



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

## Learning Optimal Individualized Decision Rules with Risk Control

### INVITED SPEAKER

Yufeng Liu

Professor

Department of Statistics and Operations Research

The University of North Carolina at Chapel Hill

### TIME

July 17, 2023 (Mon) · 2:30 pm - 3:30 pm

### VENUE

LT2 · Lady Shaw Building · CUHK

### ABSTRACT

With the emergence of precision medicine, estimation of optimal individualized decision rules (IDRs) has attracted tremendous attentions in many scientific areas. Most existing literature has focused on finding optimal IDRs that can maximize the expected outcome for each individual. Motivated by complex individualized decision making procedures and the popular conditional value at risk, in this talk, I will introduce two new robust criteria to evaluate IDRs: one is focused on the average lower tail of the subjects' outcomes and the other is on the individualized lower tail of each subject's outcome. The proposed criteria take tail behaviors of the outcome into consideration, and thus the resulting optimal IDRs are robust in controlling adverse events. The optimal IDRs under our criteria can be interpreted as the distributionally robust decision rules that maximize the "worst-case" scenario of the outcome within a probability constrained set. Simulation studies and a real data application are used to demonstrate the robust performance of our methods. Finally, I will introduce a more general decision-rule based optimized covariates dependent equivalent framework for individualized decision making with risk control.