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Summer Program on Transportation Statistics
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Lecture: *Efficient Planning in Large Spatio-temporal Decision Problems*

Speaker: Eric Laber

Abstract:

Motor vehicle accidents are responsible for tens of thousands of fatalities and millions of injuries each year. Thus, improving the safety of our roadways is a top priority for state and federal agencies. An adaptive resource allocation strategy for roadway safety is a sequence of decision rules, one per time point, that maps up-to-date information on roadway and traffic information to a recommended investment of current resources into roadway safety projects. These investments could include structural changes, e.g., installing a stoplight at an intersection or adding reflective markers along a road segment, or data-gathering actions, e.g., installing embedded sensors to measure traffic flow and driving behaviors at selected locations. An optimal allocation strategy maximizes the mean of some cumulative measure of roadway safety. Estimating an optimal allocation strategy for roadway safety is challenging as: (i) data are noisy, incomplete, and not generally collected in a designed experiment; (ii) interventions can induce spillover effects complicating causal inference; and (iii) system dynamics are generally non-stationary. We discuss a general framework for estimating optimal allocation strategies for roadway safety that
can be applied with noisy, heterogeneous, and non-stationary data streams. We discuss some of the key technical challenges and lines for future research.