Indiana University-Purdue University Indianapolis

Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, October 30, 2018
LD 265

Speaker: **Haixia Li**
Department of Mathematical Sciences, IUPUI

Title: **Limit of the Smallest Eigenvalue of a Large Dimensional Sample Covariance Matrix**

Abstract:

In this paper, the authors show that the smallest (if $p \leq n$) or the $(pn+1)$-th smallest (if $p > n$) eigenvalue of a sample covariance matrix of the form $(1/n)XX^{\intercal}$ tends almost surely to the limit $(1\sqrt{y})^2$ as $n \to \infty$ and $p/n \to y \in (0, \infty)$, where X is a $p \times n$ matrix with iid entries with mean zero, variance 1 and fourth moment finite. Also, as a by-product, it is shown that the almost sure limit of the largest eigenvalue is $(1+\sqrt{y})^2$, a known result obtained by Yin, Bai and Krishnaiah. The present approach gives a unified treatment for both the extreme eigenvalues of large sample covariance matrices.