Washington University in St. Louis

SCHOOL OF ENGINEERING & APPLIED SCIENCE

Preston M. Green Department of Electrical & Systems Engineering

Seminar Announcement

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Thursday, April 20, 2017
Green Hall, Room 0120
10:00 A.M.

Data-driven Analysis and Control of Large-scale Dynamical Systems

Abstract: While in past decades, modeling and control was mostly limited to exclusively one system, in recent years we are seeing a significant shift towards populations of systems and even more general large-scale dynamical systems in virtually all of the applied sciences. In this talk, I will first describe ongoing projects dealing with different control and estimation tasks for populations of dynamical systems. These range from the design of improved pulse treatment strategies for cancer to the optimal estimation of relaxation rates in MRI. I will then go on to highlight how the general framework of population systems can be fitted into an even broader framework in which a decision-making model for large-scale systems based on a compression/expansion architecture is considered. This decision-making model has further points of contacts with e.g. Data Science, Neuroscience, and, Biomechanics, and is closely linked to a fundamental systems theoretic concept, called aggregation. I will demonstrate how the exploration of this link will pave the way for identifying crucial dynamical features of the considered large-scale systems from recorded measurement data only, which will also facilitate the control of large-scale systems by simple and robust feedback mechanisms.

Bio: Shen Zeng studied at the University of Stuttgart, Germany, and received degrees in Engineering Cybernetics, Mechatronics and Mathematics. He received the Ph.D. degree in Engineering in 2016 from the University of Stuttgart, and is currently a postdoctoral researcher and lecturer there.

Host: R. Martin Arthur