

# Baoyu Zhou

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## CONTACT INFORMATION

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Ann Arbor, MI 48109

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<https://baoyuzhou18.github.io>

## RESEARCH INTERESTS

Data Analytics and Optimization, Optimization Methods for Machine Learning, Large-scale Continuous Optimization, Constrained Stochastic Optimization, Nonsmooth Optimization

## ACADEMIC POSITIONS

**Postdoctoral Researcher** Aug. 2022 – present  
**The University of Michigan**, Ann Arbor, MI  
*Department of Industrial and Operations Engineering*  
Supervisor: Prof. Albert S. Berahas  
**The University of Chicago**, Chicago, IL  
*Booth School of Business*  
Supervisor: Prof. Haihao (Sean) Lu  
Topics: Two-stage Stochastic Programming, Convex Constrained Optimization

## EDUCATION

**Lehigh University**  
Ph.D. in Industrial & Systems Engineering Aug. 2018 – May 2022  
Advisor: Prof. Frank E. Curtis  
Doctoral Committee: Frank E. Curtis (Lehigh), Albert S. Berahas (U of Michigan), Jorge Nocedal (Northwestern), Daniel P. Robinson (Lehigh), and Luis Nunes Vicente (Lehigh)  
M.S. in Industrial & Systems Engineering Aug. 2016 – May 2018  
**Shanghai Jiao Tong University**  
B.S.E. in Mechanical Engineering Aug. 2012 – Aug. 2016  
**The Chinese University of Hong Kong**  
Undergraduate Exchange Student Jan. 2015 – Apr. 2015

## RESEARCH EXPERIENCE

**Research Assistant** Aug. 2018 – May 2022  
**Lehigh University**, Bethlehem, PA  
*Department of Industrial & Systems Engineering*  
Supervisor: Prof. Frank E. Curtis  
Topics: Large-scale Nonlinear Optimization, Constrained Stochastic Optimization

**Research Intern** May 2021 – Aug. 2021  
**Facebook, Inc.**, New York, NY  
*Facebook AI Research*  
Supervisor: Dr. Aaron Defazio  
Topics: Nonconvex and Stochastic Optimization with Deep Learning Applications.

**Givens Associate** May 2020 – Aug. 2020  
**Argonne National Laboratory**, Lemont, IL  
*Mathematics and Computer Science Division*  
Supervisor: Dr. Jeffrey M. Larson  
Topics: Composite Nonsmooth Optimization under Derivative-Free Setting.

**Visiting Research Assistant** June 2017 – Aug. 2017  
**Northwestern University**, Evanston, IL

*Department of Industrial Engineering and Management Sciences*  
Supervisor: Prof. Andreas Wächter  
Topics: Quadratic Programming with Bound Constraints.

**PUBLISHED  
JOURNAL  
ARTICLES**

- [1] A. S. Berahas, J. Shi, Z. Yi, and **B. Zhou**. Accelerating Stochastic Sequential Quadratic Programming for Equality Constrained Optimization using Predictive Variance Reduction. *Computational Optimization and Applications*, 86:79-116, 2023
- [2] A. S. Berahas, F. E. Curtis, and **B. Zhou**. Limited-Memory BFGS with Displacement Aggregation. *Mathematical Programming*, 194(1):121-157, 2022.
- [3] J. Larson, M. Menickelly, and **B. Zhou**. Manifold Sampling for Optimizing Nonsmooth Non-convex Compositions. *SIAM Journal on Optimization*, 31(4):2638-2664, 2021.
- [4] A. S. Berahas, F. E. Curtis, D. P. Robinson, and **B. Zhou**. Sequential Quadratic Optimization for Nonlinear Equality Constrained Stochastic Optimization. *SIAM Journal on Optimization*, 31(2):1352-1379, 2021.
- [5] F. E. Curtis, D. P. Robinson, and **B. Zhou**. A Self-Correcting Variable-Metric Algorithm Framework for Nonsmooth Optimization. *IMA Journal of Numerical Analysis*, 40(2):1154-1187, 2020.

**WORKING  
PAPERS**

- [6] J. R. Birge, H. Lu, and **B. Zhou**. On the Convergence of L-shaped Algorithms for Two-Stage Stochastic Programming. arXiv 2309.01244, 2023.
- [7] J. C. N. Liang, H. Lu, and **B. Zhou**. Online Ad Procurement in Non-stationary Autobidding Worlds. arXiv 2307.05698, 2023.
- [8] F. E. Curtis, D. P. Robinson, and **B. Zhou**. Sequential Quadratic Optimization for Stochastic Optimization with Deterministic Nonlinear Inequality and Equality Constraints. arXiv 2302.14790, 2023.
- [9] A. S. Berahas, M. Xie, and **B. Zhou**. A Sequential Quadratic Programming Method with High Probability Complexity Bounds for Nonlinear Equality Constrained Stochastic Optimization. arXiv 2301.00477, 2023.
- [10] A. Defazio, **B. Zhou**, and L. Xiao. Grad-GradaGrad? A Non-Monotone Adaptive Stochastic Gradient Method. arXiv 2206.06900, 2022.
- [11] A. S. Berahas, R. Bollapragada, and **B. Zhou**. An Adaptive Sampling Sequential Quadratic Programming Method for Equality Constrained Stochastic Optimization. arXiv 2206.00712, 2022.
- [12] F. E. Curtis, D. P. Robinson, and **B. Zhou**. Inexact Sequential Quadratic Optimization for Minimizing a Stochastic Objective Function Subject to Deterministic Nonlinear Equality Constraints. arXiv 2107.03512, 2021.

