At the Chair of **Logistics and Supply Chain Management** of TUM School of Management we are looking for an interested and qualified student to conduct his/her

Bachelor thesis

on the topic:

Modelling and Simulation of Car Sharing Rebalancing Operations for Different Vehicle Types

Car2Go operates a fleet of mainly Mercedes A-class cars and Smart ForTwo cars. Most car-sharing customers (A) travel alone and do not require large trunks, but some customers (B) might travel in groups or bring bulky luggage such as strollers. For A-customers it therefore does not make a difference whether they use an A-class or a Smart, but for the other B-customers, only the larger type is feasible. Currently, research in relocation operations either neglects this issue (by treating all cars equally), or treats the demand for both car types entirely independent (for example in the car-rental industry). The latter ignores the obvious overlap, as A-customers randomly choose any available car. We would like to solve the problem optimally using CPLEX or Xpress.

Selected research tasks:

- Literature overview on car sharing and car rental focusing on rebalancing operations
- Formal problem definition
- Optimal solution on randomly generated data sets
- Evaluation of performance (costs, service level) in comparison to neglecting different vehicle types
- Evaluation of performance (costs, service level) in comparison to strictly treating different vehicle types separately

Requirements:

The thesis is for Bachelor students of the study-program TUM-BWL (with a major in Supply Chain Management). Qualified students participated in the course “Modelling, Optimization, and Simulation”. The ability to work independently as well as analytical skills are required. Knowledge of Linear Programming and proficiency in CPLEX or Xpress is mandatory. The thesis should be written in German or English.

Begin: as soon as possible

Advisor: Layla Martin

Application: Email with curriculum vitae and transcript of records to logtheses.wi@tum.de