Xufeng Cai

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RESEARCH INTERESTS

Optimization, Machine Learning.

EDUCATION

University of Wisconsin-Madison — Madison, WI

Ph.D. in Computer Sciences — *09/2020 – Present*

- **Advisor:** Jelena Diakonikolas

Shanghai Jiao Tong University — Shanghai, China

B.Sc. in Mathematics and Applied Mathematics, Honorable Class (Zhiyuan College) — *09/2016 - 06/2020*

PUBLICATIONS

[2] Cyclic Block Coordinate Descent With Variance Reduction for Composite Nonconvex Optimization.
X. Cai, C. Song, S. J. Wright, J. Diakonikolas.
Under Review, 2022.

[1] Stochastic Halpern Iteration with Variance Reduction for Stochastic Monotone Inclusions.
X. Cai, C. Song, C. Guzmán, J. Diakonikolas.
In *Proceedings of the Neural Information Processing Systems (**NeurIPS**)*, 2022.

TALKS

ICCOPT'22 Session on *Optimization for Data Science and Machine Learning*.
Bethlehem, PA, USA (07/2022).

EXPERIENCES

University of Wisconsin-Madison — Madison, WI

Graduate Research Assistant. Advisor: Jelena Diakonikolas. — *08/2020 - Present*

- Developed cyclic block coordinate methods for *nonconvex* minimization with *non-asymptotic* gradient norm guarantees in both deterministic and stochastic settings. Validated the efficacy of the cyclic scheme in *deep learning* experiments.
- Proposed variance-reduced Halpern iterations for *stochastic monotone inclusion (convex-concave min-max)* problems, with *last-iterate* operator norm guarantees and *improved* $\mathcal{O}(1/\epsilon^3)$ stochastic oracle complexity.

Tencent Inc. — Shenzhen, China

Algorithm Engineer Intern. — *07/2020 - 10/2020*

- Analyzed and visualized user data with feature extraction. Developed *graph-based* machine learning approaches for *personalized recommendations*.

Institute of Natural Sciences — Shanghai, China

Undergraduate Research Assistant. Advisors: Xiaoqun Zhang and Shi Jin. — *10/2019 - 05/2020*

- Studied the convergence of the *gradient-free* consensus-based global optimization methods. Conducted the numerical experiments on logistic regression and compressed sensing.

University of Illinois Urbana-Champaign — Urbana, IL

Research Intern. Advisor: Jian Peng. — *07/2019 - 10/2019*

- Developed *deep generative models* for molecular graphs in *drug discovery*. Accelerated the auto-regressive generative model training via deploying the batch-training and parallel-training logics.

TEACHING

University of Wisconsin-Madison — Madison, WI

CS639: Foundations of Data Science	Spring 2022
CS760: Machine Learning	Spring 2021
CS760: Machine Learning	Fall 2020

SELECTED AWARDS & HONORS

The Interdisciplinary Contest in Modeling (ICM), Comap — USA

- Outstanding Winner (top 0.16% in over 20,000 teams worldwide) — 2018

Shanghai Jiao Tong University — Shanghai, China

- Academic Excellence Scholarship (top 10% in university) — 2017 & 2018 & 2019
- Zhiyuan Honors Scholarship — 2016 & 2017 & 2018 & 2019
- Xingcai Scholarship (1% in Zhiyuan Honors College) — 2018
- Merit Student (6% in university) — 2018
- Kaiyuan Scholarship (5% in Zhiyuan Honors College) — 2017

TECHNICAL SKILLS

Programming: Python, C++, MATLAB, Julia, LaTeX, HTML, CSS. **Framework**: Pytorch, Gurobi.