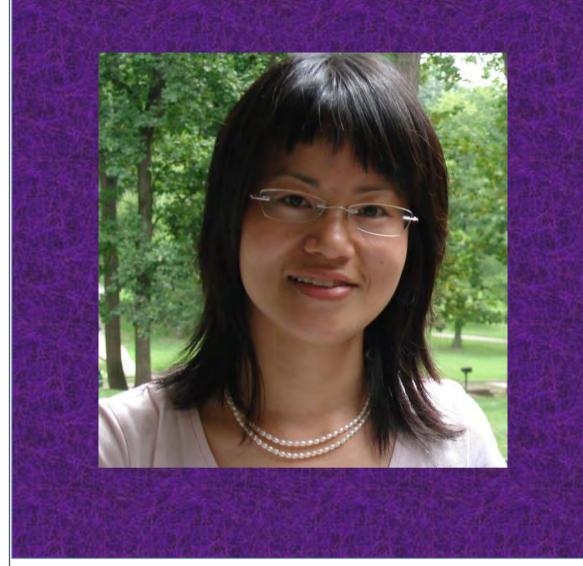# Dr. Liu Chun-ling, Catherine

Research interests include:

- **Incomplete data analysis: censoring, missing and limit of detection**
- **Longitudinal data analysis**
- **Multivariate data analysis and related topics**
- **Non- and semi- parametric statistics**
- **Linear and non-linear modeling and regression analysis**
- **Sequential analysis in biomedical studies**
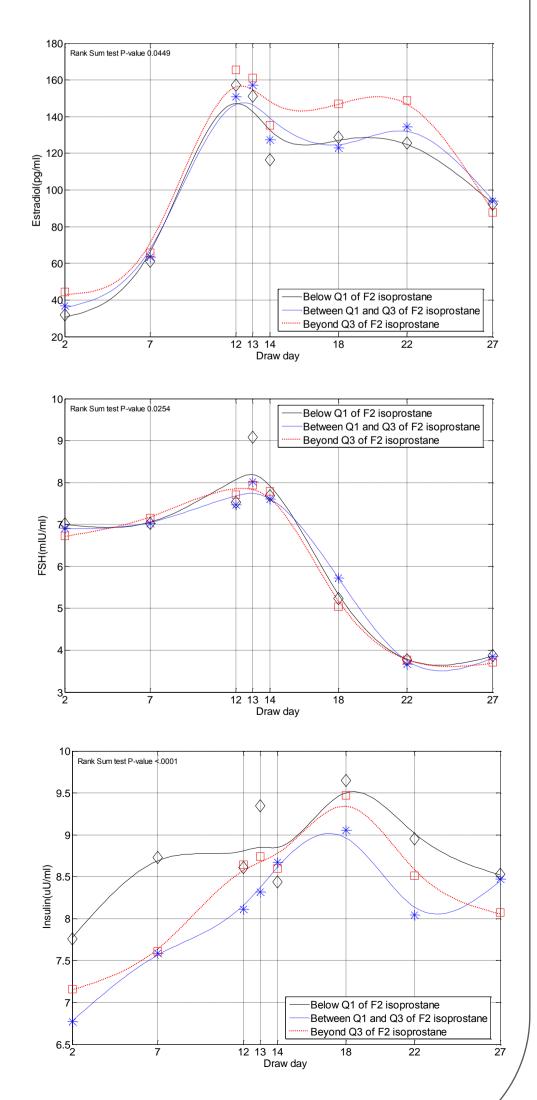- **Survival analysis**

On-going GRF project

Rank-Based Procedures for Comparison of Multivariate Longitudinal Data in Biomedical Studies

In clinical, epidemiologic and many other biomedical studies multiple outcome variables are often measured repeatedly over a period of time on study subjects. For example, in a genomic study microarray gene expressions of hundreds target genes are collected from cancerous and normal tissues from study subjects at multiple time points (e.g. times of pre- and post- treatment), or in an observational study of hormone reproduction mechanism levels of several reproductive hormones as well and oxidative stress biomarkers are recorded repeatedly at critical time windows of a woman's menstrual cycle.

We plan to develop some robust nonparametric testing procedures that enable us to compare multivariate longitudinal data with minimal model assumptions. These proposed methods are based on ranks among multivariate longitudinal observations from study subjects, providing statistics in a global test for the null hypothesis that the distributions of the outcome variables do not differ between groups at any time points. Next, we will extend these nonparametric procedures to the case of data subject to detection limits below which laboratory-measured biomarkers can not be accurately quantified.