Spring 2018
Mathematical Sciences Colloquium

"Polynomial-Time Run-and-Inspect Method for Certain Nonconvex Optimization "

Abstract:
Many optimization algorithms provably converge to stationary points. When the underlying problem is nonconvex, those algorithms may get trapped at local minimizers and occasionally stagnate near saddle points. We propose the Run-and-Inspect Method, which adds an "inspection" step to existing algorithms that helps escape from local minimizers and stationary points that are not globally optimal. The "inspection" step either finds a sufficient descent or ensures that the current point is an approximate "R-local minimizer." We show that an exact R-local minimizer is globally optimal for sufficiently large (but finite) R if the objective function can be implicitly decomposed into a smooth convex function plus a restricted function that is possibly nonconvex, nonsmooth. Deterministic and stochastic (stochastic gradient Langevin dynamics) inspections are developed. Coupling with gradient descent, coordinate descent, EM, and prox-linear algorithms, the Run-and-Inspect Method worked well on tested nonconvex problems. We show the stochastic approach finds an approximate global minimizer in polynomial time. This is joint work with Yifan Chen (Tsinghua) and Yuejiao Sun (UCLA).

Speaker: Wotao Yin

UCLA

Friday, April 13, 2018

Time: 4:00 – 5:00 PM

Where: Amos Eaton 216

Host: Yangyang Xu)