**Stanford University**
Departments of Mathematics and Statistics

**Probability Seminar**

*** Special Event ***

4:30pm, Wednesday, October 12, 2016
Sequoia Hall Room 200
Cookies served at 4pm, 1st floor Lounge.

**Speaker:** Piotr Nayar  
*Wharton Statistics Department,*  
*University of Pennsylvania*

**Title:** Gaussian mixtures with applications to Khinchine inequalities, information theory and convex geometry

**Abstract:**

We say that a symmetric random variable $X$ is a Gaussian mixture if $X$ has the same distribution as $YG$, where $G$ is a standard Gaussian random variable, and $Y$ is a positive random variable independent of $G$. We use this simple notion to study certain Schur convexity properties of $p$-th moments for weighted sums of independent random variables. This gives, in particular, optimal Khinchine inequalities for Gaussian mixtures. The Shannon entropy of sums of independent random variables is also studied.

In the second part of the talk we investigate, using Gaussian mixtures, several topics coming from convex geometry, such as the so-called $B$-inequality, correlation conjecture, and extremal sections and projections of $B^n_p$ balls. We mention several open problems.

This is based on joint work with Alexandros Eskenazis and Tomasz Tkocz.