

# **RESEARCH FOCUSED TEACHING**

## PROF DR-ING ANDREA IRIS SCHÄFER

Professor of Water Process Engineering, Faculty of Chemical and Process Engineering

Karlsruhe Institute of Technology

## **INTERNATIONAL CONCEPTS OF WATER TECHNOLOGIES**

- Bachelor Wahlpflichtfach VL 22644
- Innovative concept of problem based learning
- Lectures & impulse lectures as topic introduction
- International desalination/water reuse project
- Team work with one tutor for every 2 projects
- Workshop presentation and report as 'exam'







(26/04/2017

## **GRADUATE ATTRIBUTES**

- Membrane technology example as state-of-the-art water treatment technology
- Confidence in technical English
- Literature search and management (Endnote)
- Industrial design software
- Report Writing and oral Presentation
- Industry relevance/real world example





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### **WATER-ENERGY NEXUS**

- ♦ INTERNATIONAL DEVELOPMENT
- ♦ RELEVANCE TO INDUSTRIAL APPLICATIONS

### **PROJECTS RELEVANT TO GLOBAL CHALLENGES**

- Masters/Bachelor/Study Project/HIWI/PhD & postdoc projects adjusted to student interests
- Visit http://mt.ifg.kit.edu/24.php for current opportunities or notice board CS Bldg 10.91

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	Diplomarbeit / Masters Project
Project Summary	<ul> <li>P25 immobilized PVDF membrane micropollutants</li> <li>Micropollutants include natural as well as anthropopenic persistent chemicals in water are a rapidly emerging global problem that seriously threatens environmental and human health. Membrane processes are used in advanced water purification to remove micropollutants. Remaining issues are incomplete removal of micropollutants, high energy demand and the requirement to dispose of concentrates/brines. Hybrid photocatalysis membrane filtration</li> <li>Hybrid photocatalysis membrane filtration</li> <li>system combines the advantages of both membrane filtration and in situ photocatalytic degradation. This approach enables superior removal efficiency and selectivity Further, the process operates at higher permeability and the in situ degradation of pollutants solves the concentrate issue. Thus, the hybrid process offers significant advantages that warrant investigation.</li> <li>The following task will be performed:</li> <li>Literature review on the topic (photocatalytic membrane and removal of contaminants, like dyes, pharmaceuticals and personal care products; integration of P25 with PVDF membrane, stability of the polymeric membranes in photocatalysis</li> <li>Characterization of synthesized membrane using electron microscopy, surface charge, and other state-of-the art spectroscopic tools</li> <li>Perform experiments with the photocatalytic micro cross flow system connected to determine micropolutant dagradation</li> <li>Analyze experimental data and write/co-author a research publication (in English)</li> </ul>
Required Skills	Studies in Chemical/Process Engineering or equivalent (Uni, TH) Basic knowledge in polymer chemistry, water treatment technologies, membrane technology. Evidenced writing skills in English language, proficiency with Origin Labs software for data analysis and graphing, willingness to lead or contribute to the writing of a scientific publication.
Institute	Membrane Technology Department, Institute for Functional Interfaces (IFG-MT)
Start Date Application	Flexible/negotiable Please email CV, transcripts and motivation letter with available time period for
Project Advisor(s)	Prease email CV, transcripts and motivation retter with available time period for evaluation. Dr. Chhabilal Regmi: chhabilal.regmi@kit.edu Prof. DrIng. Andrea Schäfer: Andrea.Iris.Schaefer@kit.edu http://mt.ifg.kit.edu/
Karlsruhe Institut	
	Diplomarbeit / Masters Project
Project Summary:	Removal of arsenic by ultra- and nanofilitration (UF/NF) membranes under varying water quality and fouling conditions Arsenic (As) concentration in groundwater is a ubiquitous problem and often referred to as current century's adversity. Among all the countries in different parts of the world affected by arsenic contamination in groundwater, the highest population at stake is in Bangladesh followed by West Bengal in India. Seawater level rise and subsequent increase in intrusion into groundwaters is likely to affect water quality significantly, and with this potentially the speciation and transport of As. Further, the nature of humic acid (HA) and the probable worsening of As release is to date little understood. Formation of organic-inorganic

