

Xiaopeng Li

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Professional Experience

The Chinese University of Hong Kong, Shenzhen (CUHK(SZ))
Assistant Professor (*tenure track*) in the School of Artificial Intelligence.

Shenzhen, China
Sept 2025 – Now

Education

Columbia University

Ph.D. in Operations Research.

M.S. in Operations Research.

Advisor: Cédric Josz

New York, U.S.

Sept 2020 – May 2025

Sept 2020 – May 2021

The Chinese University of Hong Kong, Shenzhen (CUHK(SZ))
B.S. in Applied Mathematics.

Shenzhen, China
Sept 2016 – May 2020

Research Interests

- Nonconvex and nonsmooth optimization, with applications in large language model reasoning.
- Stochastic optimization for machine learning.
- Applied semialgebraic geometry.
- Dynamical systems.

Preprints & Publications

- Chen, P., Li, X., Chen, X., & Lin, T. (2026). Reward-free Alignment for Conflicting Objectives. *arXiv preprint arXiv:2602.02495*.
- Chen, P., Li, X., Li, Z., Yin, W., Chen, X., & Lin, T. (2025). Exploration vs Exploitation: Rethinking RLVR through Clipping, Entropy, and Spurious Reward. *ICLR 2026*.
- Chen, P., Li, X., Li, Z., Chen, X., & Lin, T. (2025). Spectral policy optimization: Coloring your incorrect reasoning in grp. Under review for *TMLR*.
- Fougereux T., Josz, C., & Li, X. (2024). *Global convergence of gradient descent for phase retrieval*. *arXiv preprint arXiv:2410.09990*.
- Josz, C., Lai, L., & Li, X. (2024). Proximal random reshuffling under local Lipschitz continuity. *arXiv preprint arXiv:2408.07182*. Major revision in *Mathematics of Operations Research*.
- Josz, C., & Li, X. (2024). Singular perturbation in heavy ball dynamics. *Journal of Dynamics and Differential Equations*. doi:10.1007/s10884-024-10402-6
- Josz, C., Lai, L., & Li, X. (2023). Convergence of the Momentum Method for Semialgebraic Functions with Locally Lipschitz Gradients. *SIAM Journal on Optimization*, 33(4), 3012–3037.
- Josz, C., & Li, X. (2023). Certifying the Absence of Spurious Local Minima at Infinity. *SIAM Journal on Optimization*, 33(3), 1416–1439.

Teaching Experience

Instructor

- AIE1902 AI Exploration, Spring 2026.
- AIE6003 Optimization for Machine Learning, Spring 2026.

CUHK(SZ)

Teaching Assistant

Columbia University

- IEOR E 4007 Optimization Methods & Models for Financial Engineering, Fall 2024
- EEOR E 6616 Convex Optimization, Spring 2024.
- IEOR E 3404 Simulation, Spring 2021.

Undergraduate Student Teaching Fellows

CUHK(SZ)

- Ordinary Differential Equations, Spring 2019 & Spring 2020.
- Elementary Real Analysis, Fall 2019.
- Mathematical Analysis I & II, Fall 2017 & Spring 2018.

Presentations

- International Conference on Continuous Optimization, invited talk, University of South California, July 23rd, 2025, *Proximal random reshuffling under local Lipschitz continuity*.
- Young Researcher Workshop, invited talk, Cornell University Ithaca, Oct. 10th, 2024, *Proximal random reshuffling under local Lipschitz continuity*.
- NYC Operations Day, poster, New York, May 10th, 2024, *Convergence of the momentum method for semi-algebraic functions with locally Lipschitz gradients*.
- INFORMS Annual Meeting, invited talk, Phoenix, Oct. 18th, 2023, *Convergence of the momentum method for semi-algebraic functions with locally Lipschitz gradients*.
- Young Researcher Workshop, poster, Cornell University Ithaca, Oct. 1st, 2023, *Convergence of the momentum method for semi-algebraic functions with locally Lipschitz gradients*.
- SIAM Conference on Optimization, invited talk, Seattle, June 2nd, 2023, *Certifying the absence of spurious local minima at infinity*.
- NYC Operations Day, poster, New York, May 5th, 2023, *Certifying the absence of spurious local minima at infinity*.
- INFORMS Annual Meeting, invited talk, Indianapolis, Oct. 18th, 2022, *Certifying the absence of spurious local minima at infinity*.
- International Conference on Continuous Optimization, contributed talk, Lehigh University, July 26th, 2022, *Certifying the absence of spurious local minima at infinity*.

Honors & Awards

- Outstanding Teaching Assistant Award in Industrial Engineering and Operations Research (Columbia University, 2025)
- Academic Performance Scholarship (CUHK(SZ), 2017, 2018 & 2019)
- Dean's List (CUHK(SZ), 2017, 2018 & 2019)
- Undergraduate Research Award (CUHK(SZ), 2018 & 2019)
- Second Prize in China Undergraduate Mathematical Contest in Modeling (China, 2018)
- Second Prize in National College Students Mathematical Competition (China, 2018)

Professional Service

Session Chair

- International Conference on Continuous Optimization, University of South California, July 23rd, 2025.
- International Conference on Continuous Optimization, Lehigh University, July 26th, 2022.

Reviewer

- SIAM Journal on Optimization (Journal)
- Mathematics of Operations Research (Journal)
- Operations Research (Journal)
- Applied Mathematics & Optimization (Journal)
- US Office of Naval Research (Grant)

Mentoring

Undergraduates

- Théodore Fougereux (École Polytechnique). Project: *Bounded flows in phase retrieval*. Summer Internship at Columbia University. May 1 – Sept 31, 2024.
- Cristian Pena (Florida Atlantic University). Project: *Moving Object Detection*. Columbia University Summer Undergraduate Research Experience (SURE) Program. May 29 – July 31, 2024. Underrepresented minority student, Hispanic.

Internship

National Renewable Energy Laboratory

Graduate PhD Intern

Golden, CO, USA

June 2024 – Aug 2024

- Smoothed progressive hedging algorithm for multi-stage stochastic MILP (available in mpi-sppy).
- L1-penalized ADMM algorithm for solving transmission expansion problems.

Citadel LLC

New York, NY, USA

Quantitative Researcher Intern

June 2025 – Aug 2025

- Reformulated a large-scale nonconvex portfolio optimization problem to exploit structure and improve conditioning, achieving 40% faster solves with KNITRO's barrier (direct) method on 1000 stocks and 30 time periods.
- Established existence guarantees for optimal portfolios in a propagator cross-impact model with factor risk by deriving sufficient, checkable conditions for well-posedness.