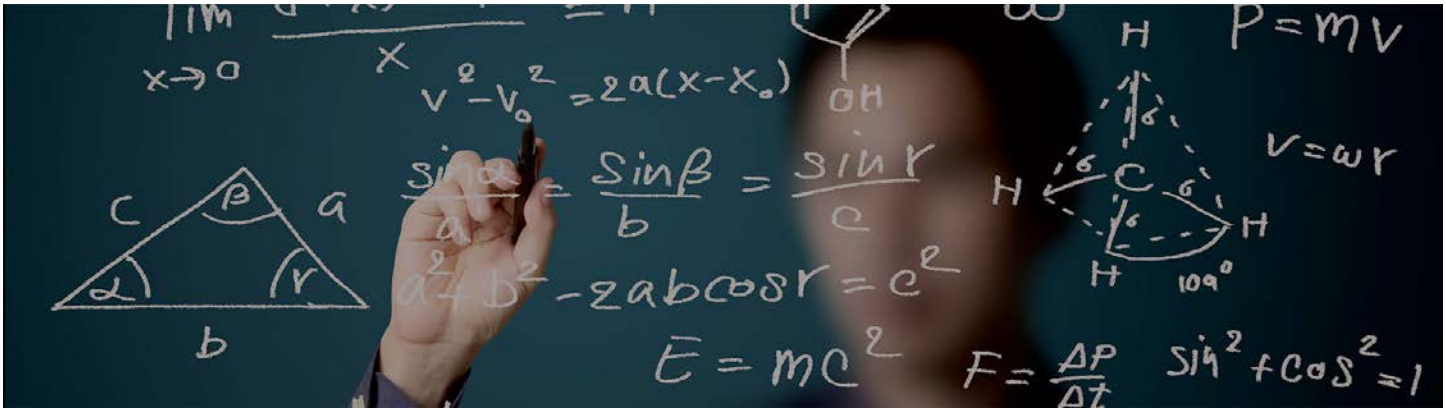

Fall 2019

RENSSELAER POLYTECHNIC INSTITUTE

DEPARTMENT OF MATHEMATICAL SCIENCES COLLOQUIUM

Uncertainty quantification and active sampling for low-rank matrices

Abstract: We present a new statistical framework to quantify uncertainty (UQ) for recovering low-rank matrices from incomplete and noisy observations. We further develop a sequential active sampling approach guided by the uncertainties. The motivation comes from two related and widely studied problems, matrix completion, which aims to recover a low-rank matrix X from a partial, noisy observation of its entries, and low-rank matrix recovery, which recovers X from a set of linear combination its entries with additive noise. The proposed framework reveals several novel insights on the role of coherence and uncertainty quantification for noisy matrix completion and recovery. Using such insights, we develop an efficient posterior sampler for UQ, which is then used to guide a closed-form sampling scheme for matrix entries. We showed the competitive performance of this integrated sampling / UQ methodology in simulation studies and applications to collaborative filtering and imaging compared with existing approaches. This is joint work with Simon Mak at Duke University and Shaowu Yuchi at Georgia Tech.

Yao Xie (Georgia Institute of Technology)

Monday, November 25, 2019

Amos Eaton 216 @ 4-5pm

Refreshments served 3:30-4pm Amos Eaton 4th Floor Lounge