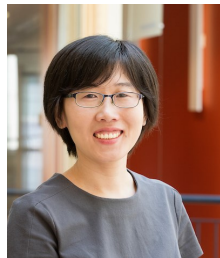


Rutgers ECE Colloquium**Preconditioning Helps: Faster Convergence
in Statistical and Reinforcement Learning**

Wednesday, November 18, 2020 | 10:00 AM | Held via Webex

**Yuejie Chi, PhD**Associate Professor
Electrical and Computer Engineering,
Carnegie Mellon University**Abstract:**

Exciting progresses have been made in demystifying the efficacy of vanilla gradient methods in solving challenging nonconvex problems in statistical estimation and machine learning. In this talk, we discuss how the trick of preconditioning further boosts the convergence speed with minimal computation overheads through two examples: low-rank matrix estimation in statistical learning and policy optimization in entropy-regularized reinforcement learning. For low-rank matrix estimation, we present a new algorithm, called scaled gradient descent, that achieves linear convergence at a rate independent of the condition number of the low-rank matrix at near-optimal sample complexities. For policy optimization, we develop the first non-asymptotic convergence guarantee for entropy-regularized natural policy gradient methods in the tabular setting for discounted Markov decision processes. By establishing its global linear convergence at a near dimension-free rate, we provide theoretical footings to the empirical success of entropy-regularized natural policy gradient methods. Based on arXiv 2005.08898 and 2007.06558.

Biography:

Dr. Yuejie Chi is an Associate Professor in the department of Electrical and Computer Engineering, and a faculty affiliate with the Machine Learning department at Carnegie Mellon University, where she holds the Robert E. Doherty Early Career Development Professorship. She received her Ph.D. from Princeton University, and B. Eng. from Tsinghua University, both in Electrical Engineering. Her research interests lie in the theoretical and algorithmic foundations of data science, signal processing, machine learning and inverse problems, with applications in sensing systems, broadly defined. Among others, Dr. Chi received the Presidential Early Career Award for Scientists and Engineers (PECASE), and the inaugural IEEE Signal Processing Society Early Career Technical Achievement Award for contributions to high-dimensional structured signal processing.