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 Modeling Based on a Reflected Brownian Motion with Application to Hypoglycemia

**By**

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**University of Connecticut**

## Abstract

Diabetic patients need to closely monitor their blood sugar levels. Hypoglycemia events are easily observed due to obvious symptoms, but hyperglycemia events are not. We propose to model observed hypoglycemia events as a lower-boundary crossing event for a reflected Brownian motion with an upper reflection line. The boundaries are set by clinical standards. Covariates are incorporated into the volatility of the Brownian motion. To further capture the heterogeneity among patients and the dependence within each patient, a frailty is introduced to the log scale of the volatility and the upper reflection line, respectively. Inferences are facilitated by a Bayesian framework using the Markov chain Monte Carlo. The methodology is validated in a simulation study. In application to a dataset of hypoglycemia events from diabetic patients, the model provides adequate fit and can be used to generate data that are similar to the observed data.

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**Date: 19 May 2022 (Thursday)**
**Time: 9:00-10:00 (Hong Kong Standard Time GMT +8)**
**Venue: Online Talk via Zoom (Meeting ID: 974 7859 4180)**
**Speaker: Prof. Jun Yan, University of Connecticut**
**Host: Prof. Xingqiu Zhao, The Hong Kong Polytechnic University**
**Click to join:**
**https://polyu.zoom.us/j/97478594180?pwd=Y0RvdE9sQnNKVUJvMlhQVS9zNWJGZz09**

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

For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 18 May 2022