Department of Statistics and Data Science
THE CHINESE UNIVERSITY OF HONG KONG

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DEPARTMENT OF STATISTICS AND DATA SCIENCE
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Beyond p-Values: A Comparative Framework for Estimation-Based Inference Using the A Priori Procedure and Gain-Probability Analysis

INVITED SPEAKER

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TIME

Oct 6th, 2026 (Tuesday) · 4:00pm – 5:00pm

VENUE

NAH 213 · CUHK

ABSTRACT

This talk compares three inferential paradigms: Null Hypothesis Significance Testing (NHST), the A Priori Procedure (APP), and Gain Probability (G-P) analysis, with the latter two paradigms featuring a conceptual shift away from binary hypothesis testing toward inference frameworks grounded in estimation and probability. NHST relies on p-values and dichotomous decision rules; in contrast, APP emphasizes pre-data estimation reliability, and G-P analysis quantifies the probability that one outcome exceeds another, and by varying extents. This shift aligns with broader methodological reforms prioritizing estimation, transparency, and interpretability. In addition to their conceptual advantages, the APP and G-P paradigms are highly applicable. To advance this perspective, we examine the derivation of APP for parameter estimation in linear regression models under skew-normal error structures, including results on the distribution of regression estimators, supported by simulation studies and empirical illustrations. We also investigate the G-P framework for gamma-distributed variables in both independent and dependent settings, again reinforced by simulation studies and real-world applications. Collectively, these frameworks provide a rigorous and interpretable alternative to conventional significance testing by prioritizing estimation accuracy, probabilistic interpretation, and practical relevance.