

Info: "Art der Arbeit" ist nicht fix und kann individuell geändert werden. Neben diesen Themen gibt es oft weitere Themen. **Fragt einfach nach!**

Info: "Type of work" is not fixed and can be individually varied. Apart from the topics below there are often more topics. **Feel free to ask!**

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Ansprechpartner	Email	Telefon (0421-218-)	Topic/Thema der Arbeit	Art der Arbeit / Type of work	Short Description/Kurzbeschreibung	starting/ab	Requirements / Voraussetzung
Thomas Schweizer	tschweizer@imsas.uni-bremen.de	62583	Implementing a dsPIC (Microchip) as a general purpose AD-Converter for sensor read out with digital filtering	Master Project or Master Thesis	dsPICs are dedicated microcontrollers supporting mathematical operations required for real time digital signal processing. Some also incorporate AD-Converters and programmable gain amplifiers.	Feb 23	Experience in programming Microcontrollers, DSP
Thomas Schweizer	tschweizer@imsas.uni-bremen.de	62583	Wireless control for DC-motor servos and stepper motors	Bachelor Project	Wireless control for DC-motor, servos and stepper motors via bluetooth communication for test stands	Immediately	Experience in programming Microcontrollers
Varuni Rathnayake	VRathnayake@imsas.uni-bremen.de	62599	Investigation of absorption and emission spectra of solutions	Bachelor Project or Bachelor Thesis	Measure and analyze the absorption and transmittance of solutions when factors such as path length, fill height of the solution, concentration of the indicator dye changes.	Immediately	Interest in Optoelectronics, Interest in 3D design
Varuni Rathnayake	VRathnayake@imsas.uni-bremen.de	62599	pH measurements using image processing methods	Bachelor Project or Bachelor Thesis	Indicator dyes can be used to determine pH of a solution. A method has to be proposed and implemented by image processing methods to extract color information to identify color that corresponds to pH values.	Immediately	Microcontroller programming (Raspberry pi), knowledge on image processing
Tim de Rijk	Trijk@imsas.uni-bremen.de	62639	Strain Gauge Sensor Circuit	Bachelor Project	The output voltage of a wheatstone bridge incorporating a strain gauge sensor will be amplified and fed to a digital circuit to control a display.	already taken	Interest of analog circuit design
Tim de Rijk	Trijk@imsas.uni-bremen.de	62639	Heart-rate detection Circuit	Bachelor Project or Bachelor Thesis	Measure the heart-rate with a light source and a detector. The variation of blood volume can be measured and detected. An analog circuit must be build that contains a filtering and amplification stage.	Immediately	Interest of analog circuit design
Henrik Nöbel	HNoebel@imsas.uni-bremen.de	62605	Optimization of heater structures on membranes	Bachelor Thesis or Master Project or Thesis	On thin membranes WTI connection lines serve as heaters for targeted breaking of the membranes. The membrane is locally heated, so that stress due to the thermal expansion causes the membrane to break. The design of these heaters is to be characterised and optimized so that the membranes can be reliably broken, even with a limited power supply. Microchips with heaters and membranes are fabricated and analysed in the clean room.	Immediately	Interest in Cleanroom fabrication and material science
Henrik Nöbel	HNoebel@imsas.uni-bremen.de	62605	Process development for anodic bonding at low temperatures	Bachelor Project or Bachelor Thesis	Anodic bonding of glass wafers and silicon wafers is typically done at about 400°C. A bonding process at <200°C is to be developed using Lithium-containing glass or interlayers between the bonded wafers. The bonding experiments are carried out in the clean room. The bond quality in terms of bond strength, reliability is to be analysed.	Immediately	Interest in Cleanroom fabrication and material science
Thomas Schweizer	tschweizer@imsas.uni-bremen.de	62583	Ultrasound detection circuit	Bachelor Project	Ultrasound within the frequency range above of what the human ear can detect is electronically captured, amplified and transferred to the audible frequency range.	already taken	Knowledge of analog and digital circuit design
Henrique Barbosa	hbarbosa@uni-bremen.de	62618	OECT Glucose sensor setup for laboratory course	Bachelor Project	Organic Electrochemical Transistors (OECTs) are three-electrode devices that can transduce ionic fluxes to electronic fluxes, allowing it to be used as biosensors. Therefore, here we propose to investigate the impact of different glucose concentrations in the OECTs response and, based on these analyses, elaborate guidelines for a laboratory experiment.	Immediately	1) Interest in clean room fabrication; 2) Interest in electronic devices testing; 3) Interest in electrochemistry; 4) Group of maximum 3 students

