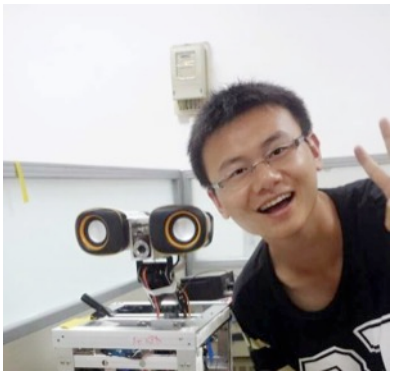
ELECTRICAL & COMPUTER ENGINEERING BIO-SEMINAR Fall 2018

When: **Friday 13:50 – 14:50**
Where: **ETB 1020**



Speaker: **Xiaohan Chen**

Department of Computer Science & Engineering
Texas A&M University

Title: **Theoretical Linear Convergence of Unfolded ISTA and Its Practical Weights and Thresholds**

Date: **11-2-2018**

Abstract: In recent years, unfolding iterative algorithms as neural networks has been shown an empirical success in solving sparse recovery problems. However, its theoretical understanding is still immature, which prevents us from fully utilizing the power of neural networks. In this work, we study unfolded ISTA (Iterative Shrinkage Thresholding Algorithm) for sparse signal recovery. We introduce a weight structure that is necessary for asymptotic convergence to the true sparse signal. With this structure, unfolded ISTA can attain a linear convergence, which is better than the sublinear convergence of ISTA/FISTA in general cases. Furthermore, we propose to incorporate thresholding in the network to perform support selection, which is easy to implement and able to boost the convergence rate both theoretically and empirically. Extensive simulations, including sparse vector recovery and a compressive sensing experiment on real image data, corroborate our theoretical results and demonstrate their practical usefulness.

Bio: Xiaohan Chen is currently a second-year Ph.D. student in the Computer Science & Engineering department, Texas A&M University, supervised by Prof. Zhangyang Wang. He also closely works with Prof. Wotao Yin, in the Mathematics department, UCLA. Prior to that, he obtained his B. S. degree from the School of Gifted Young, University of Science and Technology of China (USTC), in 2017. His research focuses on sparse optimization and deep learning, recently in particular their analytical links and how that could help accelerate sparse solvers in a data-driven fashion. His work is recently published with NIPS'18. He was a student volunteer with AAAI'18 and has reviewed for several venues.