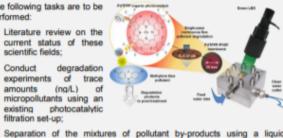
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omarbeit / Masters Project	Karlsnuhe Institut	Diplomarbeit / Masters P
zed PVDF membrane for photocatalytic degradation of s	Project Summary	Evaluation of contaminants removal by novel bio membranes
Include natural as well as persistent chemicals in rapidly emerging global seriously threatens and human health. occesses are used in repurification to remove Remaining issues are	Summary	Reverse osmosis (RO) is commonly used in seawa of drinking water, and increasingly used in w micropollutants. Due to the high pressure requiren intensive. The design of novel RO membrane mater and high permeability is an ongoing challenge. structures (e.q. water and ion channels) within the selectivity of ions transport and contaminants remo-
noval of micropollutants, nand and the requirement incentrates/brines. alysis membrane filtration		The aim of this project is to carry out a range of experiments to evaluate the membrane selectivity and removal of water contaminants (e.g. fluoride,
is the advantages of both membrane filtration and in situ photocatalytic his approach enables superior removal efficiency and selectivity. ccess operates at higher permeability and the in situ degradation of s the concentrate issue. Thus, the hybrid process offers significant t warrant investigation. project is to fabricate nanocomposite (P25-PVDF) membranes with y to achieve micropollutant adsorption and degradation.		arsenic, nitrate, and possibly uranium) by RO membrane functionalized with bio-inspired water channels. The project is carried out in collaboration with the Institut Européen des Membrane (Montpellier, France), where the membranes are produced.
sk will be performed:		The following specific task will be performed as part
eview on the topic (photocatalytic membrane and removal of is, like dyes, pharmaceuticals and personal care products; integration h PVDF membrane, stability of the polymeric membranes in sis		<ul> <li>Literature review on the topic (water quality with fluoride, arsenic, nitrate and uranium; retention in RO; incorporation of water channels in p characterization (e.g. molecular weight cut off ()</li> </ul>
ation of synthesized membrane using electron microscopy, surface other state-of-the art spectroscopic tools		<ul> <li>Characterize the novel RO membrane and membranes</li> </ul>
eriments with the photocatalytic micro cross flow system connected to nicropollutant degradation		<ul> <li>Perform experiments with a micro cross flow sys characterization to evaluate the contaminants re</li> </ul>
erimental data and write/co-author a research publication (in English)	Required	Analyse experimental data and write/co-author a
mical/Process Engineering or equivalent (Uni, TH) je in polymer chemistry, water treatment technologies, membrane denced writing skills in English language, proficiency with Origin Labs a analysis and graphing, willingness to lead or contribute to the writing bilication.	Skills	Studies in Chemical/Process Engineering or equilibrium Basic knowledge in water and polymer chemistri membrane technology. Evidenced writing skills in Er Origin Labs software for data analysis and gray management, willingness to lead or contribute to th
nology Department, Institute for Functional Interfaces (IFG-MT)	Institute/	Institute for Functional Interfaces, Membrane Techr
ble	Department	Bldg 352, Campus North
CV, transcripts and motivation letter with available time period for	Start Date Application	Flexible/negotiable Please email CV, transcripts and motivation letter
egmi: chhabilal.regmi@kit.edu	Procedure Project	evaluation. Dr. Alessandra Imbrogno: alessandra.imbrogno@ki
