

For favour of posting

DEPARTMENT OF STATISTICS AND ACTUARIAL SCIENCE
THE UNIVERSITY OF HONG KONG

Departmental Seminar

Dr. Haoyu ZHANG

Harvard School of Public Health
Harvard University
USA

will give a talk
entitled

**A MIXED-MODEL APPROACH FOR POWERFUL TESTING OF
GENETIC ASSOCIATIONS WITH CANCER RISK INCORPORATING
TUMOR CHARACTERISTICS**

Abstract

Cancers are routinely classified into subtypes according to various features, including histo-pathological characteristics and molecular markers. Previous genome-wide association studies (GWAS) have reported heterogeneous association between loci and cancer subtypes. However, it is not evident what is the optimal modeling strategy for handling correlated tumor features, missing data, and increased degrees-of-freedom in the underlying tests of associations. We propose score tests for genetic associations using a mixed-effect two-stage polytomous model (MTOP). In the first stage, a standard polytomous model is used to specify all possible subtypes defined by the cross-classification of the tumor characteristics of interest. In the second stage, the subtype-specific case-control odds ratios are specified using a more parsimonious model based on the case-control odds ratio for a baseline subtype, and the case-case parameters associated with tumor markers. Further, to reduce the degrees-of-freedom, we specify case-case parameters for additional exploratory markers using a random-effect model. We use the Expectation-Maximization (EM) algorithm to account for missing data on tumor markers. Through simulations across a range of realistic scenarios and data from the Polish Breast Cancer Study (PBCS), we show MTOP outperforms alternative methods for identifying heterogeneous associations between risk loci and tumor subtypes. We also identified 32 novel breast cancer susceptibility loci using both standard methods and MTOP from a GWAS analysis including 133,384 breast cancer cases and 113,789 controls, plus 18,908 BRCA1 mutation carriers (9,414 with breast cancer) of European ancestry.

on

Wednesday, December 18, 2019

(Refreshments will be served from 2:15 p.m. outside Room 301 Run Run Shaw Building)

2:30 p.m. – 3:30 p.m.

at

Room 301, Run Run Shaw Building

Visitors Please Note that the University has limited parking space. If you are driving please call the Department at 3917 2466 for parking arrangement.

All interested are welcome