

# Xiaopeng Li

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## Professional Experience

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**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

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**Columbia University**  
*Ph.D. in Operations Research.*  
*M.S. in Operations Research.*  
Advisor: Cédric Jozs

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

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

## Preprints & Publications

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- 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 grpo. Under review *for TMLR*.
- Fougereux T., Jozs, C., & Li, X. (2024). *Global convergence of gradient descent for phase retrieval*. *arXiv preprint arXiv:2410.09990*.
- Jozs, 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.
- Jozs, C., & Li, X. (2024). Singular perturbation in heavy ball dynamics. *Journal of Dynamics and Differential Equations*. doi:10.1007/s10884-024-10402-6
- Jozs, 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.
- Jozs, C., & Li, X. (2023). Certifying the Absence of Spurious Local Minima at Infinity. *SIAM Journal on Optimization*, 33(3), 1416–1439.

## Teaching Experience

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### Instructor

CUHK(SZ)

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

### 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

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

### Honors & Awards

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- 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

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#### Session Chair

- International Conference on Continuous Optimization, University of South California, July 23<sup>rd</sup>, 2025.
- International Conference on Continuous Optimization, Lehigh University, July 26<sup>th</sup>, 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

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## 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

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### National Renewable Energy Laboratory

Golden, CO, USA

*Graduate PhD Intern*

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.