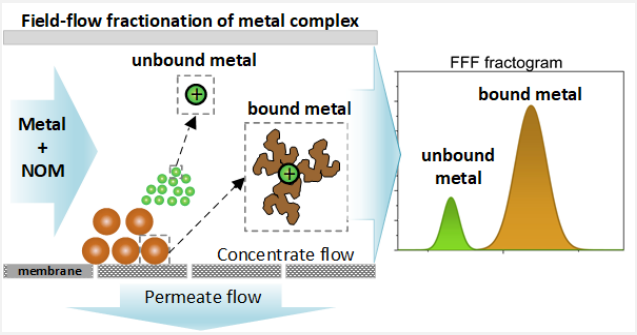
Masters Project

Project Summary	**Characterization of metal-organic matter complexation using field-flow fractionation with relevance to membrane filtration**

Understanding the nature of complexation of various metallic pollutants with natural organic matter (NOM) in water is critical for improving the efficiency of membrane filtration. The quantity and quality of complexation of a metal with NOM largely determines the transport of the metal in a membrane filtration process. Field-flow fractionation (FFF) is a state of the art analytical tool used for the fractionation of various solutes such as polymers, macromolecules and nanoparticles based on their hydrodynamic size. An asymmetrical flow across an ultrafiltration membrane mainly determines the nature of fractionation.



The aim of this project is to establish a protocol that delivers high resolution fractionation of metals species unbound and bound with humic acid. Metallic pollutants such as Sr/Cr/As will be evaluated and the significance of the results will be correlated with corresponding filtration of these metals.

The following specific task will be performed as a part of the project:

- Perform the metal-humic acid complex fractionation in using tight UF membranes in FFF
- Evaluate the flow parameters and membrane types in FFF for better resolution
- Establish the fundamental factors affecting the fractionation and optimize the separation and recovery

In addition, the master student will have the opportunity to co-author a research publication (provided the results are promising) and participate in international cooperation. Besides, the student will be participating in group activities, oral presentation in group meetings and writing of reports (medium of all communications and writing will be in English).

Required Skills	**Studies in Chemical/Process Engineering or equivalent (Uni, TH)** Basic knowledge in chemistry and membrane technology. Analytical skills and method validation skills are favourable. Evidenced writing skills in English language, ability to use MS Word, Excel, know-how for Origin Labs software and Endnote for data analysis, graphing and citation management, willingness to lead or contribute to the writing of a scientific publication.
Institute/ Department	Institute for Advanced Membrane Technology (IAMT) Bldg 352, Campus North, Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen
Start Date	Flexible/Negotiable
Application Procedure	Please email CV, transcripts and motivation letter with available time period for evaluation.
Project Advisor(s)	Dr. Akhil Gopalakrishnan: akhil.gopalakrishnan@kit.edu Prof. Dr.-Ing. Andrea Iris Schäfer: andrea.iris.schaefer@kit.edu https://www.iamt.kit.edu/