# Xufeng Cai

xufengcai.com

✉ xcai74@wisc.edu

+1-608-772-1268


## 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

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|---|---|
| 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 — 2017 & 2018 & 2019

Zhiyuan Honors Scholarship — 2016 & 2017 & 2018 & 2019

Xingcai Scholarship — 2018

Merit Student — 2018

Kaiyuan Scholarship — 2017

## TECHNICAL SKILLS

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