drea Schäfer: Andrea.Iris.Schaefer@kit.edu du/	Advisor(s)	Prof. DrIng. Andrea Iris Schäfer: andrea.iris.schae http://mt.ifg.kit.edu/
	Karlsruhe Institut	e of Technology
lomarbeit / Masters Project	Kararane HBUU	Diplomarbeit / Masters F
senic by ultra- and nanofiltration (UF/NF) membranes under varying nd fouling conditions	Project	Graphene Membrane Composites for Water Tre
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	Kansrune Institute of	rechn
Diplomarbeit / Masters Project		
Evaluation of contaminants removal by novel bio-inspired reverse osmosis (RO) membranes	Project	Mic
membranes Reverse osmosis (RO) is commonly used in seawater desalination for the production of drinking water, and increasingly used in water reuse for the removal of micropolutants. Due to the high pressure requirements, this process is very energy intensive. The design of novel RO membrane materials able to combine ion selectivity and high permeability is an ongoing challenge. The incorporation of bio-inspired structures (e.g. water and ion channels) within the membrane allows to improve the selectivity of ions transport and contaminants removal by RO. The aim of this project is to carry out a range of experiments to evaluate the membrane selectivity and removal of water contaminants (e.g. fluoride, arsenic, nitrate, and possibly uranium) by RO membrane functionalized with bio-inspired water channels. The project is carried out in collaboration with the Institut Européen des	Project Summary:	In t vib trai to mic dev me Thi kno env cha obt Th pe
Membrane (Montpellier, France), where the membranes are produced.		•
<ul> <li>The following specific task will be performed as part of the project:</li> <li>Literature review on the topic (water quality with a focus on ionic contaminants like fluoride, arsenic, nitrate and uranium; retention and transport mechanisms of ions in RO; incorporation of water channels in polymeric membranes; membrane characterization (e.g. molecular weight cut off (MWCO), salt retention)</li> <li>Characterize the novel RO membrane and benchmark against commercial membranes</li> </ul>		•
<ul> <li>Perform experiments with a micro cross flow system designed for novel membrane characterization to evaluate the contaminants retention</li> </ul>		•
<ul> <li>Analyse experimental data and write/co-author a research publication (in English)</li> </ul>		
Studies in Chemical/Process Engineering or equivalent (Uni, TH) Basic knowledge in water and polymer chemistry, water treatment technologies, membrane technology. Evidenced writing skills in English language, ability to learn/use Origin Labs software for data analysis and graphing and Endnote for literature management, willingness to lead or contribute to the writing of a scientific publication. Institute for Functional Interfaces, Membrane Technology Department (IFG-MT) Bidg 352, Campus North	Required Skills:	Stu Lab Kno Des Evic Con
Flexible/negotiable Please email CV, transcripts and motivation letter with available time period for	Institute/Dept:	Inst
evaluation. Dr. Alessandra Imbrogno: alessandra.imbrogno@kit.edu Prof. DrIng. Andrea Iris Schäfer: andrea.iris.schaefer@kit.edu http://mt.ifg.kit.edu/	Start Date: To apply: Project Supervisors:	c/o To t Ema Ron Prof
e of Technology		
Diplomarbeit / Masters Project	Karlsruhe Institut	te of Te
Graphene Membrane Composites for Water Treatment Applications		
Steroid hormones are excreted by humans and are subsequently found in many waterways as micropollutants. Removal of such micropollutants is a major engineering challenge because the separation of steroid from water requires membranes with very small pores and hence a significant amount of energy. Nanomaterials such as composed by the order of the microil theat the because the success.	Project Summary:	De

