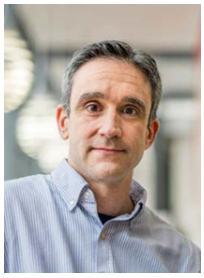
Computing@PNNL SEMINAR

Quantitative Assessment of Transportation Network Vulnerability with Dynamic Traffic Simulation Methods



Lance Fiondella

Assistant Professor, Electrical and Computer Engineering
University of Massachusetts Dartmouth

October 03 | 10 AM | ISB2 Wanapum (155)

Transportation networks are critical to the social and economic function of nations. Given the continuing increase in city populations throughout the world, the criticality of transportation infrastructure can only be expected to increase. Thus, it is ever more important to mitigate congestion and to assess the impact disruptions would have on individuals who depend on transportation for their work, livelihood, and emergency services.

Most transportation network vulnerability research has been performed in the context of static traffic models, many of which are formulated as traditional optimization problems. However, transportation networks are dynamic because their usage varies over time. Thus, more appropriate methods to characterize the vulnerability of transportation networks should consider their dynamic properties. Such an approach could answer the question: *When and where would a disabled link be the most disruptive to the network*?

This talk will present a quantitative approach to assess a transportation network's vulnerability to disruptions with methods from traffic simulation. The approach can prioritize the critical links over time and is generalizable to the case where both link and node disruptions are of concern. Results indicate that the approach provides quantitative insight into the time-varying criticality of links and could be used as the objective function of less traditional optimization methods that use simulation and other techniques to evaluate the relative utility of a particular network defense to reduce vulnerability and increase resilience.

Professor Fiondella will be available for discussions on October 03-04. If interested, please contact Mahantesh Halappanavar at hala@pnnl.gov.

Pacific Northwest NATIONAL LABORATORY | U.S. DEPARTMENT OF ENERGY

Host:
Mahantesh Halappanavar
ACMD Division
Data Sciences
hala@pnnl.gov