

**Speaker: Jianqing Fan**

**Title: Penalized Likelihood with NP-Dimensionality**

**Abstract:** Penalized likelihood methods are fundamental to ultra- high-dimensional variable selection. How high a dimension can such methods handle? What are the roles of penalty functions? How to analyze ultra- high-dimensional data and what are possible spurious relations due to ultra-high dimensionality? This talk will provide some insights into these problems. The focus will be on model selection consistency and oracle properties for a class of penalized likelihood approaches using folded-concave penalty functions. The advantages over convex penalty functions will be clearly demonstrated. Coordinate optimization is implemented for finding the solution paths, whose performance is evaluated by simulation examples and the analysis of a real data set. Recent results on independence screening will also be summarized.