#### Diplomarbeit / Masters Project

cropollutant removal using photosensitizer-assisted membranes the modern world, the course to sustainable development is more than ever rant. In this regard, the concept of using a sunlight for chemica nsformations is a hot topic. The research field of photocatalysis continue grow and attract significant research interest. However, the removal of ropollutants from water is a global challenge. This has led to the velopment of a number of hybrid processes, including photocatalytic embrane reactors his master thesis is mainly experimental and based on the combine

owledge of several scientific fields such as catalysis, photochemistry, and vironmental engineering. While working with the cutting-edge aracterization methods applied in the group of Prof. Schäfer, you will also tain an overview working experience with each of them.

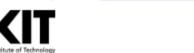


chromatography method; Data analysis and scientific writing (contribution to the writing of a paper

#### idies in Chemical/Process Engineering or equivalent (Uni, TH) work experience, in particular water quality & analysis wledge in the field of catalysis, organic chemistry, membrane technology irable knowledge of principles of HPLC separation fenced writing skills in English language

fident use of Origin Labs software for data analysis and graphing titute for Functional Interfaces (IFG) / Membrane Technology Department KIT Campus North be discussed

ail CV, transcripts and motivation letter with available time period for evaluation man Lyubimenko: roman.lyubimenko@kit.edu of. Dr.-Ing. Andrea Schäfer: andrea.iris.schaefer@kit.ed Andrey Turshatov: andrey.turshatov@kit.edu



#### Diplomarbeit / Masters Project

challenge because the separation of steroid from water requires membranes with very

ray requirements for water treatment if sufficient removal was attainable. PES-

Basic knowledge in water guality, water treatment technologies, membrai

Institute for Functional Interfaces / Membrane Technology Department (IFG-I

logy, nanomaterials. Evidenced writing skills in English language, profic

ith Origin Labs software for data analysis and graphing, willingness to lead or

evelopment and characterization of novel PES-CD nanofiber membrane for water treatment applications Steroid hormones are excreted by humans and are subsequently found in many waterways as micropollutants. Removal of such micropollutants is a major engineeri

cyclodextrin (CD) are able to adsorb certain micro

ermany, will be investigated for

understood and the potential n

nanofiber

PhD <u> «</u>Kit PhD Position (Doktorarbeit) This PhD project builds on ongoing research projects within the NanoMembrane initiative and will This PhD project ballies on ongoing research projects within the Anometionate initiative and with explore novel materials and membrane preparation methods for photocatalytic membrane development. The project will focus on i) photocatalyst selection, looking beyond the most commonly used materials, ii) explore options of catalyst deposition and coating, iii) investigate system design from small-scale to potentially pilot scale process design - with one of the challenges being the integration of the light source, and iv) an application to micropollutant common the design from small-scale to potentially pilot scale process design - with one of the challenges being the integration of the light source, and iv) an application to micropollutant common the design from small-scale to potentially pilot scale process design - with one of the challenges being the integration of the light source, and iv) an application to micropollutant common the design from small-scale to potentially pilot scale of the second source scale. There are common the second source are source and the second source of the second source source source source of the common the second source of the second source of the second source source source of the common the second source of the second source of the second source of the common the second source of the second source of the second source of the common source of the second source of the second source of the common source of the second source of the second source of the common source of the second source of the common source of the second source of the second source of the common source of the second source of the second source of the common source of the second source of the common source of the second source of the second source of the common source of the second source of the common source of the second source of the second source of the common source of the second source of the common source of the second source of the common source of the second source of the second so emoval. Modelling aspects are open to exploration at molecular and process scale. There are nany aspects of this project, potential that require in-depth R&D, including:

. How can a system degrade contaminants in-situ in a membrane with photocataly · What is the most suitable photocatalytic material for micropollutant degradation in water and

· What are the mechanisms behind in kinetics in membrane photocatalysis and how can such anisms be quant

The PhD project will be largely experimental and will begin with an identification of a set of



roughout the project, there will be multi partners, supervising bachelor and mas udents, giving oral presentations at conferences, writing high-impact journal articles, as well as sharing your knowledge via teaching.

