

# Improving Transportation Demand Modeling in the Portland Region with Automatic Empirical Speed-Flow Relations Generated from Archived Sensor Data

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## ABSTRACT

With rising fuel prices, concerns about the health effects of vehicular emissions, increasing congestion, and skyrocketing costs of construction projects, there is no better time to attempt to improve the planning, design, operation and management of a multimodal transportation system. To do so, we rely on the ability to reliably forecast future land use, economic and transportation scenarios. Improvements to the mathematical modeling tools used for forecasting are critical for ensuring a future for the Portland metropolitan region that is efficient, equitable and sustainable. A key ingredient in the improvement of any forecasting tool is the calibration step, which usually requires a major data collection effort. This enables modelers to match the performance of the transportation network with "actual" conditions by replicating trip origins, destinations, mode choice, travel times and speeds to values that are actually measured on the network. Fortunately, here in the Portland region, we have access to a rich database containing five years' worth of high resolution traffic measurements from a network of more than 600 sensors. A small unfunded pilot using OR 217 as a case study was conducted that confirms that this sensor data stored at PSU can be used to improve the calibration of Metro's travel demand model. Therefore, the objective of this project is to engage a graduate student to develop an automated, systematic way to produce the calibration parameters needed by Metro for the entire Portland freeway network. The results of this project will be transferable to other regions in the U.S. and abroad.

## HOW PROPOSED GRANT ACTIVITY MEETS THE STATEMENT OF PURPOSE

This proposed grant activity clearly meets several goals identified in the *Statement of Purpose* for Faculty Enhancement Grants:

- The proposed project will support a graduate student in state-of-the-art advanced research and will lead to conference presentations/publications, a journal paper submittal, and possibly the development of a Ph.D. dissertation topic.
- The project will lead to new directions in the project coordinator's research, particularly with a focus on engagement with Metro, one of our key regional partners in sustainable transportation and urban management. It will also bridge across research areas currently being pursued by other PSU transportation faculty and will likely lead to cross-disciplinary collaborations.
- The proposed research will serve as a mechanism for subsequent proposals for external funding and will leverage funds from the Oregon Transportation Research and Education Consortium (OTREC). Improving the linkage between land use and transportation through the use of advanced technology (data collection and modeling) is one of OTREC's themes, and is directly linked to the research priorities of the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), as well as the Oregon Department of Transportation. The project coordinator will seek additional funding at the federal level. The funding of this proposal will continue to generate early results and momentum that will greatly increase the probability of success of receiving additional federal funding.
- Outcomes of this research will strengthen graduate teaching courses in transportation engineering and planning at PSU.