

Project Information Form

Project Title:	Solving for Equilibrium in the Bathtub Model
University:	University of California, Riverside
Principal Investigator:	Joshua Buli Advisor: Richard Arnott
PI Contact Information:	Jbuli001@ucr.edu
Funding Source(s) and Amounts Provided (by each agency or organization):	NCST Graduate Fellowship - \$20,000
Total Project Cost:	\$20,000
Agency ID or Contract Number:	DOT DTRT13-G-UTC29
Start and End Dates:	September 19, 2016 – June 16, 2017
Brief Description of Research Project:	<p>The purpose of this research was to develop new models of downtown rush-hour traffic congestion that account for traffic jams, with the goal of developing a numerical solution for the “bathtub model” of rush-hour traffic dynamics. During the tenure of this NCST graduate fellowship, Joshua Buli and Economics Professor Richard Arnott were able to construct a numerical method that provides a numerical solution to the bathtub model.</p> <p>Additionally, Joshua was able to work on pure mathematical research in his home department of Mathematics, under the supervision of his dissertation advisor Dr. Yulong Xing. They were able to complete numerical work on a fluid dynamics problem with the couple BBM equations. They constructed a discontinuous Galerkin method for the system and submitted a paper on the submit.</p> <p>This NCST award provided the crucially important time to conduct the research described above and complete three associated papers. All three papers will be beneficial to the research work that Joshua will be doing for his final dissertation project. In that project, he will use the discontinuous Galerkin method framework to look at developing a computationally efficient method to numerically solve macroscopic traffic flow problems on large networks. The dissertation will combine elements of the three papers that were completed during the NCST graduate fellowship award period.</p>
Describe Implementation of Research Outcomes (or why not implemented): Place any photos here	

Impacts/Benefits of Implementation (actual, not anticipated):	
Web Links <ul style="list-style-type: none">• Reports• Project website	https://ncst.ucdavis.edu/graduate-student-research/ Arnott, Richard, and Joshua Buli (2018). Solving for Equilibrium in the Basic Bathtub Model. <i>Transportation Research Part B: Methodological</i> , Volume 109, 2018, 150-175. https://doi.org/10.1016/j.trb.2017.12.003