



TEMPLE UNIVERSITY'S BIG DATA INSTITUTE PRESENTS

DATA SCIENCE SEMINAR SERIES

MONDAY, JANUARY 30TH

10:00—11:30 AM

ROOM 378, ALTER HALL

TEMPLE UNIVERSITY

ON ADDITIVE CONDITIONAL INDEPENDENCE FOR HIGH-DIMENSIONAL STATISTICAL ANALYSIS

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With the advance of high-throughput technologies, massive and complex data are routinely collected and these data need to be processed and analyzed differently from conventional data. In this presentation, Dr. Lee will discuss a nascent concept for analyzing big data—additive conditional independence (ACI)—a three-way statistical relation that shares many similarities with conditional independence. However, its nonparametric characterization does not involve multivariate kernel, which enjoys the flexibility of nonparametric estimators but avoids the curse of dimensionality in high-dimensional settings.

We facilitate the implementation of ACI via a case study on nonparametric graphical models, and describe a general framework for adopting ACI to a broader scope. Additionally, to emphasize the increasing impact of ACI we also introduce several recent developments under various statistical settings. We investigate the properties of the proposed estimators through both theoretical and simulation analyses. The usefulness of our procedures is also demonstrated through an application to gene regulatory network (GRN) inference using a DREAM Challenge dataset. This is joint work with Bing Li (Penn State), Hongyu Zhao (Yale), Lexin Li (UC Berkeley) and Tianqi Liu (Yale).

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