

## PhD Position (Doktorarbeit)

<b>Project</b>	<p>This PhD project builds on ongoing research projects within the NanoMembrane initiative and will explore the development of multi scale models in membrane materials and processes design.</p> <p>The project will focus for a chosen scale of modelling (such as molecular dynamics or mesoscale modelling) and consider i) an experimental challenge that is to be described with the chosen model, identifying clearly the parameters that are to be incorporated in a model, the software required and the experimental methods used, ii) current literature and based on a thorough analysis identify current limitations of existing models, iii) requirements to develop the model by application of several existing commercial tools, and iv) an application to micropollutant removal in water treatment with a focus on permeability and selectivity of material and process.</p> <p>Modelling aspects are open to exploration at molecular and process scale and should consider the following aspects with clear focus on one specific scale and novelty;</p> <ul style="list-style-type: none"> <li>◆ How can a membrane system adsorb and degrade contaminants in-situ in a membrane with adsorption or photocatalytic reactivity?</li> <li>◆ What is the most suitable membrane material for micropollutant removal from water and what are selection criteria/tools?</li> <li>◆ What are the mechanisms of adsorption and degradation kinetics in membrane filtration and how can such mechanisms be quantified?</li> </ul> <p>The PhD project will be a combination of theory and experiment and will begin with an identification of a set of research questions based on detailed literature survey, hence modifying the initial research proposal. Subsequently, development of a research plan and timetable for the 3 year research project, and set-up of required equipment and development of relevant analytical methods will follow. Establishment of suitable models to explain the results obtained drawing of interdisciplinary and potentially multi-scale approaches will be an opportunity to integrate experiment and model. Execution of the research plan through conducting of experiments, sample and data analysis and write up of results for scientific publication are part of the PhD process – a journey to become an independent researcher!</p> <p>Throughout the project, there will be multiple opportunities for cooperation with internal and external partners, supervising bachelor and master students, giving oral presentations at conferences, writing high-impact journal articles, as well as contributing to teaching.</p>
<b>Qualifications</b>	<p>You hold a Masters in Chemical, Process, Environmental Engineering, or equivalent. You are a naturally curious person who is eager to learn more and has a strong interest in research. Experience with membrane filtration systems (of any scale) is a definite advantage, as well as being comfortable in specifying system components and sound experimental problem solving skills in both model and experiment. Excellent English language proficiency is essential, basic German language skills of advantage and evidenced communication skills expected.</p>
<b>KIT</b>	<p>KIT is one of the biggest research institutions worldwide and has access to state-of-the art research facilities resulting from the merger of the National Research Centre of the Helmholtz Association and the former Technical University of Karlsruhe. This project bridges Membrane Technology group at the Institute for Functional Interfaces (IFG) and colleagues with expertise in modelling, both at KIT as well as international collaborators (US, Israel, Australia, UK). The PhD will be registered in the Faculty of Chemical and Process Engineering at KIT.</p>
<b>Contact</b>	<p><b>Prof. Dr.-Ing. Andrea I. Schäfer</b>, Membrane Technology Department, Institute of Functional Interfaces (IFG-MT), Tel: +49(0)721-608-26906, Email: <a href="mailto:Andrea.Iris.Schaefer@kit.edu">Andrea.Iris.Schaefer@kit.edu</a></p>
<b>Applications</b>	<p>There are 3 positions available and will be filled following an ongoing selection process on a first come first served process. All candidates are requested to apply for scholarships as applicable.</p> <p>Please send applications with CV, publication list and your contribution to the publication (if relevant), academic transcripts, degree certificates, contact details for three references and a preliminary research proposal (about 10 pages with workplan and 3 focused research questions).</p>