

Seminar Announcement

Depts of Biological
Sciences &
Chemistry, and
Materials Science &
Engineering Program

Friday. February 20
4-5 pm
Science Library, Room 212

Korneel Rabaey

The University of Queensland, Advanced Water Management Centre, Brisbane

“Electrochemically active biofilms as new drivers for environmental (and industrial?) biotechnology”

Bio-electrochemical Systems (BESs) use microorganisms as catalysts for oxidation and reduction reactions at electrodes. The two main types of BESs are microbial fuel cells, targeting the production of electrical power from organics, and microbial electrolysis cells, targeting the production of e.g. hydrogen. Both systems rely heavily on biofilms. Particularly biofilms conveying electrons towards an electrode (the anode) have been studied thus far. Complex foodwebs can develop within these biofilms, the outcome of the foodweb can be altered by changing the operational conditions. I will be discussing recent findings from our research on the relationship between pure culture, coculture and mixed population biofilms. I will be focussing on biofilm structure and gene expression for pure culture systems. In a second part of my talk, I want to address the transfer of electrons from a cathode towards microorganisms. This process has received far less attention, while it is potentially more attractive from an application perspective. I will be discussing results obtained with denitrifying cathodes, and how BESs are tools to study how differences in the control of the system can shift such a reduction from nitrogen gas to e.g. nitrous oxide as a terminal reduction product. The communities responsible for this denitrification are quite unexpectedly enriched in putative nitrifying organisms, in combination with Gram positive and “conventional” denitrifying organisms. In the last part of my talk, I want to give an overview of how this biofilm-based technology has the potential to cause a paradigm shift in wastewater treatment and environmental and industrial biotechnology in general.

If you are interested in meeting with the speaker, please contact Karin Sauer
(ksauer@binghamton.edu)