**THE HONG KONG POLYTECHNIC UNIVERSITY**
**香港理工大學**

**DEPARTMENT OF APPLIED MATHEMATICS**
**應 用 數 學 系**

**The Hong Kong Polytechnic University**
**Department of Applied Mathematics**

**Statistics and Data Science Online Colloquium Series**

**Recurrent Events Analysis with Data Collected at Informative Clinical Visits**
**in Electronic Health Records**

**By**

**Prof. Chiung-Yu HUANG**
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**Abstract**

Although increasingly used as a data resource for assembling cohorts, electronic health records (EHRs) pose many analytic challenges because they are primarily collected for clinical encounters rather than for research purposes. In particular, a patient's health status influences when and what data are recorded, generating sampling bias in the collected data. In this work, we consider recurrent event analysis using EHR data. Conventional regression methods for event risk analysis usually require the values of covariates to be observed throughout the follow-up period. In EHR databases, time-dependent covariates are intermittently measured during clinical visits, and the timing of these visits is informative in the sense that it depends on the disease course. Simple methods, such as the last-observation-carried-forward approach, can lead to biased estimation. On the other hand, complex joint models require additional assumptions on the covariate process and cannot be easily extended to handle multiple longitudinal predictors. By incorporating sampling weights derived from estimating the observation time process, we develop a novel estimation procedure based on inverse-rate-weighting and kernel-smoothing for the semiparametric proportional rate model of recurrent events. The proposed methods do not require model specifications for the covariate processes and can easily handle multiple time-dependent covariates. The estimators for the regression parameters are asymptotically unbiased and normally distributed with a root-n convergence rate. Simulation studies are conducted to evaluate the performance of the proposed estimator. Our methods are applied to a kidney transplant study for illustration. (Joint work with Yife Sun, Chuck McCulloch, and Kieren Marr)

**Biography**

Dr. Chiung-Yu Huang is Professor of Biostatistics at the Department of Epidemiology and Biostatistics, University of California, San Francisco and an elected Fellow of the American Statistical Association (ASA). She is a Member of the UCSF Helen Diller Family Comprehensive Cancer Center and an Adjunct Professor at the Johns Hopkins University Sidney Kimmel Comprehensive Cancer Center. She is recognized for her novel methodology research in survival analysis, competing risks analysis, recurrent event analysis, outcome-dependent sampling, and design and evaluation of vaccine efficacy trials.

**Date:  28 April 2022 (Thursday)**
**Time:  10:30-11:30 (Hong Kong Standard Time GMT +8)**
**Venue: Online Talk via Zoom (Meeting ID: 963 3452 7658)**
**Speaker: Prof. Chiung-Yu Huang, University of California, San Francisco**
**Host: Prof. Xingqiu Zhao, The Hong Kong Polytechnic University**
**Click to join:**
**https://polyu.zoom.us/j/96334527658?pwd=UXJkckhyQUlMaVRsVE5NT2NoUEFEQT09**

Click to join (Zoom)

**\* \* \*  ALL ARE WELCOME  \* \* \***

For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 27 April 2022