1154-60-2206 **Abishek Sankararaman***, abishek@utexas.edu, and **Emmanuel Abbe** and **Francois Baccelli**.
Community Detection on Euclidean Random Graphs.

In this talk, we consider the problem of community detection on Euclidean random geometric graphs where each vertex has two latent variables: a binary community label and a $\mathbb{R}^d$ valued location label which forms the support of a Poisson point process of intensity λ. A random graph is then drawn with edge probabilities dependent on both the community and location labels. In contrast to the stochastic block model (SBM) that has no location labels, the resulting random graph contains many more short loops due to the geometric embedding. We consider the recovery of the community labels, partial and exact, using the random graph and the location labels. We establish phase transitions for both sparse and logarithmic degree regimes, and provide bounds on the location of the thresholds, conjectured to be tight in the case of exact recovery. We also show that the threshold of the distinguishability problem, i.e., the testing between our model and the null model without community labels exhibits no phase-transition and in particular, does not match the weak recovery threshold (in contrast to the SBM). (Received September 17, 2019)