Fall Colloquium

September 19, 3:30-4:30pm
Seitz 313

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Analysis of Extreme Conditional Quantiles

An important problem in many fields is the modeling and prediction of events that are rare but have significant consequences. Unexpectedly heavy rainfall, large portfolio loss, and dangerously low birth weight are some examples of rare events. For such events, scientists are particularly interested in modeling and estimating the tail quantiles of the underlying distribution rather than the central summaries such as the mean or median. Quantile regression provides a valuable semiparametric tool for modeling the conditional quantiles of a response variable given predictors. However, making inference for quantile regression is challenging in data-sparse regions such as at extremely low or high quantiles with quantile levels close to zero or one. In this talk, I will present estimation methods for extreme conditional quantiles based on the application of the extreme value theory and quantile regression. In data-sparse areas, the formulation of models plays a critical role. I will discuss the problem under various models with different levels of complexity, which calls for different techniques for quantifying the tail quantiles. Asymptotic theory and empirical studies will be presented to demonstrate the properties and value of the proposed methods.