TU Berlin, Institute of Chemistry  
Straße des 17. Juni 115, 10623 Berlin

Building C, Lecture Hall **C 264**

**Prof. Dr. Hildebrandt (TUB)**

Organizer

Coffee and cake will be served 30 minutes before the lecture. Guests are cordially invited to attend!  
Prof. Dr. Matthias Driess - Chair of the Cluster of Excellence UniCat - [www.unicat.tu-berlin.de](http://www.unicat.tu-berlin.de)



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