**When:**          **Friday 15:00 – 16:00**
**Where:**          **HRBB 204**
**Coordinator:**  **Xiaoning Qian** (xqian@ece.tamu.edu)

**Speaker:**     **Prof. Tie Liu**

Associate Professor
Department of Electrical & Computer Engineering
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Texas A&M University

**Title:**          **Info-Clustering: An Information-Theoretic Paradigm for Data Clustering**

**Date:**          **10-07-2016**

**Abstract:**  The problem of clustering random variables is considered from an information-theoretic perspective. A new paradigm that utilizes the notion of multivariate mutual information is proposed. We show that the choice of a multivariate mutual information measure inspired by the classical problem of multi-terminal secret key agreement leads to clustering solutions that are guaranteed to be hierarchical. Furthermore, we show that the clustering solutions can be computed in strongly polynomial time (under the entropy oracle) via submodular function optimizations. Finally, we demonstrate that under the well-known Chow-Liu tree approximation on the joint distribution of the random variables, the proposed clustering solutions reduce to those of clustering by mutual information relevance networks, a well-known algorithm for discovering functional genomic clusters in computational biology.

**Biography:** Tie Liu was born in Jilin, China in 1976. He received his B.S. (1998) and M.S. (2000) degrees, both in Electrical Engineering, from Tsinghua University, Beijing, China and a second M.S. degree in Mathematics (2004) and Ph.D. degree in Electrical and Computer Engineering (2006) from the University of Illinois at Urbana-Champaign. Since August 2006 he has been with Texas A&M University, where he is currently an Associate Professor with the Department of Electrical and Computer Engineering. His primary research interest is in the area of information theory and statistical information processing.

Dr. Liu received an M. E. Van Valkenburg Graduate Research Award (2006) from the University of Illinois at Urbana-Champaign and a CAREER Award (2009) from the National Science Foundation. He was a Technical Program Committee Co-Chair for the 2008 IEEE GLOBECOM and a General Co-Chair for the 2011 IEEE North American School of Information Theory. He currently serves as an Associate Editor for Shannon Theory for the IEEE Transactions on Information Theory.