

The NCMUG's vision is to provide a forum for sharing knowledge and experiences of using state-of-practice transportation modeling tools, techniques and innovations appropriate to answer transportation planning and policy questions for the State of North Carolina, and promote its implementation across the State.

# 2016 Fall NCMUG Meeting

Wednesday, November 16, 2016

1:00 p.m. – 5:00 p.m.

Room 2600, ITRE/NCSU

909 Capability Drive, Research Building IV, Raleigh, North Carolina 27606

## Bio and Abstract

- **SUB-AREA ANALYSIS/CORRIDOR ANALYSIS**

### **Sub-Area and Corridor Analysis – Guidelines and Tool for TRM v6**

#### **Abstract**

Subarea modeling procedures are particularly useful in large regional models where there is a desire to investigate a particular sub-region or corridor where greater detail is required than that provided in the regional model. This presentation provides general guidelines in defining, developing the subarea cordon and application of the tool along with a detailed overview of the subarea tool developed for TRM v6. Additionally, the presentation also covers some guidance beyond the mechanics of the subarea tool such as procedures to improve validation inside the subarea, importance of closure criteria in the subarea assignment, and different methods to compute adjustment factors for future year use.

#### **Bio**

#### **Amar Sarvepalli**

[Sarvepalli@pbworld.com](mailto:Sarvepalli@pbworld.com), PB, Raleigh, NC

Amar Sarvepalli has over ten years of experience in the field of transportation engineering and travel demand modeling. He specializes in planning research and development techniques, along with model development. He worked extensively on data analysis of household travel surveys and transit onboard surveys; model estimation, calibration and validation along with programming and scripting of the models in CUBE, TransCad, and Vissim. Most of his work involved the estimation and development of four-step models, statewide models and special event models. He also worked on model enhancements and calibration required for New Start/Small Starts applications.

- **SIMULATION MODEL**

### **Construction Traffic Analysis: To be or Not to be: A Case Study for NC-107 Widening, Sylva, NC**

#### **Abstract**

NC 107 is an important arterial serving Jackson County in western North Carolina. The northern portion of the corridor is also the region's major commercial corridor, resulting in AADTs as high as 30,000 vehicles/day on a predominantly 5-lane cross-section (4 lanes with TWLTL). In June 2013, NCDOT began focusing its efforts on improving existing NC-107 from south of NC 116 (Fairview Road) to US 23 Business (Asheville Highway) in Sylva, as opposed to constructing a controversial NC-107 bypass.

However, concerns arose that with no viable detour route, businesses along NC-107 would suffer significant adverse economic impacts due to traffic congestion and access restrictions throughout a long construction process. In part to address these concerns, a traffic management study was conducted to analyze construction and final design traffic conditions to help assess (and minimize) potential economic impacts resulting from travel delays and access constraints.

To effectively assess traffic impacts of construction activities, **TransModeler** software developed by Caliper Corporation was used to simulate and evaluate traffic patterns and operations for a range of construction scenarios and design year alternatives. Quantitative analyses considered and compared travel times, average travel speeds, levels of service (LOS), queue lengths, and average vehicle delays at intersections. Peak hour summary statistics were developed for each scenario analyzed. Benefit cost analysis was also performed to compare the construction scenario and final build design. The net impact of construction-related congestion delays on the project's anticipated travel-time savings benefits was also estimated.

## Bio

### **Taruna Tayal**

[TTayal@vhb.com](mailto:TTayal@vhb.com), VHB, Raleigh, NC

Sr. Project Manager, Systems Planning, VHB Engineering NC, P.C.

Taruna is a result-driven planner with more than a decade and a half of experience providing innovative and efficient solutions in demand modeling, traffic analysis and multimodal transportation planning. She has broad expertise that encompasses GIS application processes, resource planning, operations and IT management. As a project manager she has designed, developed and applied a number of regional travel demand models used for multi-modal planning, sub-area analysis, highway and transit alternatives evaluation, land use and transportation connection. In her time away from work Taruna is busy taking pictures of the beautiful landscapes or painting them on a canvas.

### **Donald A. Bryson**

[dBryson@vhb.com](mailto:dBryson@vhb.com), VHB, Raleigh, NC

Principal, Systems Planning, VHB Engineering NC, P.C.

Don has been involved for many years in transportation planning and engineering, primarily with long-range and project planning at the state and municipal level. As a consultant, he combines his NCDOT and Greensboro DOT experience with knowledge and skills gained in working in other jurisdictions to help resolve conflicts that inevitably arise in complex, multimodal transportation studies, whether rural or urban in nature. He has been directly involved in a number of recent corridor studies, providing project management, technical analysis, and public involvement support, and has been especially focused on developing and documenting effective recommendation packages and implementation strategies.

