Eawag, the Swiss Federal Institute of Aquatic Science and Technology, is a Swiss-based and internationally networked aquatic research institute within the ETH domain (Swiss Federal Institute of Science and Technology). It is committed to the ecologically, economically and socially responsible management of water resources and aquatic ecosystems.

The University of Zurich (UZH) is one of the leading research universities in Europe and offers the widest range of study courses in Switzerland. The Limnological Station Kilchberg (LS-UZH) is a department of the Institute of Plant Biology, dedicated to research in freshwater microbiology.

2 PhD Positions on biofilm structure and microbial community in gravity-driven membrane filtration

Two PhD positions are available in a joint project on the topic of biofilms growing on membranes at Eawag and at LS-UZH.

The offered PhD positions are part of an interdisciplinary research project BIOMEMBRA funded by the Swiss National Science Foundation. BIOMEMBRA is a joint interdisciplinary project between Eawag (Prof. Morgenroth, Dr Derlon) and LS-UZH (Prof. Pernthaler, PD Dr Blom). The project aims at better understanding how the formation of biofilm on membrane surface influences the quality and quantity of flux produced during Gravity-Driven Membrane (GDM) filtration (http://www.eawag.ch/membranefilter). Two PhD positions are available:

- PhD position 1 (available at Eawag) will focus on understanding the mechanisms of biofilm physical structure formation and how its physical structure influences the filtration performances.
- PhD position 2 (available at LS-UZH) will focus on how the microbial community composition of biofilms and specific microbial functions influence permeate quality.

Project summary Biofilm growth on membranes is a key concern in the application of membranes for water filtration. A significant amount of research has been devoted to identify approaches to prevent or reduce the development of such unwanted biofilms. One of the lessons learned is that preventing biofilm formation is usually not possible and minimizing biofilm accumulation is costly in terms of required energy, chemicals, and labor intensive operation. In this project we propose to evaluate basic mechanisms and application of gravity-driven membrane (GDM) filtration where biofilm development on the membrane is tolerated. Instead of trying to remove the biofilm, the focus in GDM filtration is to modify biofilm structure so that biofilm accumulation has only a limited influence on the quantity of produced water (i.e., the water flux). In fact, biological processes in the biofilm can help to improve the quality of the permeate produced, e.g., by removing organic compounds. GDM filtration is normally operated without any cross flow and without any physical or chemical cleaning of the membrane – but nonetheless results in long-term (on the order of several months) stable water fluxes. Advancing this new concept of GDM filtration requires a fundamental understanding of mechanisms governing biofilm development, the influence of biofilm physical structure on water permeability, and the influence of microbial community composition on biological function.

We are looking for independent and motivated students with a broad background and interest in water treatment, microbiology, and engineering applications. The candidates should hold an MS degree in Environmental Engineering, Microbiology, Environmental Sciences, Civil Engineering, or similar.

The position starts as soon as possible. The duration of the PhD program at ETH-Zurich and at UZH are generally three years. Applications should include a cover letter describing the applicant's motivation for pursuing a PhD, a complete resume, and contact information for three references. Copies of prior publications or theses will also be considered if made available as PDF.

We look forward to receiving your application – including CV, motivation letter, and copies of academic qualifications and references – Please send your application through this webpage, any other way of applying will not be considered. Please click on the following link, this will take you directly to the application form. http://internet1.refline.ch/673277/0235/++publications++/1/index.html

The deadline for applications is 1 December 2013.

For further information on the two partners see http://www.eawag.ch and http://www.botinst.uzh.ch/research/limnology.html; for information GDM see http://www.eawag.ch/membranefilter.

For specific information on project #1, please contact Prof. Eberhard Morgenroth (eberhard.morgenroth@eawag.ch). For specific information on position #2, please contact Prof. Jakob Pernthaler (pernthaler@limnol.uzh.ch)