

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

**Statistics and Data Science Online Colloquium Series**

Heterogeneous Mediation Analysis on Epigenomic PTSD and Traumatic Stress in an African American Cohort

By

**Prof. Annie Qu**  
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**Abstract**

Mediation analysis is widely used to understand mediating mechanisms of variables in causal inference. However, existing approaches have not considered heterogeneous mediation effects for potential high-dimensional mediators. Mediators in different sub-populations could have opposite effects on an outcome and thus could be difficult to identify under the homogeneous model framework. In this paper, we propose a new mediator selection method, which allows heterogeneous mediation effects and identifies sub-populations in which individuals share similar effects. In addition, we propose a new mediation penalty to select mediators within each subgroup, which jointly penalizes the effect of an independent variable on a mediator and the effect of the mediator on the response. The proposed method is implemented through a modified difference of convex (DC) algorithm. Our numerical studies show that the proposed method outperforms existing methods for both homogeneous and heterogeneous data. We also apply the proposed method to select DNA methylation mediators for post-traumatic stress disorder (PTSD) using the Detroit Neighborhood Health Study (DNHS). We are able to identify meaningful mediators which are not discovered by existing homogeneous mediation methods. This is joint work with Fei Xue and Xiwei Tang.

**Date : 16 April 2021 (Friday)**

**Time : 11:00-12:00 (Hong Kong Standard Time GMT +8)**

**Venue : Online Talk via Zoom (Meeting ID: 953 0245 6134)**

**Speaker: Prof. Annie Qu, University of California, Irvine**

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

**Click to join :**

<https://polyu.zoom.us/j/95302456134?pwd=dEt2QnNyVzVOUGtyVFQ3ak8rL0Nldz09>



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

For enrolment, please send your name and email to [shuk-wai.ko@polyu.edu.hk](mailto:shuk-wai.ko@polyu.edu.hk) on or before 15 April 2021