

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

Statistics and Data Science Online Colloquium Series

Bayesian joint modeling for multivariate longitudinal and survival data with random change-points

**By
Prof. Yangxin Huang
University of South Florida**

Abstract

Joint modeling of longitudinal and survival data is an active area of statistical research that has received much attention recently. Although it is a common practice to analyze complex longitudinal data using linear mixed-effects (LME), nonlinear mixed-effects (NLME) or nonparametric mixed-effects (NPME) models in literature, the following issues may stand out: (i) In the practice, the profile of each subject's longitudinal responses may follow a "broken stick" like trajectory, indicating multiple phases of increase and/or decline in responses. Such multiple phases (with change-points) may provide important surrogate indicators to help quantify treatment effect, benefit disease diagnosis, and increase probability of trial success. To estimate random change-points, LME, NLME or NPME models become a challenge due to unique structure of model specifications. (ii) A common assumption for longitudinal variables is that model errors are normally distributed due to mathematical tractability and computational convenience. This requires the variables to be "symmetrically" distributed. A violation of this assumption could lead to misleading inference. (iii) Many studies often collect multivariate longitudinal outcomes which are significantly correlated, ignoring their correlation may lead to bias and reduce efficiency in estimation. (iv) Repeated measures over time are often interrelated with time-to-events of interest. In this talk, under Bayesian framework we explore multivariate piecewise joint model (MPJM) with skewed distributions for longitudinal-survival data to accurately estimate change rates of longitudinal trajectories and timing of change-points which may be critical indicators to quantify the effect of longitudinal profile on the risk of an event. The proposed models and method are applied to analyze an exemplified dataset. Simulation studies are conducted to assess the performance of the proposed models and method under various scenarios.

Date : 7 May 2021 (Friday)

Time : 09:30-10:30 (Hong Kong Standard Time GMT +8)

Venue : Online Talk via Zoom (Meeting ID: 922 3510 2485, Passcode: 0507)

Speaker : Prof. Yangxin Huang, University of South Florida

Host : Dr. Catherine Liu, The Hong Kong Polytechnic University

Click to join :

<https://polyu.zoom.us/j/92235102485?pwd=eExBRjhZU3pnNmc3azh3eWxUamVQZz09>



[Click to join \(Zoom\)](#)

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

For enrolment, please send your name and email to shuk-wai.ko@polyu.edu.hk on or before 6 May 2021