

Lexiao Lai

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Employment	The University of Hong Kong Assistant Professor, Department of Mathematics	Hong Kong, China July 2024 -
Interests	Nonconvex optimization, applied semialgebraic geometry, data science	
Education	Columbia University in the City of New York Ph.D. in Operations Research [thesis] Advisor: Cédric Josz	New York, U.S. Sept. 2019 - May 2024
	The University of Hong Kong B.Sc. in Mathematics	Hong Kong, China Sept. 2015 - June 2019
Publications	<ol style="list-style-type: none">Phase transitions in phase-only compressed sensing (with Junren Chen and Arian Maleki), <i>IEEE International Symposium on Information Theory (ISIT)</i>, 2025 [preprint] [proceeding]Nonsmooth rank-one symmetric matrix factorization landscape (with Cédric Josz), <i>Optimization Letters</i>, 2025 [preprint] [journal]Sufficient conditions for instability of the subgradient method with constant step size (with Cédric Josz), <i>SIAM Journal on Optimization</i>, 2024 [preprint] [journal]Convergence of the momentum method for semialgebraic functions with locally Lipschitz gradients (with Cédric Josz and Xiaopeng Li), <i>SIAM Journal on Optimization</i>, 2023 [preprint] [journal doi]Global stability of first-order methods for coercive tame functions (with Cédric Josz), <i>Mathematical Programming</i>, 2023 [preprint] [journal]Lyapunov stability of the subgradient method with constant step size (with Cédric Josz), <i>Mathematical Programming</i>, 2023 [preprint] [journal]Nonsmooth rank-one matrix factorization landscape (with Cédric Josz), <i>Optimization Letters</i>, 2022 [preprint] [journal doi]Time-dependent surveillance-evasion games (with Elliot Cartee, Qianli Song, and Alexander Vladimirsksy), <i>IEEE Conference on Decision and Control (CDC)</i>, 2019 [preprint] [proceeding]	
Preprints	<ol style="list-style-type: none">Non-convex self-concordant functions: Practical algorithms and complexity analysis (with Donald Goldfarb, Tianyi Lin, and Jiayu Zhang), 2025 [preprint]On the diameter of subgradient sequences in o-minimal structures (with Mingzhi Song), 2025 [preprint]Proximal random reshuffling under local Lipschitz continuity (with Cédric Josz and Xiaopeng Li), 2024 [preprint]	
Talks	<ol style="list-style-type: none">International Conference on Scientific Machine Learning, Hong Kong, December 3rd 2024, <i>Proximal random reshuffling under local Lipschitz continuity</i>14th Triennial International Conference of APORS, Hangzhou, November 17th 2024, <i>Proximal random reshuffling under local Lipschitz continuity</i>International Symposium on Mathematical Programming, Montréal, July 23rd 2024, <i>Global stability of first-order methods for coercive tame functions</i>IMS Young Mathematical Scientists Forum – Applied Mathematics, Singapore, January 9th 2024, <i>Global stability of first-order methods for coercive tame functions</i>INFORMS Annual Meeting, Phoenix, October 17th 2023, <i>Global stability of first-order methods for coercive tame functions</i>UCSD Optimization and Data Science Seminar, San Diego, October 4th 2023, <i>Global stability of first-order methods for coercive tame functions</i>International Congress on Industrial and Applied Mathematics, Tokyo, August 24th 2023, <i>Global stability of first-order methods for coercive tame functions</i>	

8. SIAM Conference on Optimization, Seattle, June 1st 2023, *Global stability of first-order methods with constant step size for coercive tame functions*
9. CUHK SEEM Department Seminar, Hong Kong, December 8th 2022, *Lyapunov stability of the subgradient method with constant step size*
10. HKU Optimization and Machine Learning Seminar, Hong Kong, December 6th 2022, *Lyapunov stability of the subgradient method with constant step size*
11. PGMODAYS, Paris, November 29th 2022, *Lyapunov stability of the subgradient method with constant step size*
12. INFORMS Annual Meeting, Indianapolis, October 17th 2022, *Lyapunov stability of the subgradient method with constant step size*

Grants

1. ECS grant 27301425, *A study of first-order methods for structured nonconvex optimization problems in data science*, HKD778,276, Jan. 2026 - Dec. 2028

Awards & Honours

- Columbia IEOR Department Fellowship 2019
- Walter Brown Memorial Prizes in Mathematics, HKU 2019
- Doris Chen Undergraduate Project Prize, HKU 2018
- Liu Ming-Chit Prize in Mathematics, HKU 2018
- Alan John Allis Prize in Mathematics, HKU 2016,2017
- Dean's Honours List, HKU 2016,2017,2019
- HKSAR Government Scholarship, HKU 2015-2019

Teaching Experience

- As course instructor:
HKU: Operations Research I Spring 2025
- As teaching assistant:
Columbia:
 - Optimization Methods & Models Spring 2024
 - Convex Optimization Spring 2023
 - Optimization Methods & Models for Financial Engineering Fall 2023
- HKU: Linear Algebra I Spring 2019

Student Mentoring

- PhD students:
 - Kaiwei Yang (2025-)
 - Mingzhi Song (2024-)
- On thesis defending committee:
 - Zimeng Wang (HKU)
 - Tan Zhang (HKU)
- Undergraduate students:
 - Zesheng Cai (HKU)
 - Shiyang Chen (HKU)
 - Pinxi Gong (HKU)
 - Tiansheng Li (HKU)
 - Qi Peng (HKU)
 - Han Zheng (HKU)

Service

- Session chair:
 - *Recent advances in first-order methods*, International Conference on Continuous Optimization (ICCOPT), 2025
 - HKMS-HKSIAM Joint Young Scholars Symposium, 2024
 - *First-order methods and large-scale optimization*, International Symposium on Mathematical Programming (ISMP), 2024
 - *Structured and tame optimization*, INFORMS Annual Meeting, 2023
- Reviewer:
 - AISTATS
 - Applied Mathematics and Optimization
 - Computational Optimization and Applications
 - Journal of Optimization Theory and Applications
 - Mathematics of Operations Research

Internship

TCL Corporate Research (Hong Kong) Company Limited
Research Intern, AI Research Lab

Hong Kong, China
May-Sept. 2021

Computer Skills

Python, MATLAB, L^AT_EX