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Friday, May 18, 2012
11:00 am – 12 Noon

Seminar Room 4080 AIR Building

INVESTIGATING TRAFFIC AND DRIVING BEHAVIORS AT SIGNALIZED INTERSECTIONS USING HIGH-RESOLUTION EVENT DATA

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This presentation talks about a series of recent applications using high-resolution vehicle-detector actuation and signal phase change event data. High-resolution event data provides detailed detector occupied times and time gaps between two consecutive vehicles. Such information is of great importance to help understand traffic and driving behaviors under congested conditions. High-resolution data are first used to investigate queuing dynamics at congested signalized intersections. A model, combined with the Lighthill-Whitham-Richards (LWR) theory, is developed to estimate intersection queue length under congested situation, a situation in which the traditional input-output method cannot work. This research then investigates the arterial fundamental diagram (AFD), in which the highly scattered cloud is lack of explanations so far. Using high-resolution data, we found that the scatter in the AFD is mainly caused by signal operations instead of traffic congestion. The final part of the talk presents an investigation of driving behaviors using a whole year's high-resolution data. A model is developed to describe the stochasticity of drivers' gap selection. This model is also used to investigate the potential impact on the fundamental diagram caused by the stochasticity of drivers' gap selection.

Dr. Xinkai Wu is an Assistant Professor of Civil Engineering at California State Polytechnic University Pomona. His research interests include urban traffic operations, network traffic flow modeling and simulation, driving behavior study, and applications of Intelligent Transportation Systems (ITS). Dr. Wu graduated from the University of Minnesota with a Ph.D. in Civil Engineering in 2010. He is the co-inventor of a pending patent: SMART-SIGNAL (Systematic Monitoring of Arterial Road Traffic Signals) technology, which collects and archives real-time high-resolution event data on signalized arterials.