Jiaming Liang

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Research Interests

Nonconvex and nonsmooth optimization; High-dimensional sampling algorithms; Foundation of data science

Education

Ph.D. in Operations Research, Georgia Institute of Technology	May 2022 (expected)
M.S. in Computational Science & Engineering, Georgia Institute of Technology	2017
B.S. in Ocean Engineering, Shanghai Jiao Tong University	2015
B.S. in Applied Mathematics, Shanghai Jiao Tong University	2015

Publications

1. J. Liang and R. D. C. Monteiro. **A proximal bundle variant with optimal iteration-complexity for a large range of prox stepsizes**. *SIAM Journal on Optimization*, 31(4):2955–2986, 2021

2. J. Liang and R. D. C. Monteiro. **An Average Curvature Accelerated Composite Gradient Method for Nonconvex Smooth Composite Optimization Problems**. *SIAM Journal on Optimization*, 31(1):217–243, 2021

3. J. Liang and Y. Chen. **A Proximal Algorithm for Sampling from Non-smooth Potentials**. *Submitted to ACM Symposium on Theory of Computing (STOC 2022), available on arXiv:2110.04597*, 2021

4. J. Liang and R. D. C. Monteiro. **A unified analysis of a class of proximal bundle methods for hybrid convex composite optimization problems**. *Submitted to Mathematics of Operations Research, available on arXiv:2110.01084*, 2021

5. J. Liang, R. D. C. Monteiro, and C.-K. Sim. **A FISTA-type accelerated gradient algorithm for solving smooth nonconvex composite optimization problems**. *Computational Optimization and Applications*, 79(3):649–679, 2021

6. J. Liang and R. D. C. Monteiro. **Average Curvature FISTA for Nonconvex Smooth Composite Optimization Problems**. *Major revision in SIAM Journal on Optimization, available on arXiv:2105.06436*, 2021

7. J. Liang, K. Sun, E. Zhou, and X. A. Sun. **Log-Difference-of-Convex (Log-DC) Sampling by the Unadjusted Langevin Algorithm**. *Submitted to AISTATS*, 2021

8. J. Liang and S. Perez-Salazar. **Proximal Bundle Methods for Online Learning**. *Technical report*, 2021

9. J. Liang and R. D. C. Monteiro. **A FISTA-type average curvature accelerated composite gradient method for nonconvex optimization problems**. *12th OPT Workshop on Optimization for Machine Learning (OPT2020)*, 2020

10. J. Liang, S. Di Cairano, and R. Quirynen. **Early Termination of Convex QP Solvers in Mixed-Integer Programming for Real-Time Decision Making**. *IEEE Control Systems Letters*, 5(4):1417–1422, 2020 and *2021 American Control Conference (ACC)*, pp. 972-977, 2021

11. J. Liang and R. D. C. Monteiro. **A Doubly Accelerated Inexact Proximal Point Method for Nonconvex Composite Optimization Problems**. *Available on arXiv:1811.11378*, 2018

12. J. Liang and Z. Lin. **Ship Roll Behaviour in Large Amplitude Beam Waves**. In *ASME 2015 34th International Conference on Ocean, Offshore and Arctic Engineering*. American Society of Mechanical Engineers, 2015

13. J. Cui, J. Liang, and Z. Lin. **Stability analysis for periodic solutions of the Van der Pol–Duffing forced oscillator**. *Physica Scripta*, 91(1):015201, 2015

Professional Experience

- Intern in Mitsubishi Electric Research Laboratories, Cambridge, MA, May-August 2020
  - Developed a projection and early termination strategy tailored to primal-dual interior point methods for mixed-integer model predictive control applications
- Summer Research Associate in NEC Labs America, Princeton, NJ, May-August 2017
  - Distributed Temperature Sensing (DTS) system spatial resolution improvement by impulse response and optimization algorithms
  - Developed algorithms to greatly improve the DTS spatial resolution from 1m to 20cm
- Software Engineer Intern in Schlumberger, Houston, TX, May-August 2016
  - Exploratory Data Analysis & Interpretation of Geophysical Data

