



## ICWS Seminar Series



### **WIRELESS NETWORK CODING WITH LOCAL NETWORK VIEWS**

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141 Coordinated Science Lab / 3:00 p.m.

**Abstract:** "If we know more, we can achieve more." This adage also applies to communication networks, where more information about the network state translates into higher sum rates. In this talk, we formalize and investigate this increase of sum-rate with increased knowledge of the network state. In particular, we focus on the case that each source-destination pair has enough information to perform optimally when other pairs do not interfere, however beyond that they only know the connectivity of the network (i.e., not the channel gains). We investigate the information-theoretic limits of communication with such limited knowledge at the nodes (called 1-local view). We develop a novel transmission strategy that solely relies on 1-local view at the nodes and incorporates three different techniques: (1) per layer interference avoidance, (2) repetition coding to allow overhearing of the interference, and (3) network coding to allow interference neutralization. We show that our proposed scheme can provide a significant throughput gain compared with the conventional interference avoidance strategies. Furthermore, we show that our strategy maximizes the achievable normalized sum-rate for some classes of networks, hence, characterizing the normalized sum-capacity of those networks with 1-local view. This work is in collaboration with Alireza Vahid, Vaneet Aggarwal, and Ashu Sabharwal.

**Biography:** Salman Avestimehr is currently an assistant Professor at the School of Electrical and Computer Engineering at Cornell University. He has been a faculty at Cornell University since 2009. He received his Ph.D. in 2008 and M.S. degree in 2005 in Electrical Engineering and Computer Science, both from the University of California, Berkeley. Prior to that, he obtained his B.S. in Electrical Engineering from Sharif University of Technology in 2003. He was also a postdoctoral scholar at the Center for the Mathematics of Information (CMI) at Caltech in 2008. He has received a number of awards including the Presidential Early Career Award for Scientists and Engineers (PECASE) in 2011, Young Investigator Program (YIP) award from the U.S. Air Force Office of Scientific Research (AFOSR) in 2011, the NSF CAREER award in 2010, the David J. Sakrison Memorial Prize from the U.C. Berkeley EECS Department in 2008, and the Vodafone U.S. Foundation Fellows Initiative Research Merit Award in 2005. His research interests include information theory, communications, and networking.