



THE UNIVERSITY OF
CHICAGO

Department of Statistics
STATISTICS COLLOQUIUM

ZHOU FAN

Department of Statistics
Stanford University

Eigenvalues in Multivariate Random Effects Models

MONDAY, January 22, 2018 at 4:30 PM

Eckhart 133, 5734 S. University Avenue

Refreshments before the seminar at 4:00PM in Jones 111

ABSTRACT

Random effects models are commonly used to measure genetic variance-covariance matrices of quantitative phenotypic traits in a population. The eigenvalues of these matrices describe the evolutionary response of the population to selection. However, they may be difficult to estimate from limited samples when the number of traits is large. I will discuss several phenomena concerning the eigenvalues of classical MANOVA estimators in such high-dimensional settings, including dispersion of the bulk eigenvalue distribution, bias and aliasing of large "spike" eigenvalues, and Tracy-Widom limits at the spectral edges. I will then describe a new statistical procedure that uses these results to consistently estimate the large population eigenvalues in a high-dimensional regime. The proofs apply and extend techniques in random matrix theory and free probability, which I will also briefly describe.

This is joint work with Iain M. Johnstone, Yi Sun, Mark W. Blows, and Emma Hine.

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