- Qualifications You will most likely already 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. Excellent English language proficiency is essential, basic German language skills of advantage.
- 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 the Nanophotonics for Energy group within the Institute of Microstructure Technology (IMT) and Light Technology te (LTI). The PhD will be registered in the Faculty of Chemical and Process Engineering Prof. Dr.-Ing. Andrea I. Schäfer, Membrane Technology Department, Institute of Functional (IFG), Tel: +49(0)721-608-26906, Email: Andrea.Iris.Schaefer@kit.edu Prof. Dr.-Ing. Bryce S. Richards, Institute of Microstructure Technology (IMT) and Light Technology Institute (LTI), Tel: +49(0)721-606-26562, Email: Bryce.Richards@kit.edu



#### PhD Position (Doktorarbeit)

explore the development of multi scale models in membrane materials and processes design. The project will focus for a chosen scale of modelling (such as molecular dynamics or mesoscale The project will focus for a chosen scale of modelling (such as molecular dynamics of mesoscale codelling) and consider i) an experimental challenge that is to be described with the chosen codel, identifying clearly the parameters that are to be incorporated in a model, the software equired 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 I application of several existing commercial tools, and iv) an application to micropollutant remova in water treatment with a focus on permeability and selectivity of material and process



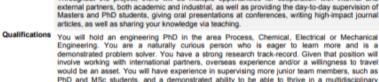
#### Postdoctoral researcher position: Engineering of photovoltaic-powered water-treatment systems

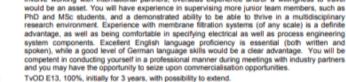
Researchers at KIT have a long-standing history of making a significant academic contribution he area of photo systems. We are seeking to design, re-and develop photovoltaic-powered mer filtration systems that are i) small-scale, i robust, iii) reliable, and iv) decentralised, which can ultimately be deployed in the remote areas 🖅 🚯 I. 🚯 🗳 of developing countries. In addition, there is

trong interest to pursue the commerciali We require an experienced postdoctoral researcher to lead this project. The position focuses or

 research in the following subjects:
 Simple and robust electrical control strategies to ensure that maximum water quality/quantity are achieved when operating without batteries (but possibly with Being able to reliably determine the level of system performance at any time and relying n a minimum number of sensors (also via remote monitoring). Understanding the long-term effects of operating the system from a fluctuating and

hroughout the project, there will be multiple opportunities for cooperation with internal and





- 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 Department at the Institute for Functional Interfaces (IFG-MT) and the Nanophotonics for Energy group within the Institute of Microstructure Technology (IMT) and Light Technology Institute 0.1
- Prof. Dr. Bryce S. Richards, Institute of Microstructure Technology (IMT) and Light Technology stitute (LTI), Tel: +49(0)721-608-26562, Bryce.Richards@kit.edu Prof. Dr.-Ing. Andrea I. Schäfer, Membrane Technology Department, Institute of Functional Interfaces (IFG), Tel: +49(0)721-608-26906, Andrea.Iris.Schaefer@kit.edu/ http://mt.ifg.kit.edu/ For the application please provide the following documents in electronic form: Motivation letter V: Response to requested qualifications and experience: List of publication: Transcript of

records / MSc degree; PhD certificate; Contact details of 3 referees. Note that incomplete applications will not be considered. Application Deadline 31 July 2019.

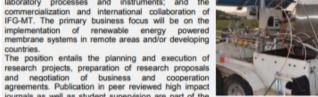


HELMHOLTZ

ASSOCIATION

The Membrane Technology Department at IFG (IFG-MT) was established in March 2014 and has access to research facilities within KIT - the Research University of the Helmholtz Association. State-of-the-art laboratories were opened in March 2019. The research vision of the IFG-MT is 'safe water for all children'. The approach is

interdisciplinary and international, with an emphasis on research excellence and enabling the academic development of team members. As the research business manager you will contribute to scientific research in one core research areas of IFG MT that matches your research track record. Your other responsibility will be of business/ administrative nature and encompasses financial administration and controlling, personnel and contract supporting team members in the maintenance laboratory processes and instruments; and t commercialization and international collaboration of IFG-MT. The primary business focus will be on the implementation of renewable energy powered membrane systems in remote areas and/or developing countries. The position entails the planning and execution o



journals as well as student supervision are part of the responsibilities. Interaction with KIT administration in terms of personnel management finance, procurement and technology transfer contracts, coordination with workshops fo equipment manufacturing as well as cooperation with industry are required. A sma contribution to teaching within the Faculty of Chemical and Process Engineering in

