Meeting: 1003, Atlanta, Georgia, SS 38A, AMS-SIAM Special Session on Orthogonal Polynomials—Random Matrices—Integrable Systems: Interdisciplinary Aspects, I

1003-60-1028 **Jack W Silverstein*** (jack@math.ncsu.edu), Department of Mathematics, Box 8205, North Carolina State University, Raleigh, NC 27695-8205. *Extreme Eigenvalues of Large Dimensional Sample Covariance Matrices.*

The talk will outline recent work on the extreme eigenvalues of a subclass of matrices of sample covariance type. The general class is of the form $B_p = (1/n)T_p^{1/2}X_pX_p^*T_p^{1/2}$, where $X_p = (X_{ij})$ is $p \times n$ with i.i.d. complex standardized entries, and $T_p^{1/2}$ is a Hermitian square root of the nonnegative definite Hermitian matrix T_p. This matrix can be viewed as the sample covariance matrix of n i.i.d. samples of the p dimensional random vector $T_p^{1/2}{}_{\cdot 1}$. It is known that if $p/n \to c > 0$ and the empirical distribution function (e.d.f.) of the eigenvalues of T_p converge as $p \to \infty$, then the spectral e.d.f. of B_p converges a.s. to a nonrandom limit. This result is relevant in situations in multivariate analysis where the vector dimension is large, but the number of samples to adequately approximate the population matrix cannot be attained. The subclass consists of B_p where all but a finite number of eigenvalues of T_p are 1, which has been called the "spike population model". Results are obtained for the limiting behavior of those eigenvalues of B_p which correspond to the population ones which deviate from 1 (joint work with Jinho Baik at U. of Michigan). (Received October 02, 2004)