

# SEMINAR NOTICE

Department of Electrical and Systems Engineering

## Scaling Laws for Distributed Inference in Random Fusion Networks

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**Abstract:** The classical framework on distributed inference considers a set of nodes taking measurements and a fusion center making the final decision on the underlying phenomenon. For modern wireless fusion networks, the cost of transporting sensor measurements to the fusion center is a key design parameter. In particular, it is of theoretical and practical significance to have appropriate scaling of the total communication cost with the network size.

We present scaling laws for total communication cost in random fusion networks for distributed inference using correlated measurements. We show that the classical fusion policy of forwarding all the raw data to the fusion center is not scalable, and scalable fusion hinges on the paradigm of in-network processing which exploits the statistical model of the measurements. For inference of Markov random fields with stabilizing Euclidean graphs, we present optimal and suboptimal scalable fusion policies whose total communication cost grows only linearly with the network size. We also show the effect of sensor location distribution on the total communication cost.

This is joint work with Lang Tong, Joseph Yukich, Ananthram Swami, Anthony Ephremides and Alan Willsky.

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Host: R. Martin Arthur

**Bio:** Anima Anandkumar received her B.Tech in Electrical Engineering from the Indian Institute of Technology Madras in 2004. She is a PhD student in Electrical Engineering at Cornell University, Ithaca, NY. Since Fall 2008, she is visiting the Stochastic Systems Group at MIT, Cambridge, MA. Her research interests are in the area of statistical-signal processing, networking and information theory. She has worked on inference of graphical models, random-access algorithms and transaction tracking in distributed systems. She is the recipient of the IEEE Signal Processing Society (SPS) 2008 Young Author award, 2007-08 IBM Fran Allen PhD fellowship, 2006-07 Google Anita Borg award finalist and the student paper award at the 2006 Intl. Conf. on Acoustic, Speech and Signal Processing (ICASSP).