

Transportation Engineering Seminar Series

Vehicle-to-Barrier and High-speed Communications to Save Lives with Connectivity

Presentation Abstract

Vehicle-to-everything (V2X) connectivity technologies enable vehicles to communicate with each other, pedestrians, cyclists, vulnerable road users, and roadside infrastructure through advanced wireless communication solutions. V2X technology is expected to create a safer, more secure, and more efficient transportation system. This talk introduces two emerging paradigms, vehicle-to-barrier (V2B) technology and millimeter-wave (mmWave) high-speed communication, to reach this vision.

Vehicle-to-barrier (V2B) technology enables communication between vehicles and next-generation roadside barriers with a focus on reducing run-off-road crashes, which account for over half of the traffic fatalities in the U.S. Reliable V2B channels can provide real-time data to (semi-) autonomous vehicles for improved decision-making. However, the characteristics of the V2B channel are not yet well understood.

Additionally, mmWave communication, part of 5G and WiFi standards, offers multi-gigabit-per-second (Gbps) speeds through broader bandwidth allocation—sometimes dubbed as wireless fiber. Multi-Gbps links can revolutionize V2X applications by enabling real-time data exchange for autonomous driving, safety, and traffic management applications. Despite its potential, mmWave poses unique technical challenges in mobile settings. This talk will discuss advancements in both V2B and mobile mmWave technologies.

About the Speakers



Mehmet Can (John) Vuran received his B.Sc. in Electrical and Electronics Engineering from Bilkent University, Ankara, Turkey 2002. He received his M.S. and Ph.D. in Electrical and Computer Engineering from Georgia Institute of Technology in 2004 and 2007, respectively. He is the Dale M. Jensen Professor of Computing in the School of Computing at the University of Nebraska-Lincoln. Dr. Vuran received an NSF CAREER award in 2010 for “Bringing Wireless Sensor Networks Underground” and was named a “highly cited researcher in Computer Science” three years in a row by Thomson Reuters “in recognition of ranking among the top 1% of researchers for most cited documents in Computer Science”. He is a National Strategic Research Institute (NSRI) Fellow and a Daugherty Water for Food Global Institute (WFI) fellow. Dr. Vuran is a co-author of the

Wireless Sensor Networks textbook, TPC Co-Chair of IEEE INFOCOM 2020, and an editor in IEEE Transactions on Wireless Communications, IEEE Transactions on Mobile Computing, and IEEE Communications Surveys and Tutorials Journal. His research interests include the 6G Internet of Things, V2X connectivity and sensing, underground communications, cognitive radio networks, and cyber-physical networks.

Please join us in person:

Friday, October 18, 2024

11:00 - 11:50 AM Central Time

Kiewit Hall (KH) Room A510, Lincoln

Peter Kiewit Institute (PKI) Room 160, Omaha (remote)

External guests may join via Zoom:

Connect at: <https://unl.zoom.us/j/98630335322>