Engineering Management, Information, and Systems

COST- AND TIME- EFFECTIVE REGIONAL EVACUATION NETWORK DESIGN AND OPERATION UNDER TRAVEL CONGESTION AND UNCERTAINTY

Ph.D. Dissertation Defense

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Advisor: Dr. Halit Üster
**Monday, August 19, 2019
12:00 pm – 2:00 pm
Room 210, Junkins Engineering Building**

Abstract: Natural disasters and extreme events, such as a hurricane that are often characterized by their violence and unpredictability, resulting in severe damage as well as many fatalities. One way to assist the vulnerable population and decision-makers during extreme event evacuation is to provide both operational and strategic evacuation guidelines that give specific information on individual route selection, evacuation timing and shelter destination assignment. In this research, we pose and analyze an evacuation network design problem in strategic and operational levels separately to provide efficient and effective planning tools. In strategic decision making, we investigate open potential shelter locations, transfer nodes and road segments under uncertainty in the number of people evacuating. In the operational level, we consider an evacuation network design problem under cost and travel congestion for pre-disaster decision making in the case of an imminent hurricane. Multiple optimization models and algorithms with different objectives are proposed to generate cost- and time- effective regional evacuation network design and operation. To examine the performance of the proposed models, we conduct a set of experiments based on real data from Central Texas. The results illustrate that our models and solution approaches can handle travel congestion and uncertainty effectively.

Biography: Nadere Mansouri is a Ph.D. candidate with a major in Operations Research at Lyle school of engineering. She has been a Research and Teaching Assistant at Southern Methodist University since 2015. She received her B.Sc. in Pure Mathematics from University of Tehran and M.Sc. degree in System Engineering from Amirkabir University of Technology (AUT) in Tehran, Iran. Her research interests include optimization models and efficient solution algorithms for network design problems.

Everyone invited and welcome!