

# COLLOQUIUM

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## **Tests for High Dimensional Regression Coefficients with Factorial Designs**

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10:20 a.m. - 11:10 a.m.  
Refreshments: 10:00 a.m.

### **Abstract**

We propose simultaneous tests for coefficients in high dimensional linear regression models with factorial designs. This is motivated by the latest need in genetic studies to identify signi-

cant sets of genes which are associated with certain clinical outcomes, rather than identifying individual genes. The proposed tests are designed for the ‘large  $p$ , small  $n$ ’ situations where the conventional F-test is no longer applicable. We evaluate the power of the F-test for models of moderate dimension. We also provide some results for the high dimensional U- statistics and derive the asymptotic distributions of the proposed test statistic under the high dimensional null hypothesis and various scenarios of the alternatives. The proposed tests are employed to analyze a microarray data set on Yorkshire Gilts to

and significant gene ontology terms which are significantly associated with the thyroid hormone after accounting for the designs of the experiment.

To improve the power of the proposed tests when the signal in the data is sparse, we propose a hard threshold method which removes data components unless their signal exceed some threshold. I will present results with regard to the hard threshold test for high dimensional means of non-normal and dependent data.

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