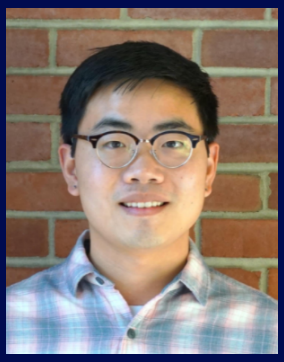
Department of Applied and Computational Mathematics and Statistics Colloquium



Likun Zhang

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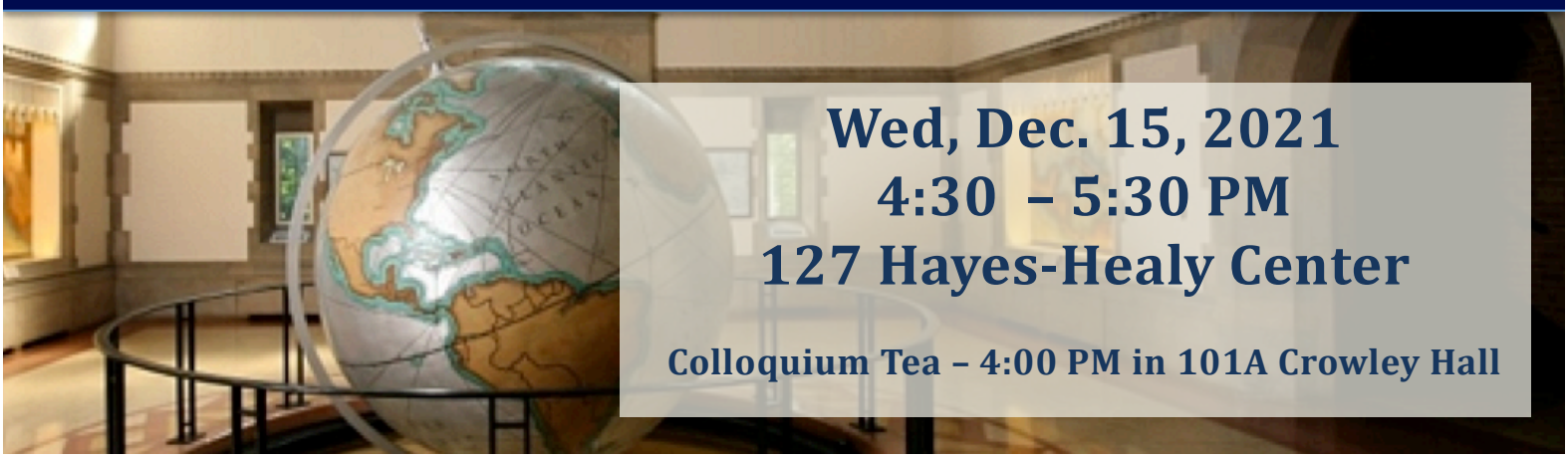
Modeling extremal dependence in trend analysis of in situ measurements of daily precipitation extremes

The detection of changes over time in the distribution of precipitation extremes is significantly complicated by noise at the spatial scale of daily weather systems. This so-called "storm dependence" is non-negligible for extreme precipitation and makes detecting changes over time very difficult. To appropriately separate spatial signals from spatial noise due to storm dependence, we first utilize a well-developed Gaussian scale mixture model that directly incorporates extremal dependence. Our method uses a data-driven approach to determine the dependence strength of the observed process (either asymptotic independence or dependence) and is generalized to analyze changes over time and increase the scalability of computations. We apply the model to daily measurements of precipitation over the central United States and compare our results with single-station and conditional independence methods. Our main finding is that properly accounting for storm dependence leads to increased detection of statistically significant trends in the climatology of extreme daily precipitation.



Wed, Dec. 15, 2021
4:30 – 5:30 PM
127 Hayes-Healy Center

Colloquium Tea – 4:00 PM in 101A Crowley Hall