DEPARTMENT OF MECHANICAL ENGINEERING COLLOQUIUM

UNIVERSITY OF CALIFORNIA
UC RIVERSIDE

The Department of Mechanical Engineering

PRESENTS

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Friday, November 2, 2018
Winston Chung Hall 205/206
11:10-12:00PM

Congestion in Large-Scale Transportation Networks: Analysis and Control

Abstract:
Fluid-like models and their discretizations like the Cell Transmission Model (CTM), have proven successful in modeling traffic networks. However, given the complexity of the dynamics, it is not surprising that the stability properties of these models, especially in congested regimes, are not yet well characterized. The first part of this talk will utilize an analogy between discetized fluid-like traffic flow models and a class of chemical reaction networks to study the existence and stability of congested steady states in networks with arbitrary toplogies. The second part of this talk will consider compositional design approaches to mitigate congestion in large-scale transportation networks by describing a scalable distributed design that uses only local information to limit the propagation of congestion in the network.

About the Speaker:
Vijay Gupta is a Professor of Electrical Engineering at the University of Notre Dame, having joined the faculty in January 2008. He also serves as the Associate Chair and the Director for Graduate Studies in the Department. He received his B. Tech degree at Indian Institute of Technology, Delhi, and his M.S. and Ph.D. at California Institute of Technology, all in Electrical Engineering. Prior to joining Notre Dame, he also served as a research associate in the Institute for Systems Research at the University of Maryland, College Park, and as a consultant at the United Technologies Research Center. He received the 2013 Donald P. Eckman Award from the American Automatic Control Council and a 2009 National Science Foundation (NSF) CAREER Award. He was the faculty advisor of a finalist for the Best Student Paper award at the American Control Conference, 2015, and was an invited plenary speaker at the American Control Conference 2014. Gupta's research and teaching interests are at the interface of communication, control, distributed computation, and incentive design with applications to transportation networks, power grid, and water networks.