

# Xufeng Cai

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## RESEARCH INTERESTS

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Optimization, Machine Learning.

## EDUCATION

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### University of Wisconsin-Madison

Ph.D. in Computer Sciences

- **Advisor:** Jelena Diakonikolas

Madison, WI

09/2020 – Present

### Shanghai Jiao Tong University

B.Sc. in Mathematics and Applied Mathematics, Honorable Class (Zhiyuan College)

Shanghai, China

09/2016 - 06/2020

## PUBLICATIONS

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[2] Cyclic Block Coordinate Descent With Variance Reduction for Composite Nonconvex Optimization.

**X. Cai**, C. Song, S. J. Wright, J. Diakonikolas.

In *Proceedings of the International Conference on Machine Learning (ICML)*, 2023.

[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

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**ICCOPT'22** Session on *Optimization for Data Science and Machine Learning*.

Bethlehem, PA, USA (07/2022).

## EXPERIENCES

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### University of Wisconsin-Madison

Graduate Research Assistant. Advisor: Jelena Diakonikolas.

Madison, WI

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.

Algorithm Engineer Intern.

Shenzhen, China

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

Undergraduate Research Assistant. Advisors: Xiaoqun Zhang and Shi Jin.

Shanghai, China

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

Research Intern. Advisor: Jian Peng.

Urbana, IL

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

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### University of Wisconsin-Madison

CS639: Foundations of Data Science (TA)

Madison, WI

Spring 2022

CS760: Machine Learning (TA)

Spring 2021

CS760: Machine Learning (TA)

Fall 2020

## SELECTED AWARDS & HONORS

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<b>The Interdisciplinary Contest in Modeling (ICM), Comap</b>	USA
Outstanding Winner (top 0.16% in over 20,000 teams worldwide)	2018
<b>Shanghai Jiao Tong University</b>	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

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**Programming:** Python, C++, MATLAB, Julia,  $\LaTeX$ , HTML, CSS.

**Framework:** Pytorch, Gurobi.