

Division of Biostatistics Seminar Series

Inference of Breakpoints in High-Dimensional Time Series

Dr. Likai Chen

Department of
Mathematics and Statistics

Washington University
School of Medicine



When: Friday, November 13, 2020
12:30pm - 1:30 pm

**Registration Link
via Zoom:**

<https://wustl.zoom.us/j/9cUnclfzyZBURY4jHYwGoix>



Dr. Liakai Chen

Inference of Breakpoints in High-Dimensional Time Series

Abstract:

For multiple change-points detection of high-dimensional time series, we provide asymptotic theory concerning the consistency and the asymptotic distribution of the breakpoint statistics and estimated break sizes. The theory backs up a simple two-step procedure for detecting and estimating multiple change-points. The proposed two-step procedure involves the maximum of a MOSUM (moving sum) type statistics in the first step and a CUSUM (cumulative sum) refinement step on an aggregated time series in the second step. Thus, for a fixed time-point, we can capture both the biggest break across different coordinates and aggregating simultaneous breaks over multiple coordinates. Extending the existing high-dimensional Gaussian approximation theorem to dependent data with jumps, the theory allows us to characterize the size and power of our multiple change-point test asymptotically. Moreover, we can make inferences on the breakpoints estimates when the break sizes are small. Our theoretical setup incorporates both weak temporal and strong or weak cross-sectional dependence and is suitable for heavy-tailed innovations. A robust long-run covariance matrix estimation is proposed, which can be of independent interest. An application on detecting structural changes of the U.S. unemployment rate is considered to illustrate the usefulness of our method.