Feb. 1    **Ngoc Tran**, UC Berkeley

*Hopfield networks and the implanted clique problem*

Hopfield networks were introduced in 1982 by Hopfield as a model for the way the brain stores memory. However, the maximal number of "memory patterns" this parameterized network can store remains an open problem. In this work, we prove necessary and sufficient conditions for the existence of a Hopfield network which can store all cliques of size $m \leq k \leq M$ in a graph on $d$ vertices as "memory patterns" of a Hopfield network for a given triple $(m, M, d)$. As a result, we can explicitly construct Hopfield networks which have exponential many memory patterns. Secondly, we utilize Hopfield networks to solve the planted clique problem for fixed, known clique size.

Joint work with Christopher Hillar.