## **VISSIM Microsimulation Modeling for South Carolina Freeway Projects**

### **Abstract**

This presentation will provide users with an overview of how VISSIM works and its features and limitations. Additionally, we will go through an overview of the modeling process from start-to-finish. Additionally, we will go over the options users have in assigning vehicles to the roadway network in VISSIM and look at some real-world projects in South Carolina.

## Bio

### **Kellie Reep**

[kellie.reep@stantec.com](mailto:kellie.reep@stantec.com), Stantec, Charlotte, NC

Kellie is based out of Stantec's Charlotte, NC office and has seven years of professional experience in the field of transportation engineering, working in both the public and private sectors. She has spent the majority of her career working with microsimulation modeling, using both VISSIM and TransModeler. Kellie has performed traffic analyses for a wide variety of projects, including freeway and arterial corridor studies, design-build projects, Traffic Impact Analyses (TIAs), and planning projects. She also has experience in capacity analysis, safety analysis, and signal design.

## **Utilizing Macro- and Micro-Simulation Tools for the Completion of I-485 HOV/HOT Analysis in the Charlotte area**

### **Abstract**

NCDOT and FHWA propose improvements to approximately 17 miles of I-485 (Charlotte Outer Loop) in southern Mecklenburg County, from I-77 to US 74 (Independence Boulevard), by adding one express lane in each direction, as well as an additional general purpose lane in each direction between Rea Road and Providence Road. The purpose of the project is to provide a reliable travel time option for the corridor. Multiple tools were select, in part, to have a more refined representation of travel times in the corridor beyond what regional models are capable of providing.

Multiple microsimulation and macrosimulation tools were used to complete the analysis and traffic forecast. The primary software tools used for the traffic operations analysis are TransCAD, **TransModeler**, and **VISUM**. TransCAD is the standard macroscopic travel demand modeling software used in North Carolina for small area, regional, and statewide models. TransModeler is a traffic simulation package that can model the behavior of complex traffic systems to evaluate traffic flow dynamics, ITS operations, and overall network performance. VISUM is a comprehensive software system for transportation planning and travel demand modeling, and is designed for multimodal analysis. VISUM was primarily used in the development of Origin-Destination (O-D) matrices.

The presentation will focus on the rationale for the combination of tools used, along with the general process used to complete the project, and lessons learned through the process.

## Bio

### **Craig Gresham**

[craig@clearboxforecast.com](mailto:craig@clearboxforecast.com), Clearbox Forecast Group, Cary, NC

Craig has 19 years of experience in travel demand modeling, traffic forecasting, and GIS. Before starting Clearbox Forecast Group in the fall of 2009, he spent 10 years at Kimley-Horn and Associates and 3 years with North Carolina DOT Transportation Planning Branch. Craig specializes in model development, HOT/HOV model analysis, multimodal analysis, time-of-day analysis, project-level traffic forecasting, and socioeconomic forecasting. When not working from his corporate headquarters in his basement, he's either entertaining his two children, working on some project on the house, trying to get some exercise in, or looking for the next great craft beer.

#### **Vivek Hariharan**

[vivek.hariharan@rsandh.com](mailto:vivek.hariharan@rsandh.com), RS&H, Washington D.C.

Vivek Hariharan is a transportation engineer at RS&H Inc in their Washington D.C. office. He has over 9 years of experience in transportation industry. He is currently involved in several traffic engineering and transportation planning projects in Washington D.C., Maryland, Virginia, North Carolina and other parts of the country. He is a registered Professional Engineer (PE) in Washington D.C., Maryland, Virginia, and North Carolina and a certified Professional Traffic Operations Engineer (PTOE). Vivek holds a bachelor's degree in engineering from Osmania University in India and a master's degree in engineering from The Ohio State University in Columbus, Ohio. Vivek received the ITE Transportation Consultant Council - 2012 Young Professionals Scholarship Award, 2013 NCSITE New Member Award, and 2013 NCSITE President's Award.

#### **Brian Wert**

[bmwert@ncdot.gov](mailto:bmwert@ncdot.gov), NCDOT, Raleigh, NC

Brian Wert is a planning professional with over 15 years of experience. He is currently a supervisor for the western planning group at TPB. Prior to that he was the NCDOT State Traffic Forecast Engineer. In that time he worked to improve the forecasting process as well as to help address recent court rulings that impacted traffic forecasting and travel demand modeling.

