

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

**Statistics and Data Science Online Colloquium Series**

Hierarchical Cancer Heterogeneity Analysis Based On Histopathological Imaging Features

**By  
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**Abstract**

In cancer research, supervised heterogeneity analysis has important implications. Such analysis has been “traditionally” based on clinical/demographic/molecular variables. Recently, histopathological imaging features, which are a “byproduct” of biopsy, have been shown as effective for modeling cancer outcomes, and a handful of supervised heterogeneity analysis has been conducted based on such features. There are two types of histopathological imaging features, which are extracted based on specific biological knowledge and using automated imaging processing software, respectively. In this study, using both types of histopathological imaging features, our goal is to conduct the first supervised cancer heterogeneity analysis that has a hierarchical structure. That is, the first type of imaging features defines a “rough” structure, and the second type defines a nested and more refined structure. This objective can be achieved using either a penalization or Bayesian approach. Simulation shows satisfactory performance of the proposed analysis. In the analysis of lung adenocarcinoma data, it identifies a heterogeneity structure significantly different from the alternatives and has satisfactory prediction and stability.

**Biography**

Prof. Shuangge Ma obtained Ph.D. in Statistics from University of Wisconsin, Madison. He was a Postdoctoral Associate at University of Washington between 2004 and 2006. He is now Professor of Biostatistics at Yale University. He was elected a fellow of the American Statistical Association (ASA) in 2013 and a member of International Statistical Institute (ISI) in 2007. His research interests include high-dimensional data analysis, cancer biostatistics, health economics, and others.

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

**Time : 09:00-10:00 (Hong Kong Standard Time GMT +8)**

**Venue : Online Talk via Zoom (Meeting ID: 959 9675 6850)**

**Speaker : Prof. Shuangge Ma, Yale University**

**Host : Prof. Xingqiu Zhao, The Hong Kong Polytechnic University**

**Click to join:**

<https://polyu.zoom.us/j/95996756850?pwd=Z2g3S2Nxd3NwbWIyZ0NzQkk5cWQ5Zz09>



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