Jinwen Yang

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Research Interests

Large-scale optimization on modern/emerging computing architectures (GPUs and other AI accelerators) with a focus on algorithms, computational tools, associated theory, and applications in data science, operations research, and machine learning.

Education

The University of Chicago, Chicago, IL — 2020 - 2026 (expected)
Ph.D. candidate in Department of Statistics*
*I have been almost exclusively focused on Operations Research and optimization, but my degree will read "Statistics"
Advisor: Haihao Lu

Fudan University, Shanghai, China — 2016 - 2020
B.S. in Mathematics and Applied Mathematics

Publications

"cuPDLP.jl: A GPU Implementation of Restarted Primal-Dual Hybrid Gradient for Linear Programming in Julia", with Haihao Lu.
Operations Research, 2025. [arXiv] [Link] [Github]

- Winner of COIN-OR Cup, 2024 [Citation]

"A Practical and Optimal First-Order Method for Large-Scale Convex Quadratic Programming", with Haihao Lu.
Mathematical Programming, 2025. [arXiv] [Link] [Github]

"On the Geometry and Refined Rate of Primal-Dual Hybrid Gradient for Linear Programming", with Haihao Lu.
Mathematical Programming, 212, 349–387 (2025). [arXiv] [Link]

"A J-symmetric Quasi-Newton Method for Minimax Problems", with Azam Asl and Haihao Lu.
Mathematical Programming, 204, 207–254 (2024). [arXiv] [Link]

"Dimensionality Reduction for Single Cell RNA Sequencing Data using Constrained Robust Non-negative Matrix Factorization", Shuqin Zhang, Liu Yang, Jinwen Yang, Zhixiang Lin and Michael K Ng.
NAR Genomics and Bioinformatics, 2.3 (2020). [Link]

Preprints and Submitted Papers

"PDOT: A practical primal-dual algorithm and a GPU-based solver for optimal transport", with Haihao Lu.
Major revision at *SIAM Journal of Optimization.* [arXiv] [Github]

"On the Infimal Sub-differential Size of Primal-Dual Hybrid Gradient Method and Beyond", with Haihao Lu.
Major revision at *Mathematical Programming.* [arXiv]

"An Overview of GPU-based First-Order Methods for Linear Programming and Extensions", with Haihao Lu.
Submitted to *SIAM Review.* [arXiv]

"cuPDLPx: A Further Enhanced GPU-Based First-Order Solver for Linear Programming", with Haihao Lu and Zedong Peng.
Submitted to *INFORMS Journal on Computing.* [arXiv] [Github]

"New Understandings and Computation on Augmented Lagrangian Methods for Low-Rank Semidefinite Programming", with Lijun Ding and Haihao Lu.
Submitted to *Operations Research*. [arXiv]

"Restarted Halpern PDHG for Linear Programming", with Haihao Lu.
Submitted to *Mathematics of Operations Research*. [arXiv]

"MPAX: Mathematical Programming in JAX", with Haihao Lu and Zedong Peng.
Targeted for *Mathematical Programming Computation*. [arXiv] [Github]

"cuPDLP-C: A Strengthened Implementation of cuPDLP for Linear Programming by C language", with Haihao Lu, Haodong Hu, Qi Huangfu, Jinsong Liu, Tianhao Liu, Yinyu Ye, Chuwen Zhang and Dongdong Ge.
[arXiv] [Github]

"On a Unified and Simplified Proof for the Ergodic Convergence Rates of PPM, PDHG and ADMM", with Haihao Lu.
[arXiv]

"Nearly Optimal Linear Convergence of Stochastic Primal-Dual Methods for Linear Programming", with Haihao Lu.
[arXiv]

Presentations

GPU-Accelerated Linear Programming and Beyond

- International Conference on Continuous Optimization (ICCOPT), Los Angeles, CA, July 2025

A Practical and Optimal First-Order Method for Large-Scale Convex Quadratic Programming

- INFORMS Annual Meeting, Seattle, WA, October 2024

cuPDLP: A GPU Implementation of Restarted Primal-Dual Hybrid Gradient for Linear Programming

- International Symposium on Mathematical Programming (ISMP), Montréal, Canada, July 2024
- INFORMS Optimization Society Conference, Houston, TX, March 2024

On the Geometry and Refined Rate of Primal-Dual Hybrid Gradient for Linear Programming

- INFORMS Annual Meeting, Phoenix, AZ, October 2023
- Modeling and Optimization: Theory and Applications (MOPTA), Bethlehem, PA, August 2023
- SIAM Conference on Optimization, Seattle, WA, June 2023

Nearly Optimal Linear Convergence of Stochastic Primal-Dual Methods for Linear Programming

- INFORMS Annual Meeting, Indianapolis, IN, October 2022
- ICCOPT, Bethlehem, PA, July 2022

Industry experience

Google Research, New York City, NY — Summer 2024
Research Intern in Algorithms and Optimization Group
Mentor: David Applegate

Academic Service

Reviewer for Journals: *Operations Research*, *Mathematics of Operations Research*, *Mathematical Programming*, *Journal of Scientific Computing*, *Journal of Machine Learning Research*

Reviewer for Conferences: *NeurIPS 2023*, *ICLR 2024*, *ICLR 2025*, *AISTATS 2025*

TEACHING EXPERIENCE

The University of Chicago
Teaching Assistant

- BUSN 36919 Modern Large-Scale Optimization: Theory and Computation
- STAT 32950/24620 Multivariate Statistical Analysis: Applications and Techniques
- STAT 34800 Modern Methods in Applied Statistics
- Undergraduate statistics courses: STAT 22000, STAT 22200, STAT 24500

PROGRAMMING Python, JAX, Julia, C/C++, CUDA, R