



## Dr. Zhao Xing-qiu

### Research interests include:

- Survival analysis
- Nonparametric and semiparametric models
- High-dimensional data analysis
- Longitudinal data analysis
- Time series analysis
- Stochastic process models and applications

## On-going GRF project

### **Analysis of High-Dimensional Survival Models**

In this project, we propose a class of novel variable selection methods in high-dimensional survival analysis models when there is group structure in covariates. The existing variable selection methods are designed for either individual variable selection or group selection, but not for both. The proposed methods are capable of simultaneous group selection and individual variable selection within selected groups. Computational algorithms will be developed for the proposed bi-level selection methods. Analysis of high-dimensional data presents novel and challenging theoretical and computational problems in statistics. Standard methods for evaluating a statistical procedure assume that the number of variables in a model is fixed and much smaller than the sample size. This formulation is not applicable to high-dimensional models. This project will study the theoretical properties of the proposed selection methods in a class of important survival analysis models, including the linear and partially linear proportional hazards models, linear and partially linear accelerated failure time models, and linear and partially linear proportional means models, in high-dimensional settings.

The proposed methods are expected to be able to correctly select the important groups and variables simultaneously with high probability in sparse models even when the number of covariates is much larger than the sample size. Simulation studies will be conducted to evaluate the proposed methods and compare them with the existing methods. Real data involving censored survival outcome and high-dimensional genomic covariates will be analyzed to illustrate the applications of the proposed methods to important scientific problems.

