附件1：课程详情

**学术报告1**

**报告题目：**疾病追踪的动态建模与分析

**报告人：**李启寨 研究员

**单位：**中国科学院数学与系统科学研究院

**摘要：**Tracking health outcomes in longitudinal biomedical studies has important clinical implications in preventive medicine, which is methodologically challenging because of time-varying covariates and unbalanced longitudinal data. A tracking index, the “tracking prediction probability” (TPP), is proposed to quantify the ability of a subject developing certain health outcomes conditioning on his\her health outcomes and covariates at a past time point. For the unknown unstructured distribution functions in practice, we consider a class of structured dynamic copula-based models for the TPPs at two time points, and give the continuous-time TPP estimates of TPP through local smoothing allowing for the known or unknown copula family. They can provide additional insights into the dynamic patterns of the disease risk factors and the health outcomes. We develop the asymptotic properties of the discrete-time and continuous-time estimators for the copula parameters and the TPPs, and investigate the finite sample properties of these estimators through a comprehensive simulation. Applying our models and estimation procedure to a large epidemiological study of child growth and cardiovascular health, the dynamic relationships between the risk of developing hypertension in the future and the evolving patterns of past blood pressure levels and BMI changes are efficiently illustrated.

**学术报告2**

**报告题目：**Statistical inference for high-dimensional convoluted rank regression

**报告人：**郭旭 教授

**单位：**北京师范大学统计学院

**摘要：**High-dimensional penalized rank regression is a powerful tool for modeling high-dimensional data due to its robustness and estimation efficiency. However, the non-smoothness of the rank loss brings great challenges to the computation. To solve this critical issue, high-dimensional convoluted rank regression has been recently proposed, introducing penalized convoluted rank regression estimators. However, these developed estimators cannot be directly used to make inference. In this paper, we investigate the statistical inference problem of high-dimensional convoluted rank regression. The use of U-statistic in convoluted rank loss function presents challenges for the analysis. We begin by establishing estimation error bounds of the penalized convoluted rank regression estimators under weaker conditions on the predictors. Building on this, we further introduce a debiased estimator and provide its Bahadur representation. Subsequently, a high-dimensional Gaussian approximation for the maximum deviation of the debiased estimator is derived, which allows us to construct simultaneous confidence intervals. For implementation, a novel bootstrap procedure is proposed and its theoretical validity is also established. Finally, simulation and real data analysis are conducted to illustrate the merits of our proposed methods.

**基础课程**

**课程1：稳健统计学习方法**

**授课专家**：崔恒建 教授

**单位：**首都师范大学数学科学学院

**内容简介：** 统计数据分析在数据科学和人工智能中起着极其重要的作用，本讲座旨在介绍数据分析中探索性和稳健性统计学习方法，谨防少数数据的干扰对分析结论带来误导性、灾难性的影响，并强化数据分析中的统计思维。具体内容包括但不限于：

1. 统计学习与稳健统计；统计泛函与稳健统计量
2. 三类代表性分布及其损失；位置与刻度估计
3. 多元位置与散布阵估计；稳健EM聚类
4. 回归参数T-型估计
5. 稳健统计学习方法在图像去噪和对抗学习中的应用

**课程2：部分线性模型的统计推断**

**授课专家**：薛留根 教授

**单位：**河南大学数学与统计学院

**内容简介（包括但不限于）：**

1. 预备知识，估计方法

2. 删失数据分析

3. 测量误差数据分析

4. 缺失数据分析

**课程3：试验设计与统计学习**

**授课专家**：艾明要 教授

**单位**：北京大学数学科学学院

**内容简介**：待定