STATISTICS
COLORADO STATE UNIVERSITY

Fall 2025 Departmental Seminar

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Wagar Building Rm 133

Understanding Drivers of Non-Stationarity in Extreme Precipitation and Flood Events and Impacts

Abstract

Extreme weather events like severe precipitation, flooding, drought and extreme heat disproportionately impact society and ecosystems, but are challenging to model and predict due to their complexity and rarity. In this seminar, I will present some of our recent research to understand extreme precipitation and flooding and how these events have been changing over recent decades. In the first part of the talk, I will highlight research using historical precipitation and flood data, econometric modeling, and climate change simulations to analyze changes in flood damages over time. We find that there have been overall increases in extreme precipitation across the U.S. over the past century, and that these changes account for more than one-third of the cost of recent U.S. flood damages. This research demonstrates a new approach to empirically quantify the socioeconomic impacts of extreme climate events under climate change. To conclude the talk, I will also introduce some of our ongoing research projects using a variety of statistical and deep learning methods to analyze the physical processes driving non-stationarity in extreme precipitation and flood events in different regions of the U.S.