Mechanical Engineering Department Seminar

3:35pm October 25, 2017
1130 Mechanical Engineering
111 Church Street SE, Minneapolis, MN 55455

Statistical Moments and Communication Via Optimal Control

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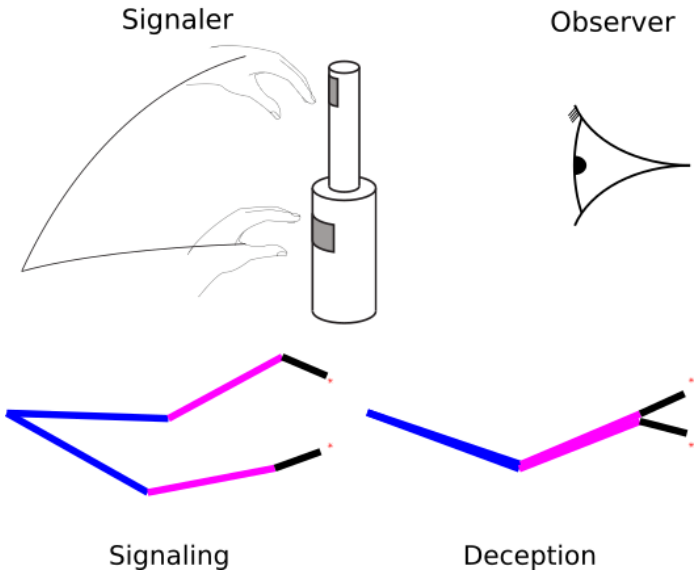
This talk will cover two topics: 1) Analysis of stochastic systems using linear optimal control methods, and 2) communication via control actions.

Stochastic dynamic systems model phenomena such as chemical reactions and mechanical systems with noise. It is often desirable to estimate statistical moments such as the mean and variance. The first half of the talk will describe a method for computing provable bounds on desired moments by solving linear optimal control problems.

Communication via control actions, such as movment, is called signaling. While most signaling problems are mathematically challenging, humans routinely signal during cooperative movements. The second half will present a tractable problem that models salient features of human signaling strategies. The problem consists of a signaler that reaches towards an unspecified target, and an observer that decides on the target location based on movement measurements. The optimal control scheme reproduces qualitative phenomena observed in human reaching experiments.



Bio: Andrew Lamperski received the B.S. degree in biomedical engineering and mathematics in 2004 from the Johns Hopkins University, Baltimore, MD, and the Ph.D. degree in control and dynamical systems in 2011 from the California Institute of Technology, Pasadena. He held postdoctoral positions in control and dynamical systems at the California Institute of Technology from 2011 - 2012 and in mechanical engineering at The Johns Hopkins University in 2012. From 2012 - 2014, did postdoctoral work in the Department of Engineering, University of Cambridge, on a scholarship from the Whitaker International Program. In 2014, he joined the Department of Electrical and Computer Engineering, University of Minnesota as an Assistant Professor. His research interests include optimal control and estimation, with applications to neuroscience and robotics.