

**The Department of  
Mechanical Engineering**

PRESENTS

***Mihailo Jovanovic, Ph.D.***

Professor

Ming Hsieh Department of Electrical Engineering  
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**Friday, October 05, 2018**  
**WCH Room 205/206**  
**11:10-12:00PM**

***Dynamics and control of distributed autonomous systems*****Abstract:**

In the first part of the talk, we examine fundamental limitations arising from the use of local feedback in autonomous systems subject to stochastic disturbances. For vehicular formation control problems in topology of regular lattices we show that it is impossible to have coherent large formations, that behave like rigid lattices, in one and two spatial dimensions. Yet we prove that this is achievable in 3D. The observed phenomenon is a consequence of the fact that, in 1D and 2D, local feedback laws are ineffective in guarding against disturbances with large spatial wavelength. We provide connections with several other problems including distributed averaging algorithms, global mean first passage time of random walks, effective resistance in electrical networks, and statistical mechanics of harmonic solids.

**About the Speaker:**

Mihailo Jovanovic is a professor in the Ming Hsieh Department of Electrical Engineering and the founding director of the Center for Systems and Control at the University of Southern California. He was a faculty in the Department of Electrical and Computer Engineering at the University of Minnesota, Minneapolis, from December 2004 until January 2017, and has held visiting positions with Stanford University and the Institute for Mathematics and its Applications. His current research focuses on large-scale and distributed optimization, design of controller architectures, dynamics and control of fluid flows, and fundamental limitations in the control of large networks of dynamical systems. He serves as an Associate Editor of the IEEE Transactions on Control of Network Systems, and had served as the Chair of the APS External Affairs Committee, a Program Vice-Chair of the 55th IEEE Conference on Decision and Control, an Associate Editor of the SIAM Journal on Control and Optimization (from 2014 until 2017), and an Associate Editor of the IEEE Control Systems Society Conference Editorial Board (from 2006 until 2010). Prof. Jovanovic is a fellow of APS and a senior member of IEEE. He received a CAREER Award from the National Science Foundation in 2007, the George S. Axelby Outstanding Paper Award from the IEEE Control Systems Society in 2013, and the Distinguished Alumni Award from UC Santa Barbara in 2014.