**DISSERTATIONS**

- [13] **B. Zhou**. Methods for Large Scale Nonlinear Optimization and Equality Constrained Stochastic Optimization. Ph.D. Thesis, Department of Industrial & Systems Engineering, Lehigh University, Bethlehem, PA, USA, 2022.
- [14] **B. Zhou**. Quadratic Optimization for Nonsmooth Optimization Algorithms: Theory and Numerical Experiments. Master Thesis, Department of Industrial & Systems Engineering, Lehigh University, Bethlehem, PA, USA, 2018.

**TECHNICAL  
REPORTS**

- [15] H. Huang, H. Feng, **B. Zhou**, E. Pan, and L. Xi. Multi-Objective Cell Formation Problem Considering Mixed-Type Data of Parts. *Technical Report* (in Chinese), 2016.

**PRESENTATIONS**

- [1] Baoyu Zhou. Inexact Bundle Methods for Two-Stage Stochastic Programming. *MOPTA Conference, Bethlehem, PA, USA*, August 2023.
- [2] Baoyu Zhou. Inexact Bundle Methods for Two-Stage Stochastic Programming. *School of Mathematics, The University of Edinburgh, Edinburgh, Scotland*, July 2023.
- [3] Baoyu Zhou. Inexact Bundle Methods for Two-Stage Stochastic Programming. *SIAM Conference on Optimization, Seattle, WA, USA*, June 2023.
- [4] Baoyu Zhou. SQP Methods for Deterministically Constrained Stochastic Optimization. *Department of Systems and Industrial Engineering, The University of Arizona, Tucson, AZ, USA*, February 2023.
- [5] Baoyu Zhou. SQP Methods for Inequality Constrained Stochastic Optimization. *INFORMS Annual Meeting, Indianapolis, IN, USA*, October 2022.
- [6] Baoyu Zhou. SQP Methods for Deterministically Constrained Stochastic Optimization. *FutureBAProf Workshop, The University of Iowa, Iowa City, IA, USA*, August 2022.
- [7] Baoyu Zhou. SQP Methods for Inequality Constrained Stochastic Optimization. *International Conference on Continuous Optimization, Bethlehem, PA, USA*, July 2022.
- [8] Baoyu Zhou. Fast, Efficient and Practical Algorithms for Nonlinear Optimization. *Department of Industrial, Manufacturing and Systems Engineering, Texas Tech University, Lubbock, TX, USA*, December 2021.
- [9] Baoyu Zhou. An Inexact Sequential Quadratic Method For Nonlinear Equality Constrained Stochastic Optimization. *INFORMS Annual Meeting, Anaheim, CA, USA*, October 2021.
- [10] Baoyu Zhou. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. *MOPTA Conference, Bethlehem, PA, USA*, August 2021.
- [11] Baoyu Zhou. SQP for Nonlinear Equality Constrained Stochastic Optimization. *MOPTA Conference, Bethlehem, PA, USA*, August 2021.
- [12] Baoyu Zhou. SQP Methods for Equality Constrained Stochastic Optimization. *SIAM Conference on Optimization, Spokane, WA, USA*, July 2021.
- [13] Baoyu Zhou. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. *SIAM Conference on Computational Science and Engineering, Fort Worth, TX, USA*, March 2021.
- [14] Baoyu Zhou. Manifold Sampling for Optimizing Nonconvex Piecewise-Smooth Compositions. *INFORMS Annual Meeting, National Harbor, MD, USA*, November 2020.
- [15] Baoyu Zhou. Limited-Memory BFGS with Displacement Aggregation. *INFORMS Annual Meeting, Seattle, WA, USA*, October 2019.
- [16] Baoyu Zhou. Limited-Memory BFGS with Displacement Aggregation. *MOPTA Conference, Bethlehem, PA, USA*, August 2019.