Awards & Honors

2021	Invited to Cornell ORIE Young Researchers Workshop
	Honorable Mention, Alice and John Jarvis Ph.D. Student Paper Competition, Georgia Tech ISYE
	Simons Institute Travel Fund for attending the workshop Sampling Algorithms and Geometries on Probability Distributions
	SIAM Student Travel Award
	Shabbir Ahmed Fellowship for Excellence in Research in Optimization, Georgia Tech ISYE
	American Control Conference (ACC) 2021 Student Registration Grant
	IDEaS-TRIAD Research Scholarship, Georgia Tech
2020	ARC-TRIAD Fellowship, Georgia Tech
2015	Outstanding Graduate of Shanghai Jiao Tong University
2014	Honorable Mention, Interdisciplinary Contest In Modeling (MCM/ICM)
2014	China Shipping Industry Scholarship
2009	First Prize, Chinese National Olympiad in Mathematics in Provinces

Patents

1. Jiaming Liang, Stefano Di Cairano, and Rien Quirynen. Early Termination of Convex QP Solvers in Mixed-Integer Programming for Real-Time Decision Making. 2020, Filed

2. Yaowen Li and Jiaming Liang. Spatial resolution of a DTS system by impulse response deconvolution

and optimization. 2019, Filed

Teaching Assistantship

- Fall 2016 CX/MATH 4640 Numerical Analysis I
- Summer 2019/Fall 2020 ISYE 8803 Topics on High-Dimensional Data Analytics
- Fall 2019/Fall 2021 ISYE 6669 Deterministic Optimization
- Summer 2021 ISYE 3770 Statistics and Applications
- Summer 2021 ISYE 6644 Simulation

Invited Talks

- A unified analysis of a class of proximal bundle methods for solving hybrid convex composite optimization problems
  - INFORMS Annual meeting, Anaheim, CA, October 2021
- A Proximal Algorithm for Sampling from Non-smooth Potentials
  - Poster Presentation, Georgia Statistics Day, Atlanta, GA, October 2021
- Average Curvature FISTA for Nonconvex Smooth Composite Optimization Problems
  - Modeling and Optimization: Theory and Applications (MOPTA 2021), Bethlehem, PA, August 2021
- Early Termination of Convex QP Solvers in Mixed-Integer Model Predictive Control for Real-Time Decision Making
  - Oral Presentation, American Control Conference (ACC), Virtual, May 2021
  - Poster Presentation, Mixed Integer Programming (MIP), Virtual, May 2021
  - Poster Presentation, Integer Programming and Combinotorial Optimization (IPCO), Virtual, May 2021
- A FISTA-type average curvature accelerated composite gradient method for nonconvex optimization problems
  - 12th OPT Workshop on Optimization for Machine Learning (OPT2020), Virtual, December 2020
- A Proximal Bundle Variant with Optimal Iteration-complexity for a Large Range of Prox Stepsizes
  - SIAM Conference on Optimization (OP21), Virtual, July, 2021
  - INFORMS Annual Meeting, Virtual, November 2020
  - ISyE PhD Student Seminar in Georgia Tech, Atlanta, GA, October 2020
  - Optimization Interest Group Meeting, Mitsubishi Electric Research Laboratories, Cambridge, MA, July 2020
- An Average Curvature Accelerated Composite Gradient Method for Nonconvex Smooth Composite Optimization Problems
  - Alice and John Jarvis Ph.D. Student Paper Competition, Georgia Tech, September 2021
  - INFORMS Annual Meeting, Seattle, WA, October 2019
  - DOS Seminar in Georgia Tech, Atlanta, GA, October 2019

- A Doubly Accelerated Inexact Proximal Point Method for Nonconvex Composite Optimization Problem
  - INFORMS Annual Meeting, Seattle, WA, October 2019
  - Machine Learning Theory Reading Group in Georgia Tech, Atlanta, GA, April 2019
  - ISyE PhD Student Seminar in Georgia Tech, Atlanta, GA, November 2018
  - DOS Seminar in Georgia Tech, Atlanta, GA, November 2018

Academic Activities

- Reviewer for IEEE Transactions on Signal Processing, IEEE Control Systems Letters (L-CSS), OPT21 Workshop on Optimization for Machine Learning, AISTATS
- Organizer of Optimization Interest Group Meeting, Summer 2020, Mitsubishi Electric Research Laboratories
- Session Chair in SIAM Conference on Optimization (OP21)

References

Renato Monteiro (Advisor)
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