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Andika Asyuda	aasyuda@imsas.uni-bremen.de	62642	OECT for selective hydrogen sensor	Master/bachelor Project or Thesis	<p>Hydrogen (H₂) gas holds very important roles in various industries, like petrochemical, transportation, and energy. A H₂ sensor is then demanded to monitor gas impurity in a stream and to keep H₂ level at a certain limit. H₂ is explosive at volume concentration 4-75% and extremely buoyant. Due to H₂ electro-oxidation on platinum (Pt) surface, it can be detected electrochemically using Pt, or more commonly Pt black, as a sensing electrode. However, Pt is also sensitive to CO electro-oxidation, which will interfere with H₂ measurement. To regulate gas flow into a sensing electrode and to allow a selective electrochemical measurement of H₂ gas, a gas-permeable membrane has been integrated into the sensor, for example Teflon films, silicone membranes, or fluorinated ethylene propylene (FEP) membranes.</p> <p>In this thesis, organic electrochemical transistors (OECTs) with platinum as gate electrodes are used for hydrogen sensor. OECT is a rising technology for electrochemical sensing application due to an amplification gain of the device. The following works are included in the thesis:</p> <ol style="list-style-type: none"> 1. Fabrication of OECTs with platinum as gate electrodes 2. Measurement of OECTs transfer curve with various H₂ content in electrolyte 3. Measurement of OECTs drain current at constant voltage with increasing H₂ content in electrolyte 4. Incorporating a membrane on OECTs for a selective H₂ sensor 5. Measurement of hydrogen content in air using OECT 	Immediately	<ol style="list-style-type: none"> 1) Interest in clean room fabrication; 2) Interest in electronic devices testing; 3) Interest in hydrogen technology
Tobias Trautmann	ttrautmann@imsas.uni-bremen.de	62619	Messeinrichtung zum Überprüfen der Robustheit von Strömungssensoren	Bachelor Project or Bachelor Thesis	Für am IMSAS gefertigte Strömungssensoren soll ein Setup erstellt werden, mit dem deren Robustheit untersucht wird. Dabei soll der Sensor in eine 3D-gedruckte Vorrichtung eingespannt und ein Überdruck angelegt werden. Zur Messung des anliegenden Luftdruckes werden kommerzielle Drucksensoren verwendet.	bereits vergeben	<ol style="list-style-type: none"> 1) Interesse an 3D Druck; 2) Interesse an Sensoren; 3) Interesse am Aufbau eines Messprüfstandes
Tobias Trautmann	ttrautmann@imsas.uni-bremen.de	62619	Investigation of thermal properties of thin film polymer materials	Master Project or Master Thesis	The thermal properties (heat capacity, thermal conductivity, ...) of the hybrid-polymer OrmoComp are to be investigated. For this purpose, simulations must be carried out in Comsol Multiphysics. In addition, chips for measuring the properties will be fabricated in our cleanroom and measurements can be done.	already taken	<ol style="list-style-type: none"> 1) Interest/Knowledge in Comsol Multiphysics; 2) Interest in cleanroom fabrication; 3) Interest in electronic devices testing
Wiebke Gehlken	WGehlken@imsas.uni-bremen.de	62613	Fabrication of 2PP Celltraps and/or scaffolds with OrmoComp resin.	Master Project	It is possible to directly 3D print nanostructures with two-photon Polymerization (2PP). The currently used resin (IP-dip) is not biocompatible and shows high autofluorescence, therefore a new resin is proposed: OrmoComp. The project focuses on finding parameters to reliably print 3D structures with this new material. At the end, a working Celltrap and/or scaffolds for cells are manufactured (with corresponding cell-compatibility tests).	Immediately	Interest in Cleanroom technology and 3D printing. Material Sciences
Wiebke Gehlken	WGehlken@imsas.uni-bremen.de	62613	2PP porous structures catalytic burning	Master Thesis	Fabricating a chip for H ₂ sensing by producing metallic porous structure by electroplated 2PP sacrificial layer. Mostly catalyst supports are porous structures that cannot be tailored, therefore 2PP (2-photon polymerization) is a promising technique to produce engineered supports on a micro-/nanoscale with a high surface area.	Immediately	Interest in cleanroom technology, Material sciences and gas sensing

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Tim de Rijk	Trijk@imsas.uni-bremen.de	62639	Aerogel Pore size variation for micromixers	Master Thesis/Project	Silica Aerogels are highly porous structures that have incredible properties like very high surface area and low thermal conductivity. The pore sizes can be (theoretically) varied by added surfactants in the mixture. This topic focuses on controlling the pore size, and increasing the pore size to enable the use of the silica aerogel for micromixing. Different aerogels will be made and the material properties will be analyzed. Finally, the aerogel with large pores can be used as a micromixer.	already taken	Interest in Aerogels, Porous structures. Material science
Sander van den Driesche	sdriesche@imsas.uni-bremen.de	62652	Please contact supervisor for topics	Master Thesis/Project		Immediately	
Sarah Bornemann, Reiner Jedermann	Sbornemann@imsas.uni-bremen.de rjedermann@imsas.uni-bremen.de		PDOT:PSS for material moisture measurement in natural fibre composites	Master Thesis	SEE PDF FOR DETAILS PDOT:PSS is one new organic semiconductor material that can be applied for several sensing applications. In building construction, there is a trend to use organic, environmental friendly materials. However, there is a risk that such materials, especially gluing lines and epoxy components loose stability if moisture penetrates in the material. A sensor system should warn, if there is a risk of material fatigue or even break down. Samples of paper printed PDOT:PSS sensors were produced during an earlier project. Some samples were embedded in a composite material based on natural plant fibres. First test proved that it is feasible to detect if moisture has penetrated into the fibre material by this sensing approach.	Mai/June 2024	* Interest in experimental work and new sensor materials * Careful work and documentation * Finish tasks in time The number of credit points is equivalent to ten weekly seminars. Accordingly, we expect a high commitment over 6 months. The experiments requ
Thomas Schweizer	tschweizer@imsas.uni-bremen.de	62583	Messaufbau und Messungen zur Bestimmung des Wassergehalts von Honig.	Vertiefungs-projekt	Als Vorversuch für einen Projektantrag soll untersucht werden, wie sich der Wassergehalt von Honig mit am IMSAS hergestellten kapazitiven Sensoren bestimmen lässt. Hierzu sind ein Messaufbau zu entwickeln, Honigproben mit unterschiedlichem Wassergehalt herzustellen sowie Messungen durchzuführen und auszuwerten.	zu vergeben	Interesse am Aufbau eines Messtandes und an der Auswertung von Messungen