Offer for an IGSSE PhD Scholarship

"Modelling the impacts of mobility patterns and transportation efficiency on the energy demand of transportation systems"

The International Graduate School for Science and Engineering (IGSSE) at Technische Universität München offers a three year PhD scholarship for a graduate student. The PhD candidate will be part of the interdisciplinary project team “Energy in the year 2030 – modelling und optimisation of energy supply and consumption in regions”. The project is conducted in cooperation with Prof. Dr.-Ing. Gebhard Wulfhorst (Fachgebiet für Siedlungsstruktur und Verkehrsplanung) and Prof. Dr.-Ing. Fritz Busch (Lehrstuhl für Verkehrstechnik). A stay abroad for three months during the scholarship is mandatory and will be paid for by IGSSE. The monthly scholarship will be 1 500 €.

Project Summary

The objective of the IGSSE Thematic Research Group is to develop a concept for an integrated and comprehensive model of energy supply and consumption in regions for the year 2030. The model will demonstrate the goals and measures for a shift from an energy industry which is dependent on fossil resources to one based on regenerative energy sources. In this context, the concept will assess possible future saving potentials and energy-efficient technologies. The premise is an energy demand-oriented point of view instead of an energy supply-oriented attitude. Based on a reduction target of CO_2 emissions of 30 % in 2030 compared to 2005, possible scenarios of an integrated and comprehensive future energy supply model are developed.

Field of Activity of the PhD candidate

A special focus inside of this interdisciplinary project will be the transportation sector. Therefore, the objective of the PhD candidate is to develop a model for simulating the impacts of land use patterns and transportation network on the energy demand of the transportation system. This research objective should cover the following questions:

- Determine demand of mobility
  - Which energy budget is available for transportation?
  - Which transportation costs and needs for the different users (passenger km, ton km, public transport/motorised individual transport/cyclist/ pedestrians) arise for specific activities and spatial location patterns (scenarios to ensure basic mobility needs)?
- Developments in technology

- Which technological developments in automotive engineering can be expected? Which improvements in energy efficiency and environmental assessment of the transport fleets (motorised individual transport and public transport, passenger traffic and goods traffic) can be expected?
- Which possible influences offer adaptive, network-efficient traffic management systems featuring new stationary and vehicle-based sensor systems that benefit for example from the potentials of the Car2X technologies.

- Changes in transport planning and organisation
  - Improvements of the models to estimate in detail the energy and pollutant behaviour in microscopic traffic simulations and their integration with the network- and regional-wide model world. This improved approach should integrate different spatial, transport planning and traffic control options. The following issues are adressed:
    - Which are the most efficient options to keep the maximum energy consumption levels in transportation (e. g. to issue certificates, to allocate journeys, to limit miles travelled, etc.)?
    - What is the impact of changes in spatial structure planning on travel behaviour? Which are the most effective measures of spatial planning?
    - What is the optimum traffic management having as a goal the optimum use of the traffic network and the users?

Applicant Profile

- Excellent University degree (diploma or M.Sc.) in a for this research profile relevant area (like transportation / civil engineering, urban planning, etc.)
- Knowledge concerning integrated modelling, computer simulation techniques.
- Team skills and experience in interdisciplinary work.
- Fluency in English and German (proven by TOEFL, e.g.).

Beginning: as soon as possible

Please send your written application (CV and letter of motivation, academic record and diploma, references and if possible a list of publications) to:

Prof. Dr.-Ing. Gebhard Wulfhorst
Fachgebiet für Siedlungsstruktur und Verkehrsplanung
Technische Universität München
Arcisstr. 21
D-80333 München

Further details on IGSSE can be found at: **www.igsse.tum.de** or call Prof. Gebhard Wulfhorst 089 289-22447