Fall 2016 Mathematical Sciences Colloquium

"Stochastic and Parallel Block Coordinate Update"

Abstract: Technological advances in data acquiring and storage have led to a proliferation of big data in diverse areas such as Internet search, information technology, healthcare, biology, and engineering. The data involved in many of these applications are large and growing faster the development of modern computer. This talk present ways to handle these large amounts of data. The strategies include sampling small amount of data, breaking variables into small blocks, and performing parallel computing. In the first part, a block stochastic gradient (BSG) method will be introduced. BSG inherits the advantage of both stochastic gradient (SG) and block coordinate descent (BCD) methods, and it per better than each of them individually. The second part of this talk present an asynchronous parallel block coordinate update (ARock) method for fixed-point problems, which abstract many applications such as solving linear equations, convex optimization, statistical learning, optimal control. Compared to its synchronous counterpart, ARock eliminates idle time, reduces memory-access congestion, and has perfect load balance. Numerical results show that ARock can achieve almost all speed-up while the synchronous methods may suffer from load imbalance have very bad speed-up.

Dr. Yangyang Xu

Thursday, December 8, 2016

4:00-5:00pm in Lally 104