



## Spring 2018 Seminar Series

### Limited-Communication Coordination of Large-Scale Networked Systems

THURSDAY MARCH 8, 2018

11:30 AM – HEC 450

The central role of cyber-physical systems in supporting critical economic infrastructure coupled with the emerging commercial and Battle Field Internet of Things (BF-IoT) is bringing together interconnected data-generating processes, people and devices that need to be coordinated and controlled. Coordinating the operation of ever-growing large scale networks offers new challenges, given various constraints on resources such as, energy, communication bandwidth, etc. The complex nature of emerging energy systems, for instance, present interesting challenges. For example, balancing electricity demand with supply in real-time is communication intensive given the two-way flow of information and power between providers and users. Specifically, each time a system operator transmits coordination signals to users, precious bandwidth is consumed. In this talk, I will introduce some challenges in the operation of power systems, and techniques we are developing to address them. Specifically, I will show how to coordinate allocation of electric power to users in a distribution system with optimized information flow, and without overloading the system capacity to avoid triggering an outage. I will also characterize the trade-off between our communication-efficient techniques and overall system performance. As I will highlight, the techniques we are developing are applicable to more general networked systems.

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Chinwendu Enyioha received the B.Sc. degree in Mathematics from Gardner-Webb University, Boiling Springs, NC, and the PhD degree in Electrical and Systems Engineering from the University of Pennsylvania, Philadelphia, PA. He is currently a Postdoctoral Fellow in Electrical Engineering at Harvard. Prior to arriving Harvard, he was a Postdoctoral Researcher in the GRASP Lab at the University of Pennsylvania. His research lies in the areas of network science, optimization and limited-communication control of distributed networked systems, with applications to cyber-physical systems and robotics. Dr. Enyioha is a Fellow of the Ford Foundation, was named a William Fontaine Scholar at the University of Pennsylvania and has, among others, received the Mathematical Association of America South-eastern Section Patterson prize.