Coordination Limits in Large Networks

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Abstract
The present day communication networks are rapidly evolving towards complex interconnections of heterogeneous modules with a diverse range of sensing, communicating, and decision-making functionalities. The collective behavior of these modules is shaped by their individual dynamics, their coupling structures, and the coordination among them. Common information-theoretic approaches often focus on delineating the fundamental limits of the individual modules when they are disengaged from the rest of the network. However, with the ever-increasing demand for proliferating network functionalities one is interested in describing the fundamental limits of the collective behavior of the network, especially when the modules have only local and imperfect views of the network. Coordination, often manifested as resource-consuming communication overhead, is desired to be minimal. In this talk I will introduce several recent theoretical and algorithmic advances for determining and establishing the minimum required coordination level among the modules in large wireless networks that warrants achieving an optimal performance for the network.

Biography
Ali Tajer received the B.Sc. and M.Sc. degrees in Electrical Engineering from Sharif University of Technology in 2002 and 2004. During 2007-2010 he was with Columbia University where he received the M.A. degree in Statistics and the Ph.D. degree in Electrical Engineering. During 2010-2012 he was a Postdoctoral Research Associate at Princeton University and an Adjunct Assistant Professor at Columbia University, and since 2012 he is an Assistant Professor of Electrical & Computer Engineering at Wayne State University. His research interests include information & communication theories, applied statistics, and estimation & detection theories. Dr. Tajer serves as an Associate Editor for the IEEE Transactions on Communications.