Diplomarbeit / Masters Project
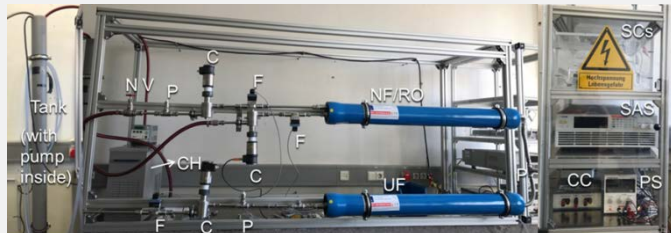
Project Summary:	**Optimize a computer-controlled interface for backwash control in a photovoltaic-powered membrane water treatment system**
	There has been increased interest in photovoltaic-powered membrane filtration (PV-membrane) systems in recent years as a solution to provide clean drinking water in small-scale communities, especially in remote areas and developing countries. The use of the sensors to measure the system performance has been crucial to accurately determine the transient nature system, while the incorporation of a backwash control is necessary to protect the membranes against fouling, hence prolonging the membrane lifetime, as well as improving the overall system reliability.
	In this master thesis, the backwash control is achieved via an 8-channel relay card to switch on/off of the solenoid valves in a certain sequence. The control of valves via LabVIEW, data acquisition and processing need to be developed and added to the main LabVIEW interface, moreover, the measurement of sensors and valves need to be optimized.
	The master project will be a combination between control development and experimental implementation and will include the following specific tasks:
	- Literature review on backwash control methods in PV-membrane system - Design the LabVIEW interface (sub VI) and integrate with main front panel - Optimize sensor measurements - Debug and test LabVIEW program - Build the setup for backwash control - Optimize the overall specific energy consumption (SEC) based on when the backwashing steps are performed
Required Skills:	**Studies in electrical/software Engineering or equivalent (Uni, TH, FH)**
	Basic knowledge in electrical/mechanical/software engineering design and control, LabVIEW programming, interest in membrane technology. Evidenced writing skills in English language, proficiency with data plotting and analysis.
Institute/Dept:	Institute for Microstructure Technology (IMT) in collaboration with Membrane Technology Department at the Institute of Functional Interfaces (IFG-MT)
Start Date:	Flexible/negotiable
Application Procedure:	Please email CV, transcripts and motivation letter with available time period for evaluation.
Project Supervisor(s)	Sheying Li: sheying.li@kit.edu Prof. Dr. Bryce Richards: bryce.richards@kit.edu, http://www.imt.kit.edu/1052.php Prof. Dr.-Ing. Andrea Schäfer: andrea.iris.schaefer@kit.edu, https://mt.ifg.kit.edu/