

**SEMINAR**

Co-Sponsored by  
UC ITS Mobility Research Program  
Pacific Southwest Region University Transportation Center

**Friday, May 18, 2018**

**10:30 am– 11:30 am**

**Seminar Room, 4080 AIR Building**

**STATISTICAL INFERENCE OF A CLASS OF STOCHASTIC CAR-FOLLOWING MODELS**

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**Abstract**

This talk presents the formulation and parameter estimation of a family of microscopic car-following models based on stochastic desired acceleration processes. This formulation generalizes previous separate efforts based on Brownian and geometric Brownian acceleration processes, each reproducing a different feature of traffic instabilities. The model parameters are estimated using maximum-likelihood estimation (MLE) on data from a series of car-following experiments. The MLE optimization problem is unique in our case because (i) error terms are regime-specific, and (ii) there is a dependency between the data and parameters that needs to be accounted for. The models are general so that a wide variety of hypotheses might be tested with statistical inference methods, such as homogeneity of driver/vehicle population, the significance of roadway geometry, or the impacts of automated vehicles.

*Dr. Laval is an Associate Professor at the School of Civil and Environmental Engineering at Georgia Institute of Technology.*

*Dr. Laval obtained his B.S. in Civil and Industrial Engineering from Universidad Catolica de Chile (1995), his M.S. in Civil Engineering from the University of California at Berkeley (2001), and his Ph.D. in Civil Engineering from the University of California at Berkeley (2004).*

*Prior to joining Georgia Tech doctor Laval held two consecutive Postdoc positions at the Institute of Transportation Studies at UC Berkeley, and at the French National Institute for Safety and Transportation Research (INRETS). After obtaining his B.S. he worked as a transportation engineer for five years at the Chilean Ministry of Public Works, where he conducted numerous traffic and revenue studies for urban and inter-urban road concessions.*

*He has made important contributions in the area of traffic flow theory, modeling and simulation, which focus in understanding freeway congestion dynamics and developing effective control strategies. He has published over 50 articles in the most prestigious journals in the field. Some of his theories and models have been adopted and are being used by practitioners around the world.*

*In addition to his CAREER award, Dr. Laval has obtained funding from the Georgia DOT and the National Science Foundation to support his PhD students in topics such as driver behavior inside stop-and-go waves, optimal freeway ramp-metering and variable speed limit strategies, simulation of lane-changing at weaving sections, dynamic traffic assignment on HOT lanes, and macroscopic modeling of cities.*

*Dr. Laval serves on the editorial board Transportation Research Part B, Recherche-Transports-Sécurité (French refereed journal), Ingeniería de Transporte (Chilean refereed journal), subcommittee chair Traffic flow webinars and MFD Dataquest subcommittees of the Traffic Flow Theory and Characteristics Committee (AHB45) of the Transportation Research Board.*