A major hurdle in freight demand modeling has always been the lack of adequate data on freight movements for different industry sectors for planning applications. Freight Analysis Framework (FAF), and Transearch (TS) databases contain annualized commodity flow data. The primary motivation for our study is the development of a fused database from FAF and TS to realize transportation network flows at a fine spatial resolution (county level) while accommodating for production and consumption behavioral trends (provided by TS). Towards this end, we formulate and estimate a joint econometric model framework grounded in maximum likelihood approach to estimate county-level commodity flows. The algorithm is implemented for the commodity flow information from 2012 FAF data and 2011 TS databases to generate transportation network flows for 67 counties in Florida. The data fusion process considers several exogenous variables including origin-destination indicator variables, socio-demographic and socio-economic indicators, and transportation infrastructure indicators. Subsequently, the algorithm is implemented to develop freight flows for the Florida region considering inflows and outflows across the US and neighboring countries. The base year models developed are employed to predict future year data for years 2015 through 2040 in 5-year increments at the same spatial level. Furthermore, we disaggregate the county level flows obtained from algorithm to a finer resolution - statewide transportation analysis zone (SWTAZ) defined by the FDOT. The disaggregation process allocates truck-based commodity flows from a 79-zone system to an 8835-zone system. A two-stage factor multiplication method is proposed to disaggregate the county flow to SWTAZ flow. The factors are estimated both at the origin and destination level using a random utility factional split model approach. Eventually, we conducted a sensitivity analysis of the parameterization by evaluating the model structure for different numbers of intermediate stops in a route and/or the number of available routes for the ODs.

**Major:** Civil Engineering

**Educational Career:**
Bachelor's of Civil Engineering, BS, 2010, Bangladesh University of Engineering & Technology  
Master's of Civil Engineering, MS, 2015, University of South Alabama

**Committee in Charge:**
Naveen Eluru, Chair, Department of Civil, Environmental and Construction Engineering  
Mohamed, Abdel-Aty, Department of Civil, Environmental and Construction Engineering  
Sabreena, Anowar, Department of Civil, Environmental and Construction Engineering  
Qipeng, Zheng, Industrial Engineering & Management Systems

Approved for distribution by Naveen Eluru, Committee Chair, on November 30, 1999.

The public is welcome to attend.