CHUWEN ZHANG

Contact Information
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Research Interests
- Second/high-order methods for optimization and computational economics
- Public-sector operations research and optimization for greater good
- Optimization solver development; large-scale optimization applications in industry.

Academic Background

The University of Chicago

Principal Postdoctoral Researcher, Booth School of Business · July 2025 - Current
Advisor: Amy R. Ward

Purdue University & The University of Chicago

Visiting PhD Student, Mitchell E. Daniels, Jr. School of Business · Mar. 2024 - Mar. 2025
Advisor: Pengyi Shi, Amy R. Ward

Shanghai University of Finance and Economics

Ph.D. Candidate in Management Science and Engineering · Sept. 2021 - June 2025
Advisor: Yinyu Ye, Dongdong Ge
Thesis: Homogeneous Models for Second-Order Methods and Interior-Point Algorithms.

The University of Texas at Austin

M.S. in Operations Research, 3.9/4.0 · Aug. 2015 - June 2017
Advisor: Jonathan F. Bard

Shanghai Jiao Tong University

B.E. in Industrial Engineering, 3.7/4.3 · Sept. 2011 - June 2015

Professional Experience

Cardinal Operations (Shanshu)

- Algorithm Expert · Oct. 2021 - June 2025
- Senior & Staff Algorithm Engineer · Oct. 2019 - Oct. 2021
- Algorithm Engineer (Operations Research) · Sept. 2018 - Sept. 2019
  Develop optimization solver; Design operations research solutions for business.

Publications

Optimization for Economics, Social Welfare, and Public Good

£: equal contribution, (αβ): alphabetic order, €: corresponding author.

E1 **C Zhang**, P Shi, A Ward. The dynamic and endogenous behavior of re-offense risk: an agent-based simulation study of treatment allocation in incarceration diversion programs

E2 **C Zhang**, C He, B Jiang, Y Ye. The second-order tâtonnement: decentralized interior-point methods for market equilibrium, 2025. {arXiv}{Major Revision at Operations Research}

Second-order/High-order/Interior-point Methods

01 Y Jiang[£], C He[£], **C Zhang**[£], D. Ge, B. Jiang, and Y. Ye. Beyond nonconvexity: a universal trust-region method with new analyses, 2026, Journal of Scientific Computing. {arXiv}{JSC}

02 ($\alpha\beta$) C He, B Jiang, Y Jiang, **C Zhang**, S Zhang. History-aware adaptive high-order tensor regularization, 2025. {arXiv}

03 Y Jiang, **C Zhang**[€], B Jiang, Y Ye. Balancing global and local efficiency of second-order methods, 2025. {arXiv}

04 **C Zhang**, D Ge, C He, B Jiang, Y Jiang, C Xue, and Y Ye. A homogeneous second-order descent method for nonconvex optimization, 2025, Mathematics of Operations Research. {arXiv}{Math. OR.}

05 C He[£], Y Jiang[£], **C Zhang**[£€], D Ge, B Jiang, and Y Ye. Homogeneous second-order descent framework: a fast alternative to Newton-type methods, 2025, Mathematical Programming. {arXiv}{Math. Prog.}

06 J Tan, C Xue, **C Zhang**, Q Deng, D Ge, and Y Ye. A homogenization approach for gradient-dominated stochastic optimization, 2024, In Proceedings of the Fortieth Conference on Uncertainty in Artificial Intelligence. {arXiv}{UAI}

07 C Xie, C Li, **C Zhang**, Q Deng, D Ge, and Y Ye. Trust region methods for nonconvex stochastic optimization beyond Lipschitz smoothness, 2024, In Proceedings of the AAAI Conference on Artificial Intelligence. {arXiv}{AAAI}

Optimization Solver Development

S1 ($\alpha\beta$) Q Deng, Q Feng, W Gao, D Ge, B Jiang, Y Jiang, J Liu, T Liu, C Xue, Y Ye, and **C Zhang**. An enhanced alternating direction method of multipliers-based interior point method for linear and conic optimization, 2024, INFORMS Journal on Computing. {arXiv}{IJOC}{⊙}

✓ Migrated into COPT.

S2 ($\alpha\beta$) D Ge, H Hu, Q Huangfu, J Liu, T Liu, H Lu, J Yang, Y Ye, and **C Zhang**. cuPDLP-C: A C-Implementation of cuPDLP for Linear Programming, 2023. {arXiv}{⊙}

✓ Migrated into COPT, HiGHS, NVIDIA's cuOPT optimization solvers. As of December 2024, cuPDLP-C is the **fastest** open-source solver for linear programming problems on Mittelmann's {LP benchmark}.

Large-scale Optimization for Industrial Applications

A1 M Zhang[£], J Yang[£], **C Zhang**[£], S He, H Liu, J Wang, and Z Wang. An approximate dynamic programming approach for solving aircraft fleet engine maintenance problem: Methodology and a case study, 2024,European Journal of Operational Research. {EJOR}

✓ Implemented in a real-world decision system in China Southern Airlines.

A2 R Wang, **C Zhang**, S Pu, J Gao, and Z Wen. A customized augmented Lagrangian method for block-structured integer programming, 2024, IEEE Transactions on Pattern Analysis and Machine Intelligence. {TPAMI}

✓ Implemented for world's busiest railway (Beijing-Shanghai high-speed railway).

A3 **C Zhang**, J. F Bard, and R Chacon. Controlling work in process during semiconductor assembly and test operations, 2017, International Journal of Production Research. {IJPR}

✓ Implemented for the Texas Instruments's wafer assembly-test plant.

Other Preprints & Technical Reports

P1 K Liang, **C Zhang**$^{€}$, J Liu, D Ge, Z Wang. A column-generation-based framework for dynamic network optimization with service customization, 2025. {SSRN}

P2 **C Zhang**, D Ge, C He, B Jiang, Y Jiang, and Y Ye. DRSOM: A dimension reduced second-order method, 2022. {arXiv}

Conference Talks & Workshops

The Second-order Tâtonnement for Market Equilibrium
- *Sept. 2025, CCF Computational Economics, Nanjing, China* (Presented by Yinyu Ye)
  under title "The Implicit Barrier from Utility Maximization and Interior-Point Methods"
- *July 2025, International Conference on Continuous Optimization, Los Angeles, USA*
  under title "Price Updating by Interior-Point Methods"

A Game-Theoretic Framework of Fairness Dynamics
- *Oct. 2024, INFORMS Annual Meeting, Washington, USA*

A Homogeneous Framework for Nonconvex and Convex Optimization
- *July 2024, International Symposium on Mathematical Programming, Montréal, Canada*

Homogeneous Second-Order Methods for Nonconvex and Convex Optimization
- *May 2023, SIAM Conference on Optimization, Washington, USA*

DRSOM: A Dimension-Reduced Second-Order Method
- *Dec. 2022, NeurIPS Workshop, Higher-Order Optimization, Spotlight paper*
- *Oct. 2022, INFORMS Annual Meeting, Indianapolis, USA*

Service

Journal Referee Service

Mathematics of Operations Research, SIAM Journal on Optimization, Automatica, European Journal of Operational Research, IEEE Transactions on Pattern Analysis and Machine Intelligence, Journal of Global Optimization.

References

Yinyu Ye
K. T. Li Professor of Engineering, Stanford University
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Pengyi Shi
Associate Professor, Purdue University
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Zizhuo Wang
Professor and Associate Dean, The Chinese University of Hong Kong, Shenzhen
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