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*SNR Estimation in High-dimensional Linear Models with  
Heterogeneous Noise*

**Wednesday, September 20, 2023**

**11:50 AM**

**110 Frelinghuysen Road, Hill Center, Room 552**

**Zoom Meeting: Meeting ID: 943 6913 4974**

**Password: 914221**

<https://rutgers.zoom.us/j/94369134974?pwd=RGhlNHRISlJEQUlmaFBBSi83bjlXZz09>

**Abstract:** Estimation of signal-to-noise ratios in high-dimensional linear models has various important applications including, e.g. heritability estimation in bioinformatics. One commonly used estimator, usually referred to as REML, is based on the likelihood of the random effects model, in which both the regression coefficients and the noise variables are respectively assumed to be i.i.d. Gaussian random variables. In this talk, we will discuss the consistency and asymptotic distribution of standard REML estimators of SNR in presence of heterogeneous noise, and show how to correct the confidence intervals by a measure of heterogeneity. Moreover, we also discuss the asymptotic properties of REML estimators of SNR under model misspecification, in which the actual regression coefficients follow a fixed effect model, while the population covariance of predictors is isotropic. Our work demonstrates the usefulness of random matrix theory for statistical inference under heterogeneity. This is a joint work with my student Xiaohan Hu.

**Bio:** Xiaodong Li is an associate professor in the statistics department at UC Davis. He is mainly interested in theory and methods in high-dimensional statistics and learning, particularly the interaction between optimization and statistics. His research interests include high-dimensional inference, network analysis, matrix factorization and completion, and inverse problems in signal processing. Prof. Li has received various awards including NSF Career Award, 2019 Information Theory Paper Award, and 2022-23 UC Davis Chancellor's Fellow. He is currently serving as an associate editor for Journal of Multivariate Analysis.

