

SHICONG CEN

shicongc@andrew.cmu.edu

Personal website: <https://shicongc.me/>

Google Scholar: <https://scholar.google.com/citations?user=QIRWZf8AAAAJ>

EDUCATION

Carnegie Mellon University, Pittsburgh

August 2019 - Present

Ph.D. Candidate

Department of Electrical and Computer Engineering

Peking University

September 2015 - July 2019

Bachelor of Science, Information and Computing Science

Double major in Computer Science

RESEARCH INTERESTS

Optimization Theory, Reinforcement Learning, Game Theory, Federated Learning.

HONORS AND AWARDS

JP Morgan Chase AI Research PhD Fellowship

June 2023

JP Morgan Chase & Co.

Wei Shen and Xuehong Zhang Presidential Fellowship

February 2023

Carnegie Mellon University, College of Engineering

Boeing Fellowship

January 2023

Carnegie Mellon University, College of Engineering

IEEE CDC Student Travel Award

September 2022

IEEE Control Systems Society (CSS)

Nicholas Minnici Dean's Graduate Fellowship

February 2022

Carnegie Mellon University, College of Engineering

George Nicholson Student Paper Competition Finalist

October 2021

Institute for Operations Research and the Management Sciences (INFORMS)

Wei Shen and Xuehong Zhang Presidential Fellowship

February 2021

Carnegie Mellon University, College of Engineering

Dean's Fellow

August 2019

Carnegie Mellon University, College of Engineering

Silver Medal (3rd)

August 2017

The 8-th session of S.-T. Yau College Student Mathematics Contests

· Teamed, Computational & Applied Mathematics

RESEARCH EXPERIENCES

Carnegie Mellon University

August 2019 - Present

Research Assistant. Advisor: Prof. Yuejie Chi

- Focusing on efficient optimization methods for decentralized networks and reinforcement learning.

Google Research

June 2023 - Present

Student Researcher. Mentor: Dr. Jincheng Mei

- Exploring policy optimization theory for reinforcement learning.

Meta AI Research

May 2022 - Aug 2022

Research Intern. Mentor: Dr. Lin Xiao

- Focused on efficient optimization methods for competitive reinforcement learning.

Machine Learning Theory Group, Microsoft Research Asia

October 2018 - January 2019

Research Intern. Mentor: Dr. Huishuai Zhang

- Developed convergence guarantees of stochastic variance-reduction methods like SVRG in the distributed setting.

Carnegie Mellon University

July 2018 - September 2018

Research Intern. Advisor: Prof. Yuejie Chi

- Conducted research on designing communication-efficient decentralized optimization algorithms.

Beijing International Center for Mathematical Research

February 2017 - March 2018

Research Intern. Advisor: Prof. Zaiwen Wen

- Implemented subsampled Semi-Smooth Newton optimization methods and conducted numerical experiments.

PUBLICATIONS

Note: * indicates equal contribution.

Preprints

- [1] **Shicong Cen**, Yuting Wei, Yuejie Chi. *Fast Policy Extragradient Methods for Competitive Games with Entropy Regularization*. Journal of Machine Learning Research (JMLR), submitted, 2021.

Peer-reviewed Journals

- [1] Wenhao Zhan*, **Shicong Cen***, Baihe Huang, Yuxin Chen, Jason D. Lee, Yuejie Chi. *Policy Mirror Descent for Regularized Reinforcement Learning: A Generalized Framework with Linear Convergence*. SIAM Journal on Optimization, vol. 33, no. 2, pp. 1061-1091, 2023.

- [2] **Shicong Cen**, Chen Cheng, Yuxin Chen, Yuting Wei, Yuejie Chi. *Fast Global Convergence of Natural Policy Gradient Methods with Entropy Regularization*. Operations Research, vol. 70, no. 4, pp. 2563-2578, 2022.

• **2021 INFORMS George Nicholson Student Paper Competition Finalist.**

[3] Boyue Li, **Shicong Cen**, Yuxin Chen, Yuejie Chi. *Communication-Efficient Distributed Optimization in Networks with Gradient Tracking and Variance Reduction*. Journal of Machine Learning Research (JMLR) 21(180):1-51, 2020.

[4] **Shicong Cen**, Huishuai Zhang, Yuejie Chi, Wei Chen, Tieyan Liu. *Convergence of Distributed Stochastic Variance Reduced Methods without Sampling Extra Data*. IEEE Transactions on Signal Processing, vol. 68, pp. 3976-3989, 2020.

[5] Andre Milzarek, Xiantao Xiao, **Shicong Cen**, Zaiwen Wen, and Michael Ulbrich. *A Stochastic Semi-Smooth Newton Method for Nonsmooth, Nonconvex Optimization*. SIAM Journal on Optimization 29(4), 2916-2948.

Peer-reviewed Conference Proceedings

[1] **Shicong Cen**, Yuejie Chi, Simon S. Du, Lin Xiao. *Faster Last-iterate Convergence of Policy Optimization in Competitive Reinforcement Learning*. International Conference on Learning Representations (ICLR), 2023. (Authors are listed alphabetically.)

[2] Ruicheng Ao, **Shicong Cen**, Yuejie Chi. *Asynchronous Gradient Play in Zero-Sum Multi-agent Games*. International Conference on Learning Representations (ICLR), 2023. (Authors are listed alphabetically.)

[3] **Shicong Cen***, Fan Chen*, Yuejie Chi. *Independent Natural Policy Gradient Methods for Potential Games: Finite-time Global Convergence with Entropy Regularization*. IEEE Conference on Decision and Control (CDC), 2022, **invited paper**.

[4] **Shicong Cen**, Yuting Wei, Yuejie Chi. *Fast Policy Extragradient Methods for Competitive Games with Entropy Regularization*. Conference on Neural Information Processing Systems (NeurIPS) 2021.

[5] Boyue Li, **Shicong Cen**, Yuxin Chen, Yuejie Chi. *Communication-Efficient Distributed Optimization in Networks with Gradient Tracking and Variance Reduction*. International Conference on Artificial Intelligence and Statistics (AISTATS) 2020.

PROFESSIONAL SERVICE

Conference Reviewer (year in parentheses): NeurIPS (2021, 2022), ICLR (2023), ICML (2020, 2021, 2022).

Journal Reviewer: SIAM Journal on Optimization, IEEE Transactions on Signal Processing, IEEE Open Journal of Signal Processing.

Mini-symposium Organizer:

Policy Optimization Methods for Reinforcement Learning and Control, 2023 SIAM Conference on Optimization (OP23)

INVITED TALKS

Fast Policy Optimization for Competitive Games

University of Washington

August 2022

Fast Policy Optimization for Regularized Reinforcement Learning

International Conference on Continuous Optimization (ICCOPT)

July 2022

California Institute of Technology

March 2021

University of California, Berkeley

September 2020

STUDENT MENTORSHIP

Ruicheng Ao, *Peking University*
Fan Chen, *Peking University*

Summer 2022
Spring 2022

TEACHING EXPERIENCES

Introduction to ML for Engineers
CMU 18-461/18-661

Summer 2020, Fall 2020