Michael Kammer

Research Group: **Section for Clinical Biometrics**

Department: **Center for Medical Statistics, Informatics and Intelligent Systems / Department of Medicine I**

Current academic degree: DI

Previous University: Technische Universität Wien

PhD Thesis: Development and validation of prediction models for recurrent thromboembolism using the "least absolute shrinkage and selection operator"

Project title:

Project description:

This PhD thesis aims at creating a set of methodological recommendations based on recent developments in statistics to simplify the analysis of medical data by the applied statistician. These problem solving strategies will be evaluated by applying them in the construction of a risk prediction model for recurrent venous thromboembolism (VTE), which is also the motivation for the project. VTE is a chronic disease in which patients with a first VTE event have been shown to have an elevated risk for recurrent events and thus prophylactic measures are indicated. As these are not without adverse effects, estimating the individual risk for developing recurrent VTEs is of great importance. To this end it is necessary to identify the important risk factors for predicting the recurrence of the disease. The least absolut shrinkage and selection operator (LASSO) introduced by Tibshirani in 1996 is one possibility to achieve such a variable selection based on optimal predictive ability. The study and refinement of this method will be the focus of this PhD thesis.

In short, the objectives of this project will be to

1) investigate the properties of LASSO, in particular on the interpretation of estimated effect sizes, and compare with other shrinkage methods in a simulation study,

2) develop a set of recommendations for creating prediction models efficiently and correctly using the LASSO,

3) based on these modeling strategies, develop a risk prediction model for recurrent VTE using data from the Department of Medicine I of the general hospital Vienna.