TRANSPORTATION SEMINAR + WEBINAR SERIES

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Improving Mobility in Urban Street Networks via Network-Wide and Decentralized Traffic Signal Control Strategies

Vikash Gayah, PhD

Associate Professor of Civil and Environmental Engineering, Pennsylvania State University

Thursday, April 13, 2023 • 1:30 pm–2:30 pm (US Arizona)

Hybrid Attendance Options:

Register for Virtual Attendance: https://bit.ly/3mmpADr

In-person: College Avenue Commons (CAVC) • Room 301 (map)

*A light lunch will be served during the seminar for all in-person attendees.

About the Talk

Signalized intersections are the most common bottlenecks in urban settings, and effective signal control strategies are needed to reduce delays and improve urban traffic flow. This presentation describes two distinct branches of research to improve vehicular mobility via traffic signal control in urban traffic networks. The first branch proposes to simplify signal timing plans by restricting conflicting left turns at signalized intersections. Doing so improves maximum vehicle throughput at intersections at the expense of increased travel distances. Macroscopic models of urban traffic are used to account for these competing effects and examine the performance of restricting left turns against competing strategies, such as allowing left turns and the use of one-way streets. Strategies on optimal implementation of this strategy (specifically, when and where) are also considered. The second branch develops decentralized signal control algorithms based on the max pressure framework using a newly proposed delay metric. This algorithm has been shown to improve both average vehicle delays and the variation of delays imparted to individual vehicles. It can also be readily applied in a Connected Vehicle environment when a subset of vehicles is able to provide information to the signal controller.

About the Speaker

Dr. Vikash V. Gayah is an associate professor in the Department of Civil and Environmental Engineering at The Pennsylvania State University. He received his B.S. and M.S. degrees from the University of Central Florida and his Ph.D. degree from the University of California, Berkeley. Dr. Gayah's research focuses on urban mobility, traffic operations, traffic flow theory, traffic safety and non-motorized transportation. Dr. Gayah currently serves as an editorial advisory board member of Transportation Research Part C and Accident Analysis and Prevention, an editorial board editor of Transportation Research Part B, an associate editor for the IEEE Intelligent Transportation Systems Magazine, and a handling editor for the Transportation Research Record. He is also a member of several Transportation Research Board committees including the Standing Committee on Access Management (ACP60), Traffic Flow Theory and Characteristics (ACP50), and Safety Performance and Analysis Committee (ACS20). He has received numerous awards for his research and teaching, including the Gordon F. Newell Award, multiple Transportation Research Board paper awards, and the CAREER Award from the National Science Foundation.

This seminar will be presented in-person and webcast live to a worldwide audience using Zoom.

To register for the webinar, please visit: https://bit.ly/3mmpADr

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For any assistance, please contact Irfan Batur at ibatur@asu.edu

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