



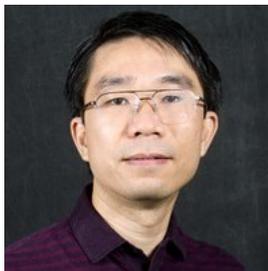
# TOMNET Transportation Center

## Teaching Old Models New Tricks

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TOMNET LEADERSHIP WEBINAR SERIES

### How to Integrate Deep Learning Methods with Transportation Model Calibration: A Computational Graph-Based Approach with Multiple Data Sources



**Xuesong Zhou, PhD**  
*Associate Professor*  
Arizona State University

**Friday, February 1, 2019**  
**2:00PM EST**

**About the Talk** This presentation aims to provide an understanding of the complex transportation modeling process using the emerging deep-learning approach by constructing computation graphs and calculating the derivatives among different layers while considering available heterogeneous data sources. Specifically, by recognizing the multiple sources of information in emerging big data applications, we map different levels of traffic demand variables to various data sources in multi-layer Hierarchical Flow Networks (HFN) for traffic demand estimation applications. By introducing the computational graph approach, a feed forward pass on the hierarchical network sequentially implements trip generation prediction, spatial distribution estimation, and path flow-based traffic assignment, respectively. A back propagation step on the computational graph is applied to aggregate different layers of partial first-order gradients and minimize composite/non-convex error functions. Finally, the proposed methodology is tested in real-world travel demand forecasting models.

**About the Speaker** Dr. Xuesong Zhou serves as an Associate Professor in the School of Sustainable Engineering and the Built Environment at Arizona State University (ASU). His research focuses on dynamic traffic assignment, traffic estimation and prediction, large-scale routing and rail scheduling. Dr. Zhou is currently an Associate Editor of Transportation Research Part C, an Associate Executive Editor-in-Chief of Urban Rail Transit, an Associate Editor of Networks and Spatial Economics, and an Editorial Board Member of Transportation Research Part B. He was the former Chair of INFORMS Rail Application Section (2016), and the Co-Chair of the IEEE ITS Society Technical Committee on Traffic and Travel Management, as well as a subcommittee chair of the TRB Committee on Transportation Network Modeling (ADB30). He is the principle architect and developer of DTALite, a light-weight open-source traffic assignment/simulation engine, and has been assisting FHWA, many state DOT and metropolitan planning agencies to learn and deploy advanced transportation network modeling tools.

**The webinar will be webcast live and recorded.**

**No registration is required.**

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TOMNET is a US Department of Transportation Tier 1 University Transportation Center that aims to develop new methods, tools, and algorithms for integrating attitudes, values, and perception variables in regional transportation planning models in an effort to enhance behavioral realism and sensitivity of travel forecasts when analyzing a wide variety of future scenarios. The Center is led by Arizona State University, and includes Georgia Tech, University of South Florida, and the University of Washington as consortium partners. The Center is conducting the TOMNET Leadership Webinar Series to help advance technology transfer, disseminate research, and foster workforce development.

