



**Title:** Bayesian Analysis of the Covariance Matrix of a Multivariate Normal Distribution with a New Class of Priors

**Date/Time:** October 5, 2018 10:30 AM to Noon (ET)

**Speakers:** Dongchu Sun, University of Missouri-Columbia

**Chair:** Terrance Savitsky

**Sponsor:** WSS Methodology

**Abstract:** Bayesian analysis for the covariance matrix of a multivariate normal distribution has received a lot of attention in the last two decades. In this paper, we propose a new class of priors for the covariance matrix, including both inverse Wishart and reference priors as special cases. The main motivation for the new class is to have available priors both subjective and objective that do not force eigenvalues apart, which is a criticism of inverse Wishart and Jeffreys priors. Extensive comparison of these “shrinkage priors” with inverse Wishart and Jeffreys priors is undertaken, with the new priors seeming to have considerably better performance. A number of curious facts about the new priors are also observed, such as that the posterior distribution will be proper with just three vector observations from the multivariate normal distribution regardless of the dimension of the covariance matrix and that useful inference about features of the covariance matrix can be possible. Finally, a new MCMC algorithm is developed for this class of priors and is shown to be computationally effective for matrices of up to 100 dimensions. This is joint work with James O. Berger and Chengyuan Song.

**Location:** Bureau of Labor Statistics Janet Norwood Conference Center, Room 9

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