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Ming Hsieh Institute Seminar Series
Ming Hsieh Department of Electrical Engineering
Center for Systems and Control
CommNetS

If Agents Could Talk…What Should They Say?

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The goal in networked control of multiagent systems is to derive desirable collective behavior through the design of local control algorithms. The information available to the individual agents, either through sensing or communication, invariably defines the space of admissible control laws. Hence, informational restrictions impose constraints on the achievable performance guarantees. The first part of this talk will provide one such constraint with regards to the efficiency of the resulting stable solutions for a class of distributed submodular optimization problems. Further, we will also discuss how strategic information exchange can help mitigate these degradations. The second part of this talk will focus on how agents should utilize available information to optimize the efficiency of the emergent collective behavior. In particular, we will discuss a methodology for optimizing the efficiency guarantees (i.e., price of anarchy) in distributed resource allocation problems through the design of local agent objective functions. Lastly, we will highlight some unintended consequences associated with these optimal designed agent objective functions – optimizing the performance of the worst-case equilibria (i.e., price of anarchy) often comes at the expense of the best-case equilibria (i.e., price of stability).

Jason R. Marden is an Associate Professor in the Department of Electrical and Computer, Engineering at the University of California, Santa Barbara. Jason received a BS in Mechanical Engineering in 2001 from UCLA, and a PhD in Mechanical Engineering in 2007, also from UCLA, under the supervision of Jeff S. Shamma, where he was awarded the Outstanding Graduating PhD Student in Mechanical Engineering. After graduating from UCLA, he served as a junior fellow in the Social and Information Sciences Laboratory at the California Institute of Technology until 2010 when he joined the University of Colorado. In 2015, Jason joined the Department of Electrical and Computer Engineering at the University of California, Santa Barbara. Jason is a recipient of the ONR Young Investigator Award (2015), NSF Career Award (2014), the AFOSR Young Investigator Award (2012), the American Automatic Control Council Donald P. Eckman Award (2012), and the SIAM/SGT Best Sicon Paper Award (2015). Furthermore, Jason is also an advisor for the students selected as finalists for the best student paper award at the IEEE Conference on Decision and Control (2011, 2016, 2017). Jason's research interests focus on game theoretic methods for the control of distributed multiagent systems.