- expected. You hold a PhD in Chemical, Process, Environmental Engineering, or equivalent and have had a number of years of postdoc experience. You are a naturally curious person who is eager to learn more and has evidenced interest in research business leadership. Experience with membrane filtration systems (of any scale) is a requirement, as well as proven track record in research administration, business management, international collaboration, student supervision, research publication and research funding. Excellent English language proficiency is essential, German language skills are required for communication with administrative and technical units. TvOD E13, 100%, initially for 3 years with the possibility of tenure following KIT processes.
- 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 Karlsrute. This position is in the Membrane Technology Department at the Institute for Functional Interfaces (IFG-MT) which is affiliated for teaching with the Faculty of Chemical and Process Engineering.
- Prof. Dr.-Ing. Andrea I. Schäfer, Membrane Technology Department, Institute of Functional Interfaces (IFG), Tel: +49(0)721-608-26906, Email: Andrea.tris.Schaefer@kit.edu; http://mt.lfg.kit.edu/
- Please send applications with CV, publication list, cover letter that addresses your motivation and position requirements, academic transcripts, degree certificates, contact details for three references, language certificates and a preliminary research plan and vision for the group to Andrea I. Schäfer by **31 August 2019**.

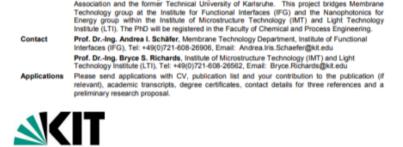
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KIT



The Membrane Technology Department at IFG (IFG-MT) was established in March 2014 and has access to state-of-the art research facilities within KIT - the Research University of the Helmholtz Association.

The research vision of the Membrane Technology Department is 'safe water for al children'. The approach is interdisciplinary and international, with an emphasis on esearch excellence and enabling of academic development of team members. As a group leader you will be responsible to establish a esearch group within one of the four main interest areas of the department (i) new membrane materials, (ii) membrane retention and fouling mechanisms, (iii) membrane systems development - applied to water reatment, and (iv) multiscale modelling of membrane materials and processes.











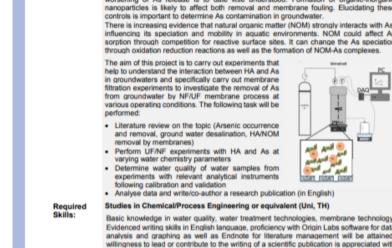


PhD Position (Doktorarbeit)

Contract







st masters projects at IFG-MT leading to a publication

Start Date: Flexible/negotiable (projects are typically scoped for a duration of 6 months

Application Please email CV, academic transcripts and motivation letter with available time period

Prantik Samanta, prantik.samanta@kit.edu Prof. Dr.-Ing. Andrea Schäfer, Andrea.Iris.Schaefer@kit.edu; http://mt.ifg.kit.edu

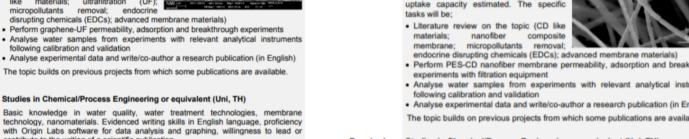
ollaboration with the University of Heidelbe

graphene are able to adsorb certain micropollutants and hence reduce the energy requirements for water treatment if sufficient removal was attainable. Graphene membranes prepared by the University of Bologna, Italy for non-aqueous applications The aim of this project is to character ariation of a number of water quali erstood and the potential micropolluta ptake capacity estimated. The specific asks will be; Literature review on the topic (graded) Perform graphene-UF permeability, adsorption and bre

following calibration and validation Analyse experimental data and write/co-author a research publication (in English The topic builds on previous projects from which some publications are available

