Hochschule Ulm

# Subjects for projects/final thesis for incoming students at HSU – Fall 2016

| | |
|---|---|
| **Supervisor** | **Prof. Dr. Walter Commerell** |
| **Institute/Department** | **Institute for Energy- and Drive Systems**<br>**Institute for Automotive Systems Engineering** |
| **Mail address** | **commerell@hs-ulm.de** |
| **Research field/project** | **Energy Storage Systems for mobile and stationary Applications** |
| **Maximum number of students, who could work on the project** | **2** |
| **Practical training / Bachelor Thesis / Master Thesis** | **Practical Training or Bachelor Thesis or Master Thesis (level will be adopted to the goal)** |
| **Compulsory Qualification of students** | **Electrical background** |
| **Date of stay (from-to)** | **1. October 2016 – can be adopted** |
| **Description** | - **Analysis of different storage technolgies**<br>- **Modelling and simulation of storage systems**<br>- **Energy management**<br>- **Design of storage systems**<br>- **Test of storage systems** |
| **Further comments** | **For the single training or thesis, a specific topic will be defined out of the context storage systems. The goal for the single project will be detailed together with the student and his background or strength.** |

Hochschule Ulm

# Subjects for projects/final thesis for incoming students at HSU – Fall 2016

| | |
|---|---|
| **Supervisor** | **Prof. Gerd Heilscher** |
| **Institute/Department** | **Institute for Energy and Drive Technologies** |
| **Mail address** | **heilscher@hs-ulm.de** |
| **Research field/project** | **Smart Grids** |
| **Maximum number of students, who could work on the project** | **Group of two** |
| **Practical training / Bachelor Thesis / Master Thesis** | **Practical training / Bachelor Thesis / Master Thesis** |
| **Compulsory Qualification of students** | **Electrical Engineering, data analysis skills,** |
| **Date of stay (from-to)** | **1. September/1. October 2016 (4-6 month)** |
| **Description** | **How to prepare for high penetration of decentralized renewable energy system (mainly photovoltaic) in the distribution grid is the main question of our research.**<br><br>**Better understanding of the solar resource based on local measurement, sky cameras and satellite images is one topic we work on.**<br><br>**Analysis of the load flow in medium and low voltage networks based on measurements and network simulation is the second topic.**<br><br>**A secure energy information network is needed for the future energy system based on distributed renewable energy. Development, demonstration and evaluation of Smart Meter Communication is the third topic we work on.**<br><br>**If you are interested in one of these topics we welcome you at Ulm and will be able to provide you with a task to support our research group.** |
| **Further comments** | **The Smart Grids Research Group at Ulm University of Applied Sciences works on Energy Meteorology, Network Analysis and Planning and Energy Informatics.**<br><br>**We use PowerFactory, Matlab, Python and KNIME as preferred tools.** |

Hochschule Ulm

# Subjects for projects/final thesis for incoming students at HSU – Fall 2016

## International Bachelor Thesis 2016 – Topic Proposal 1

Timeframe for a Bachelor Project: tbd.

**Major topic:** design of new types of wave energy converters (2 principles)

Date: Dec. 10th, 2015

| | |
|---|---|
| **Supervisor** | Prof. Dr.-Ing. Gerald Stengele |
| **Institute/Department** | Hochschule Ulm, Department of Mechanical engineering and automotive engineering |
| **Mail address** | stengele@hs-ulm.de |
| **Research field/project** | New type of wave energy converter (ocean energy) |
| **Maximum number of students, who could work on the project** | 1 or 2 (one for every principle, see Description) |
| **Compulsory Qualification of students** | Very good in mechanical engineering and design, at best in the area of turbo machines and weldment construction (shipbuilding or similar), practical experience in mechanical engineering, CAD, some manufacturing knowledge. |
| **Date of stay (from-to, incl. internship)** | Tbd. |
| **Description** | This area of research is quite new for our school. We pursue 2 different principles of wave energy converters.<br><br>1) In the first principle we use the relative movement between floats to pump water in a hydraulic circle. The water will pump a on-shore turbine to generate electricity. All elements are to be designed as a low tech, low cost system. Up to now, 3 bachelor thesis have been passed to find good solutions in this principle. But we are still some steps away from a solution which is ready to be realized in a demonstrator size. The goal is to answer all open questions (from optimized kinematics over hydraulic scheme up to FMEA to cover all possible errors). In best case (depends on result) it could be complemented by a internship to accompany a realization (prototype) or some measurements at a demonstrator.<br><br>2) In the second principle we plan to transform the movement of the water particles in an ocean wave directly into the rotation of a new type of turbine. Here we are preparing first trials in an aquarium with a small model of the turbine. The Thesis will start with different measurements and analyses at the model. On the basis of the results, the main part of the thesis will be the first design of a turbine in a demonstrator size. |
| **Further comments** | CAD-System is Siemens NX.<br>It will be necessary to sign a confidentiality agreement |

Hochschule Ulm

# Subjects for projects/final thesis for incoming students at HSU – Fall 2016

## International Bachelor Thesis 2016 – Topic Proposal 2

Timeframe for a Bachelor Project: tbd.

