Title: Lazy Stochastic Gradients for Communication-Efficient Federated Learning

Speaker: Prof. Tianyi Chen, ECSE, Rensselaer Polytechnic Institute
Room: ENGR 3507
Time: 2:30pm – 3:30pm, Wednesday Feb. 12, 2020

Abstract:
Today, the widespread consensus is that besides data centers at the cloud, machine learning tasks have to be performed starting from the network edge, namely smart devices. In this context, we will highlight key challenges in learning at the network edge, including communication overhead and heterogeneity. We will introduce a class of novel gradient and stochastic gradient methods that can reduce communication overhead for solving federated learning problems in heterogeneous settings. Our methods are simple to implement. They rely on an adaptive rule designed to detect slowly-varying information and, therefore, trigger the reuse of outdated information, and they come with rigorous performance guarantees in terms of convergence and communication reduction. We will corroborate analytical guarantees with impressive empirical tests on standard learning benchmarks.

Bio
Tianyi Chen received the B. Eng. degree in Communication Science and Engineering from Fudan University in 2014, the M.Sc. and Ph.D degrees in Electrical and Computer Engineering (ECE) from the University of Minnesota (UMN), in 2016 and 2019, respectively. Since August 2019, he is with Department of Electrical, Computer, and Systems Engineering at Rensselaer Polytechnic Institute as an Assistant Professor. During 2017-2018, he has been a visiting scholar at Harvard University, University of California, Los Angeles, and University of Illinois Urbana-Champaign. His research interests lie in optimization, signal processing, and machine learning with applications to large-scale networked systems such as communication, computing systems, and energy systems. He was a Best Student Paper Award finalist in the 2017 Asilomar Conf. on Signals, Systems, and Computers. He received the National Scholarship from China in 2013, the UMN ECE Department Fellowship in 2014, and the UMN Doctoral Dissertation Fellowship in 2017.