



香港中文大學統計學系

Department of Statistics

THE CHINESE UNIVERSITY OF HONG KONG

# SEMINAR

DEPARTMENT OF STATISTICS  
THE CHINESE UNIVERSITY OF HONG KONG

## Recent advances in the problem of combining p-values

### INVITED SPEAKER

George C. Tseng

Professor

Department of Biostatistics

University of Pittsburgh

### TIME

October 18, 2023 (Wed) · 10:30 am - 11:30 am

### VENUE

HYS G05 · Hui Yeung Shing Building G05 · CUHK

### ABSTRACT

The topic of combining p-values has a long-standing history and interest in statistical science and many application fields. In this talk, we will survey methods in three major historical developments: (1) combine independent and non-sparse signals (2) combine independent, sparse and weak signals (3) combine dependent, sparse and weak signals. I will firstly summarize several recent developments from our lab as well as others in all three categories. Specifically, an adaptive Fisher's method is developed using weakly geometric grid search for combining independent signals with optimal detection boundary. In the second paper, an accurate and ultra-efficient computational strategy for higher criticism will be presented for large-scale data analysis. Finally, heavy-tailed distribution for combining dependent p-values with asymptotic robustness is discussed with their theoretical properties. Multiple applications from omics research and COVID-19 surveillance will be presented.