## **Piedmont Triad Freight and Commercial Vehicle Model**

### **Abstract**

The presentation will describe the Piedmont Triad Freight Study, Phase 2, which has developed a new freight and commercial vehicle model of the region. The model has been integrated into the Piedmont Triad Regional Model (PTRM). The presentation will introduce these advanced models, which differ from traditional trip based truck models, and describe the two key model segments – freight trucks that pick and up deliver shipments at business establishments, and commercial vehicles that provide other services and home deliveries. The presentation will include discussion of how the models function within the PTRM and the types of outputs now available to PART through an output dashboard and other model outputs.

**Software:** The software we use is **R**, which is an open source statistical programming platform (<https://www.r-project.org/>) RSG had developed **rFreight**, an R package that supports implementation of freight simulation models.

### **Bio**

#### **Colin Smith**

[Colin.Smith@rsginc.com](mailto:Colin.Smith@rsginc.com), RSG, White River Junction, VT

Colin is a Director in RSG's travel modeling practice. He recently leads the development of Florida's statewide freight model and has a leading role in the development of FHWA's new national freight model. His past experience includes the development of Utah's statewide freight model and regional freight simulation models for Chicago and Baltimore.

- **SURVEY – STATE OF PRACTICE**

### **Web-Based with GPS Samples: 2016 Triangle Household Travel Survey**

#### **Bio**

#### **Joe Huegy**

[jbhuegy@ncsu.edu](mailto:jbhuegy@ncsu.edu), TRMSB/ITRE/NCSSU, Raleigh, NC

Joseph Huegy leads the Travel Behavior Modeling Group at ITRE. He has thirty years' experience in transportation planning and travel forecasting. Currently, he is leading a team of highly qualified professionals in developing the Triangle regional model. He has also done transit forecasting for FTA New Starts projects while with the Triangle Transit Authority, and done transportation planning for the Wilmington MPO.

- **MORNING WORKSHOPS**

## **AirSage Data Update: Estimated Population Movement Patterns derived from Cell Phone Tower Interactions**

### **Abstract**

Ninety-one percent of adults carry cell phones and they connect with cell phone towers on a continuous basis. This quickly evolving and growing field of data collection provides origin and destination travel patterns for an enormous portion of the population. Transportation planners can harness the data and make the best use of it in studies and system analysis.

### **Bio**

[bking@airsage.com](mailto:bking@airsage.com)

Bill King is an experienced civil engineer, project manager, expert witness and consultant with over 25 years in the transportation and infrastructure development industry. Before joining AirSage, his career includes the Georgia DOT, City Engineer for Cartersville, GA as well as private engineering and planning firms. Bill is a licensed PE in Georgia and is a graduate of Georgia Institute of Technology, where he earned a bachelor's degree in Civil Engineering (CE).

## **Drilling Down on Big Data: Types, Sources, and Modeling Use Cases**

### **Abstract**

Everyone is talking about “big data” – but the term itself can be misleading due to its vague, all-encompassing nature. How can we ensure that “big data” is used effectively, and that it is not simply a buzz word? To help modelers address these important questions, Neal will provide a high-level overview of the different types and sources of big data that are gaining traction in the transportation community. Drawing on his personal experience, Neal will delve into the big data that are proving to be the most valuable for modeling applications in particular: sensor data and three unique types of archival geospatial data generated by mobile devices, cellular, GPS, and Location-Based Services. Neal will drill down on mobile device data by explaining how each type of data is generated and from which devices. Following this introduction, Neal will explore the advantages and disadvantages of these mobile data types for modelers in terms of spatial precision, sample size, and sample bias. He will highlight the implications of each of these characteristics for transportation modeling applications through case studies from practitioners who are the forefront of using big data to develop micro, meso, and macro models. For each case study, Neal will focus on the type of data that modelers used to accomplish their goals, and he will analyze the specific insights that modelers gleaned from the data. The presentation will emphasize best and worst practices, highlighting when big data was used to great benefit and when it was not.

### **Bio**

#### **Neal Bowman**

[neal.bowman@streetlightdata.com](mailto:neal.bowman@streetlightdata.com), San Francisco, CA

Neal Bowman is a Sales Engineer at StreetLight Data, where he works directly with transportation consulting firms and public sector agencies to utilize big data analytics in transportation modeling, planning, and engineering projects. Prior to joining StreetLight Data, Neal worked for over five years at Quality Counts, a traffic data collection firm. He was responsible for research and development of new technology and technical sales. While at Quality Counts, Neal worked closely with private engineering firms, local governments, and state DOTs across the US to deploy highly sophisticated traffic monitoring systems, including the design of complex Bluetooth origin-destination deployment methodologies. He earned his BA in Sociology and Black Studies from UC Santa Barbara.