Biography:

Dr. Eric J. Gonzales joined the Department of Civil and Environmental Engineering at the University of Massachusetts Amherst as an Assistant Professor in January 2014. Dr. Gonzales has a research background in modeling of urban street networks, and his interests are in the operation, management, and design of large-scale multimodal transportation systems. He has research experience with modeling large logistics systems including freight and transit networks, modeling and analysis of different structures of public transit networks and services, and analyzing the dynamics of traffic congestion in street networks. Dr. Gonzales was an Assistant Professor at Rutgers following completion of a Ph.D. in Civil and Environmental Engineering from the University of California, Berkeley, in 2011. He has been recognized with numerous awards including the University of California Transportation Center’s Outstanding Student of the Year Award for 2010-11 and the Gordon F. Newell Award for Excellence in Transportation Science. He was also an Eno Transportation Foundation Fellow in 2010.

Abstract:
Recent research will be presented about the way that cars and transit are used over the course of a congested period. Using physically realistic macroscopic models of traffic at bottlenecks and in networks, this work relates the choices that commuters make of what time to travel and which mode to use with the total cost of completing their trip. Analysis of equilibrium and system optimum conditions is performed for morning and evening peak periods. This work considers infrastructure constraints, time-dependent demand, the inherent differences between morning and evening commuting demands, and the dynamic nature of traffic congestion. Many insights from the analysis are obtained for understanding equilibrium travel patterns, designing optimally coordinated operations of traffic and public transit service, and identifying efficient pricing strategies. Although much of the analysis is based on models of a single bottleneck, it is shown that strategies that eliminate queueing can also be applied to more complex urban networks.