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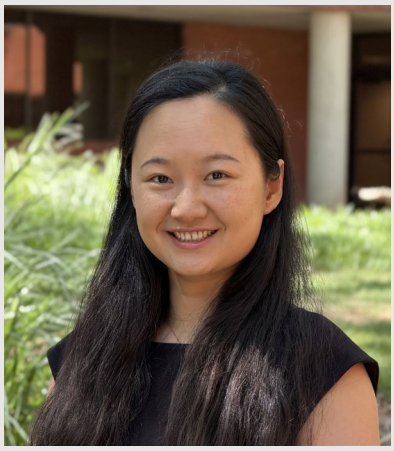

Yao Ji

Postdoctoral Fellow
H. Milton Stewart School of Industrial and Systems Engineering (ISyE)
Georgia Institute of Technology

Time

Wed, April 22,
11:15am – 12:15pm

Location

M104

Stochastic Auto-conditioned Fast Gradient Methods with Optimal Rates

Abstract

Achieving optimal rates for stochastic composite convex optimization without prior knowledge of problem parameters remains a central challenge. In the deterministic setting, the auto-conditioned fast gradient method has recently been proposed to attain optimal accelerated rates without line-search procedures or prior knowledge of the Lipschitz smoothness constant, providing a natural prototype for parameter-free acceleration. However, extending this approach to the stochastic setting has proven technically challenging and remains open. Existing parameter-free stochastic methods either fail to achieve accelerated rates or rely on restrictive assumptions, such as bounded domains, bounded gradients, prior knowledge of the iteration limit, or strictly sub-Gaussian noise. To address these limitations, we propose a stochastic variant of the auto-conditioned fast gradient method, referred to as stochastic AC-FGM. The proposed method is fully adaptive to the Lipschitz constant, the iteration limit, and the noise level, enabling both adaptive stepsize selection and adaptive mini-batch sizing without line-search procedures. Under standard bounded conditional variance assumptions, we show that stochastic AC-FGM achieves the optimal iteration complexity of $O(1/\sqrt{\varepsilon})$ and the optimal sample complexity of $O(1/\varepsilon^2)$.

About the Speaker

Dr. Yao Ji is the H. Milton Stewart Postdoctoral Fellow in the H. Milton Stewart School of Industrial and Systems Engineering at the Georgia Institute of Technology, where she works with Prof. Guanghui (George) Lan. She received her Ph.D. in Industrial Engineering from Purdue University in 2024. Her research focuses on stochastic optimization, variational inequalities, and reinforcement learning, with a particular emphasis on adaptive algorithms with provable complexity guarantees. Her recent work develops stochastic accelerated methods with optimal rates. More broadly, she studies parameter-free optimization and reinforcement learning, with applications in health care and other data-driven decision problems.