

UTC INSTITUTE FOR ADVANCED SYSTEMS ENGINEERING Seminar Series

Monday October 22rd, 2018

1:00 - 2:00PM

UConn, Storrs Campus – IPB 203

[To view live webcast click here](#)

Synchronized Networks using Delayed Self-Reinforcement

Synchronization is important in many multi-agent networks including velocity synchronization to maintain inter-vehicle spacing in connected automated transportation systems, alignment synchronization to help maintain formations during maneuvers of flocks and swarms in nature, and maintaining formation of engineered networks such as satellites, unmanned autonomous vehicles and collaborative robots. However, a challenge to synchronization is that information about the desired response (such as the desired orientation or speed) might be available to only a few agents. The desired-response information needs to be propagated through the network to other agents, which results in response-time delays between agents that are “close to” the information source and those that are “farther away.” These response-time delays lead to loss of synchronization between agents, especially during rapid network maneuvers. The talk will present a delayed self-reinforcement (DSR) approach, where each individual augments its neighbor-based information update using its previously available updates, to (i) increase the information-transfer rate without requiring an increased, individual update-rate; (ii) enable superfluid-like information transfer seen in biological systems; and (iii) improve synchronization. Such improvements in network synchronization can enable better understanding of cohesiveness of flocking in nature, as well as improve the performance of engineered swarms such as unmanned mobile systems.

Santosh Devasia

Santosh Devasia the B.Tech (Hons) from the Indian Institute of Technology, Kharagpur, India, in 1988, and the M.S. and Ph.D. degrees in Mechanical Engineering (ME) from the University of California at Santa Barbara in 1990 and 1993 respectively. He is the Director of the Boeing Advanced Research Center (BARC) at the University of Washington (UW) <https://depts.washington.edu/barc/> and a Professor of Mechanical Engineering at the UW, Seattle, where he joined in 2000 after teaching from 1994 to 2000 in the ME Department at the University of Utah, Salt Lake City. He served as the Associate Chair of the ME Department at UW from 2010-2013, and as the Associate Dean of Research and Faculty Affairs in the College of Engineering at UW from 2013-2017. He is the General Chair for the 2020 American Control Conference. He is a fellow of ASME. His current research interests include control of multi-agent systems, including precision human machine systems.

Additional details of current efforts can be found at <http://faculty.washington.edu/devasia/>

Keywords: Multi-agent systems, Network theory, Synchronization

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