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DEPARTMENT OF STATISTICS AND BIOSTATISTICS

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Approximate Message Passing and its Application in Communications and Signal Processing

October 11, 2017
3:20 – 4:20pm
Light refreshments will be served
110 Frelinghuysen Road
Hill Center, Room 552

Abstract: Approximate Message Passing or AMP is a class of low complexity, scalable algorithms used to solve high-dimensional noisy linear regression problems where the goal is to estimate a vector x from a noisy measurement y = Ax + e. AMP has the attractive feature that its performance, measured for example by the squared error loss, can be tracked accurately by a scalar iteration referred to as state evolution.

In this talk, I will present recent performance guarantees for analysis of the algorithm under various problem conditions and I will introduce applications of the algorithm in communications and signal processing. In particular, I will show how it can be used as a low-complexity, capacity-achieving decoder for sparse regression codes over Shannon's additive white Gaussian noise channel and for efficient image and video reconstruction for signals with dependencies modeled by a Markov random field prior.

Joint work with Ramji Venkataramanan, Adam Grieg, Dror Baron, and Yanting Ma.

Bio My name is Cynthia Rush and I am an Assistant Professor in the Department of Statistics at Columbia University. Originally from North Carolina, I completed my undergraduate coursework at the University of North Carolina at Chapel Hill where I obtained a B.S. in Mathematics and in May, 2016, I received my Ph.D. from Yale University under the supervision of Andrew Barron.