



**Summer Program on Transportation Statistics  
August 14-18, 2017**

**Lecture: *Causal Inference in Transportation Safety Studies: Comparison of Potential Outcomes and Causal Diagrams***

**Speaker:** Vishesh Karwa

**Abstract:**

The research questions that motivate transportation safety studies are causal in nature. Safety researchers typically use observational data to answer such questions. In this talk, I will focus on exploring the applicability of two frameworks “Causal Diagrams and Potential Outcomes” to answer causal questions for a specific transportation safety problem. The causal effects of pavement marking retroreflectivity on safety of a road segment were estimated. More specifically, the results based on three different implementations of these frameworks on a real data set were compared: Inverse Propensity Score Weighting with regression adjustment and Propensity Score Matching with regression adjustment versus Causal Bayesian Network. The effect of increased pavement marking retroreflectivity was generally found to reduce the probability of target nighttime crashes. However, we found that the magnitude of the causal effects estimated are sensitive to the method used and to the assumptions being violated.