October 18, 2024

Elevating the Performance of the Built Environment through Cyberphysical Systems

ABSTRACT: The increasing number of sensing and information technologies being integrated into our built environment is a driving force of smart cities. Fundamentally, smart city solutions are part of the broader family of cyber-physical systems (CPS) that embed cloud-enabled sensors and actuators in physical systems with cloud-based data analytics used to enhance system performance. The introduction of CPS architectures into the infrastructure domain offers a historic opportunity for the civil engineering profession to serve as the technological leaders of smart cities. This presentation gives a review of experiences in the design and deployment of CPS architectures into real-world operational infrastructure systems. First, a CPS framework for the asset management of bridges in a highway corridor will be introduced. Computer vision for traffic tracking is combined with bridge monitoring systems to quantitatively assess structural health and performance by linking measurement of traffic loads and bridge responses. Second, extensions of the CPS framework illustrated on bridges are explored to assess the use and benefits of social infrastructure in cities such as parks and public spaces. The talk concludes with an outlook for the future opportunities for the impact of CPS in other smart city applications.

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Rockwell Lecture Series Details

Friday, October 18, 2024 2:30pm – 4:00pm

UH Campus Classroom & Business Building Room CBB 104

Online via Teams https://www.cive.uh.edu/research/beyer-distinguished-lecture

BIOGRAPHY: Dr. Jerome Lynch is the Vinik Dean of Engineering and Fitzpatrick Family University Distinguished Professor of Engineering at Duke University. Prior to joining Duke in 2022, he was a tenured faculty member in the Department of Civil and Environmental Engineering at the University of Michigan including serving as the Department Chair of Civil and Environmental Engineering. Dr. Lynch's research interests are in advancing cyber-physical system (CPS) architectures that combine sensing, computing, and controls to create intelligent infrastructure systems. He is best known for his research portfolio in structural health monitoring. He was the founding Director of the University of Michigan Urban Collaboratory, a cross-campus research institute that facilitates close collaboration with city stakeholders to prototype solutions to community challenges using information technologies and socially engaged design methods. Dr. Lynch’s impact has been recognized by several honors including the 2009 Presidential Early Career Award for Scientists and Engineers, 2012 ASCE Leonardo da Vinci Award, and 2014 ASCE Huber Award. He was also elected Fellow of the ASCE Engineering Mechanics Institute in 2021. Dr. Lynch completed his graduate studies at Stanford University where he received his Ph.D. in Civil and Environmental Engineering, M.S. in Civil and Environmental Engineering, and M.S. in Electrical Engineering. Dr. Lynch also received his B.E. in Civil and Environmental Engineering from the Cooper Union.