

# STATISTICS SEMINAR

Kun Chen, Ph.D.

University of Connecticut

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Dickens Hall, Room 207, 4:00-5:00 pm

Refreshments: Dickens 108, 3:30-4:00 pm



## On Sparse and Low-rank Estimation in High Dimensions

In various fields of scientific research such as genomics and economics, massive amount of data are routinely generated and many associated statistical problems can be cast in the framework of multivariate regression, where both the responses and predictors are possibly of high dimensionality. The low-rank structure in the regression coefficient matrix is of intrinsic multivariate nature, which, when further combined with other attractive structures such as sparseness, can further lift dimension reduction and facilitate model interpretation. In this talk, I will review some recent developments on low-rank estimation, including the model complexity problem and the robust estimation problem. We then propose a unified approach to estimate a low-dimensional factor structure represented by a sparse singular value decomposition of the coefficient matrix. The problem is formulated as an orthogonality constrained optimization with flexible forms of sparsity-inducing regularization. An efficient computation algorithm using the alternating direction method of multipliers is developed, and nonasymptotic error bounds for our estimator are established. The efficacy of the proposed method is demonstrated through simulation studies and an application to eQTL data analysis.