- Studies in Chemical/Process Engineering or equivalent (Uni, TH Basic knowledge in water quality water treatment technologies membra
- Department: in collaboration with the University of Bologna, Italy Start Date:
- period for evaluation Procedure:

## **Masters & Bachelors**



- nology, nanomaterials. Evidenced writing skills in English language, proficien h Origin Labs software for data analysis and graphing, willingness to lead or
- Flexible/negotiable (projects are typically scoped for a duration of 6 months Please email CV, academic transcripts and motivation letter with available time
- Prof. Dr.-Ing. Andrea Schäfer, Andrea.Iris.Schaefer@kit.edu; http://mt.ifg.kit.edu Matteo Minelli, Uni Bologna, Italy, Matteo Tagliavini, IFG-MT, KIT
- Start Date: Inegotiable (projects are typically scoped for a duration of 6 month Application Please email CV, academic transcripts and motivation letter with available tin
- period for evaluation Prof. Dr.-Ing, Andrea Schäfer, Andrea Iris Schaefer@kit.edu; http://mt.ifg.kit.ed Alaa Khalii, alaa.khalii2@kit.edu, Germany, IFG-MT, KIT

intribute to the writing of a scientific publication

- the following aspects with clear focus on one specific scale and novelty
- How can a membrane system adsorb and degrade contaminants in-situ in a membrane with the system adsorb and degrade contaminants in-situ in a membrane with the system adsorb and degrade contaminants in-situ in a membrane with the system adsorb and degrade contaminants in-situ in a membrane with the system adsorb and degrade contaminants in-situ in a membrane with the system adsorb and degrade contaminants in-situ in a membrane with the system adsorb and degrade contaminants in-situ in a membrane with the system adsorb adsorb address a adsorption or photocatalytic reactivity
- e PhD project will be a combination of theory and experiment and will begin with a ods will follow. Establishment of suitable models to explain the results obtained drawing of disciplinary and potentially multi-scale approaches will be an opportunity to integrate riment and model. Execution of the research plan through conducting of exp mple and data analysis and write up of results for scientific publication are part of the Pt cess - a journey to become an independent researcher
- roughout the project, there will be multiple opportunities for cooperation with internal an external partners, supervising bachelor and master students, giving oral presentations at conferences, writing high-impact journal articles, as well as contributing to teaching. Qualifications You hold a Masters in Chemical, Process, Environmental Engineering, or equivalent. You are a
- aturally curious person who is eager to learn more and has a strong interest in research eing comfortable in specifying systems (of any scale) is a definite advantage, as well as eing comfortable in specifying system components and sound experimental problem solving
- 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 Herhnholtz 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 the State of the State o nodelling, both at KIT as well as international collaborators (US, Israel, Australia, UK). The Phil vill be registered in the Faculty of Chemical and Process Engineering at KIT. Prof. Dr.-Ing. Andrea I. Schäfer, Membrane Technology Department, Institute
- , Tel: +49(0)721-608-26906, Email: Andrea.Iris.Schaefer@kit.edu 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
  - 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).

explore novel materials and membrane preparation methods for functionalized membrane development. The project will focus on i) membrane material selection, , ii) explore options of material functionalization and/or coating, iii) investigate system design from small-scale to development. potential that require in-depth R&D, in How can a system react with con What is the most suitable functionality

This PhD project builds on ongoing research projects within the NanoMembrane initiative and will

mechanisms be quantified The PhD project will be largely experimental and will begin with an identification of a set of research questions based on detail survey that results in a suggestion of functionalities/materials and the micropollutants Subsequently, development of a research plan and timetable for the 3 year research project, an

stablishment of suitable models to explain the results obtained stablishment of suitable approaches will be an opportunity to xecution of the research plan through conducting of experime roughout the project, there will be multiple opportunities for coc

