CASE SCHOOL OF ENGINEERING
CASE WESTERN RESERVE UNIVERSITY

Department of Civil and Environmental Engineering
Case Western Reserve University
Bingham Bldg. Room 208
10900 Euclid Ave
Cleveland, OH 44106

Civil and Environmental Engineering Department Seminar

How Smart Can Smart Cities Be? From Smart Devices to Integrated Urban Management

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Location: Nord 356

Abstract

In recent years, the IEEE has stood up a cross-cutting Smart Cities initiative. To organize its efforts, it has identified the 7 application domains of Energy, Water, Mobility, Healthcare, Food, Waste, and Government. These are investigated through the five functional domains of Sensor & Device Design, Communications, Machine Learning, Control & Decision-Making Algorithms, and Systems Architecture. And yet, it remains unclear as to whether an infusion of ICT-enabled devices will meaningfully address the impending 21st-century challenges of population growth, urbanization, and global climate change. This presentation advocates for an integrated socio-technical engineering systems approach to the smart cities initiative. It argues that while Internet of Things technologies are necessary for understanding human needs and device-level actuation, they must ultimately be coordinated into closed-loop decision-making architectures that integrate the heterogeneity of multiple interdependent infrastructures, recognize multiple-time scales, and respect jurisdictional boundaries and authorities. To ground the discussion, the presentation will draw upon several case studies from the Laboratory for Intelligent Integrated Networks of Engineering Systems in the energy, water, and transportation sectors. Together, these studies show that while a city's many engineering systems have the potential to disrupt one another, they can also be harmonized to create sustainable city-wide synergies.

Speaker Bio: Prof. Amro M. Farid is currently an Associate Professor of Engineering at the Thayer School of Engineering at Dartmouth and Adjunct Associate Professor of Computer Science at the Department of Computer Science. He leads the Laboratory for Intelligent Integrated Networks of Engineering Systems (LIINES). The laboratory maintains an active research program in Smart Power Grids, Energy-Water Nexus, Electrified Transportation, Industrial Energy Management, Interdependent Smart City Infrastructures.

Prof. Farid received his Sc. B. in 2000 and his Sc. M. 2002 from the MIT Mechanical Engineering Department. He went onto complete his Ph.D. degree at the Institute for Manufacturing within the University of Cambridge (UK) Engineering Department in 2007. He has varied industrial experiences from the automotive, semiconductor, defense,

chemical, and manufacturing sectors. In 2010, he began his academic career as a visiting scholar at the MIT Technology Development Program.

Prof. Farid is also a Research Affiliate at the MIT Mechanical Engineering Department and the U. of Massachusetts Transportation Research Center. He has made active contributions to the MIT-Masdar Institute Collaborative Initiative, the MIT Future of the Electricity Grid Study, the IEEE Vision for Smart Grid Controls, and the Council of Engineering Systems Universities. He currently serves as Chair of IEEE Smart Cities R&D Technical Activities Committee, and Co-Chair of the IEEE Systems, Man & Cybernetics (SMC) Technical Committee on Intelligent Industrial Systems. He is a senior member of the IEEE and a member of the ASME and INCOSE.