Stanford University
Department of Statistics

DEPARTMENTAL SEMINAR

4:15pm, Tuesday, September 11, 2012
Sequoia Hall Room 200

Speaker:  Bala Rajaratnam, Stanford University

Title:  Regularization of positive definite matrices:
connections between algebra, graph theory & statistics

Abstract:

Positive definite (p.d.) matrices arise naturally in many areas within mathematics and also feature extensively in scientific applications, including the earth sciences and biomedical sciences. In modern high-dimensional applications, a common approach to finding sparse positive definite matrices is to threshold their small off-diagonal elements. This thresholding, sometimes referred to as hard-thresholding, sets small elements to zero. Thresholding has the attractive property that the resulting matrices are sparse, and are thus easier to interpret and work with. In many applications, it is often required, and thus implicitly assumed, that thresholded matrices retain positive definiteness. In this paper we formally investigate the algebraic properties of positive definite matrices which are thresholded. Some interesting and unexpected results will be presented. If time permits, probabilistic properties of thresholded positive definite matrices and connections to optimization will also be discussed.

(The presentation will be based on results from three papers: the first based on work by the speaker and D.Guillot, the second based on the work by the speaker, B.Naul, D.Guillot and A.Hero, and the third by the speaker.)