- You are required a Masters in Chemical, Process, Enviro xperience with membrane filtration systems (of any scale) is a definite advantage, as well a being comfortable in specifying system components and sound experimental problem solvir skills. You are a naturally curious person who is eager to learn more and has a strong interes search. Excellent English language proficiency is essential, basic German language skills
- 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 Heinholtz Association and the former Technical University of Karlsruhe. This project is hosted by the Membrane Technology, Institute for Functional Interfaces (IFG-MT). The PhD will be registered in he Faculty of Chemical and Process Engineering.
- Prof. Dr.-Ing. Andrea I. Schäfer, Membrane Technolog Interfaces (IFG-MT), Tel: +49(0)721-608-26906, Email: Andrea.Iris.Schaefer@kit.edu ttp://mt.ifg.kit.edu/
- 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.

he position entails the planning and ex national and international funding agencies (English & German). Cooperation with internal and external partner including industry), data acquisition and analysis ublication in peer reviewed high impact journals as we is student supervision are part of the responsibilities. A small contribution to teaching within the Faculty of Chemical and Process Engineering is expected. The position is not bound to a particular project and hence provides possibilities for the career development of a researcher. State-of-the-art laboratorie were opened in March 2019.

- Qualifications You hold a PhD in Chemical, Process, Environments ystems (of any scale) is a requirement, as well as proven track record in student supervision search publication and research funding. Experience focused on several of relevant topics ater treatment process design, polymer material development, membrane modelling, analytic cellent English language proficiency is essential, German language skills are strongly desire
- VOD E14, 100%, initially for 3 years with the expectation to extend and develop an academi KIT is one of the biggest research institutions worldwide and has access to state-of-the a
- earch facilities resulting from the merger of the National Research Centre of the Helmholt sociation and the former Technical University of Karlsruhe. This position is in the Membran echnology Department at the Institute for Functional Interfaces (IFG-MT) with an affiliation to the aculty of Chemical and Process Engineering
- Prof. Dr.-Ing. Andrea I. Schäfer, Membrane Technology Department, Institute of F Interfaces (IFG), Tel: +49(0)721-808-26906, Email: Andrea.Iris.Schaefer@kit.edu; http://mt.ifg.kit.edu/ Please send applications with CV, publication list, motivation letter that addresses your motivation
- and position requirements, academic transcripts, degree certificates, contact details for three references, language certificates and a preliminary research plan and vision for the group to Andrea I. Schäfer by **31 July 2019**.

**Postdoc/Group Leader** 

### **STATE-OF-THE-ART FACILITIES**

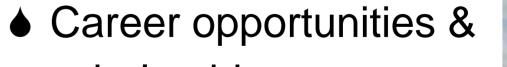
- Process Engineering Laboratory: nanofiltration, electrodialysis, photocatalytic membranes, solar powered systems
- Water Analysis & Radiotracer Laboratories: full characterization of waters before and after treatment (nanoparticles, organic matter, ions, micropollutants)
- Membrane Manufacturing & Characterization Laboratory

### **DYNAMIC RESEARCH TEAM**

- English language research team
- Multi-cultural background and mobility
- Structured supervision with regular group meetings, seminars and in-depth feedback
- Transdisciplinary team work
- Publication focused work from masters project through to academic independence
- International recognition and extensive network

### **OPPORTUNITIES**

- International collaboration and travel opportunities
- Field work in remote locations (Australia, Ghana, Tanzania with many other opportunities)
- Research exchange sabbaticals
- International projects and conferences





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## **NEW LABORATORIES**

## **INTERNATIONAL TEAM**

## **TRAVEL & CAREER**

KIT – The Research University in the Helmholtz Association

Prof Dr Ing Andrea Iris Schäfer Contact: andrea.iris.schaefer@kit.edu Email +49 (0)721 608 26906 Phone http://mt.ifg.kit.edu Website