**Major topic:** Simulation of new types of wave energy converters (2 principles)

Date: Dec. 10th, 2015

| | |
|---|---|
| **Supervisor** | Prof. Dr.-Ing. Gerald Stengele |
| **Institute/Department** | Hochschule Ulm, Department of Mechanical engineering and automotive engineering |
| **Mail address** | stengele@hs-ulm.de |
| **Research field/project** | CFD: 2 phase fluid mechanics of ocean waves and their interaction with wave energy converters |
| **Maximum number students, who could work on the project** | 1 (eventually 2 for 2nd principle) |
| **Compulsory Qualification of students** | Very good in fluid mechanics and should at best have some experiences in CFD. |
| **Date of stay** | Tbd. |
| **Description** | This area of research is quite new for our school. We pursue 2 different principles of wave energy converters.<br><br>1) In the first principle we use the relative movement between floats to pump water in a hydraulic circle. The water will pump a on-shore turbine to generate electricity.<br><br>We had a first student's project to simulate the behaviour of a system consisting of different floats, connected with joints and cylinders. We found different difficulties like the reflection of a wave at the boundary of the simulation area. Also the integration of the behaviour of cylinders with check valves is not a trivial issue. The goal is to develop the test environment to simulate the behaviour of a number of coupled floats in an ocean wave, which are linked with joints and cylinders. The completion will be a work optimization to find the optimal cylinder force (i.e. counter pressure) for which we get the optimal power output.<br><br>2) In the second principle we plan to transform the movement of the water particles in an ocean wave directly into the rotation of a new type of turbine. For this type it is necessary to implement a complete simulation of the interaction between the turbine and the ocean wave.<br><br>Both thesis are linked with other thesis in the area of mechanical engineering (proposal "Thesis1"). |
| **Further comments** | The calculations will probably be done on Ansys or ccm+ (tbd.)<br>It will be necessary to sign a confidentiality agreement |

Hochschule Ulm

# Subjects for projects/final thesis for incoming students at HSU – Fall 2016

| | |
|---|---|
| **Supervisor** | **Susanne Radtke, Dipl.-Des. Prof.** |
| **Institute/Department** | **Program Digital Media** |
| **Mail address** | **radtke@hs-ulm.de** |
| **Research field/project** | **Design Principles, Corporate Identity, Static and Kinetic Typography, Signage Systems and Intercultural Design** |
| **Maximum number of students, who could work on the project** | **2** |
| **Practical training / Bachelor Thesis / Master Thesis** | **Bachelor Thesis** |
| **Compulsory Qualification of students** | **Completion of undergraduate courses** |
| **Date of stay (from-to)** | **1. October 2016 - 13. February 2017** |
| **Description** | 1) Gender aspects of symbols. Analysis of both gender-specific and gender-neutral digital icons, traffic signs, public pictograms and other symbols. Presentation of comprehensive design results in an appropriate medium.<br><br>2) Bilingual kinetic typography using Latin and Non-Latin typography. Students can either choose their own topic using animation or create an e-learning application that analyzes and compares the two scripts.<br><br>3) Intercultural Design. Analysis of the application in companies and in public media. Comparison of visual languages around the globe. Presentation of results in an appropriate medium.<br><br>4) Kinetic typography. Creation of an e-learning application which gives the history, styles and techniques of kinetic typography or presents a series of animations that show the unique communication qualities of kinetic typography.<br><br>5) Survey school of design Ulm for design students. Presentation of results in an appropriate medium considering (in due consideration of) a professional and comprehensive design.<br><br>6) Refugees and Design. Examination of the challenges faced by refugees in navigating the visual world of a new culture; the use of design by governmental and non-governmental |

# Subjects for projects/final thesis for incoming students at HSU – Fall 2016

| | |
|---|---|
| | organizations in the resettlement process; and an exploration of how cultures communicate using non-verbal design to promote better inter-cultural understanding. |
| **Further comments** | **Point 1 and 2 is intended mainly for non-Western countries.** |