**TEACHING  
EXPERIENCE**

<b>Bootcamp Organizer and Instructor</b>	Aug. 2021
<b>Lehigh University</b> , Bethlehem, PA	
<b>Teaching Assistant Mentor</b>	Sept. 2014 – Aug. 2016
<b>Shanghai Jiao Tong University</b> , Shanghai, China	
<b>Undergraduate Teaching Assistant</b>	
<b>Shanghai Jiao Tong University</b> , Shanghai, China	
VV156: Honors Calculus II	Fall 2013, Spring 2014, Fall 2015
VM240: Intro to Dynamics and Vibrations	Summer 2015

<b>PROFESSIONAL EXPERIENCE</b>	<b>Cost Engineer Intern</b> Mar. 2016 – May 2016 Fiat Chrysler Automobiles, Shanghai, China
	<b>Technical Assistant Intern</b> Aug. 2015 – Sept. 2015 Shenyang Blower Works Group Corporation, Shenyang, China
<b>HONORS &amp; AWARDS</b>	<b>Elizabeth V. Stout Dissertation Award, Lehigh University</b> 2022
	<b>SIAM Student Travel Award</b> 2021
	<b>Van Hoesen Family Best Publication Award, Lehigh ISE Department</b> 2021
	<b>P.C. Rossin Doctoral Fellow, Lehigh University</b> 2021
	<b>Ph.D. Student of the Year, Lehigh ISE Department</b> 2021
	<b>Lehigh University Fellowship</b> 2018 – 2019
	<b>Outstanding Freshman Scholarship, Shanghai Jiao Tong University</b> 2012 – 2016 <b>Outstanding Academic Scholarship, Shanghai Jiao Tong University</b> 2015
<b>MENTORSHIP EXPERIENCE</b>	<b>Ph.D. Students</b>
	• Wanning Dong (University of Michigan) 2023 – present <i>co-supervised with Prof. Albert S. Berahas</i> Topics: Algorithms for Large-Scale Stochastic Optimization with General Constraints
	• Jinwen Yang (University of Chicago) 2023 – present <i>co-supervised with Prof. Haihao (Sean) Lu</i> Topics: Quasi-Newton methods for Constrained Optimization Problems
	• Jiahao Shi (University of Michigan) 2021 – present <i>co-supervised with Prof. Albert S. Berahas</i> Topics: Algorithms for Constrained Stochastic and Derivative-Free Optimization
	<b>Undergraduate Students</b>
	• Zihong Yi (University of Michigan) 2021 – 2022 <i>co-supervised with Prof. Albert S. Berahas</i> Topics: Accelerating Stochastic Sequential Quadratic Programming for Equality Constrained Optimization using Predictive Variance Reduction
<b>ACADEMIC SERVICE</b>	<b>Professional Affiliations</b>
	• Society for Industrial and Applied Mathematics (SIAM) 2021 – present
	• Institute for Operations Research and Management Sciences (INFORMS) 2018 – present
	<b>Professional Community Service</b>
	• Vice President, Lehigh University INFORMS Student Chapter 2020 – 2021
<b>Organized Conference Sessions</b>	
• ICCOPT Conference	
- <i>Advances in Nonlinear Optimization</i> , Bethlehem, PA, USA, July 2022.	
- <i>Large-Scale, Nonlinear, and Stochastic Optimization IV</i> , Bethlehem, PA, USA, July 2022.	
• INFORMS Annual Meeting	

- *Recent Advances in Nonlinear and Stochastic Optimization*, Indianapolis, IN, USA, October 2022.
- *Nonlinear and Stochastic Optimization*, Indianapolis, IN, USA, October 2022.
- *Advances in Nonlinear and Stochastic Optimization (I-II)*, Anaheim, CA, USA, October 2021.
- *Optimization in Quantum Computing and vice versa I*, Anaheim, CA, USA, October 2021.
- MOPTA Conference
- *Nonlinear and Stochastic Optimization Algorithms*, Bethlehem, PA, USA, August 2021.
- *Algorithms for Derivative-Free Optimization*, Bethlehem, PA, USA, August 2021.
- SIAM Conference on Optimization
- *Recent Advances in Large-Scale Nonlinear Optimization I-II (Sessions I-IV)*, Seattle, WA, USA, May 2023.

**Journals Reviewed for (# of articles reviewed)**

- Computational Optimization and Applications (3)
- IEEE Transactions on Automatic Control (1)
- IEEE Transactions on Network Science and Engineering (1)
- IEEE Transactions on Neural Networks and Learning Systems (3)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (1)
- IMA Journal of Numerical Analysis (1)
- Journal of Machine Learning Research (2)
- Journal of Optimization Theory and Applications (1)
- Machine Learning (1)
- Management Science (1)
- Mathematical Programming (2)
- Mathematical Programming Computation (1)
- Mathematics of Computation (1)
- Optimization Methods and Software (2)
- SIAM Journal on Matrix Analysis and Applications (1)
- SIAM Journal on Optimization (3)

**Conferences Reviewed for (# of articles reviewed)**

- When Machine Learning meets Dynamical Systems: Theory and Applications (MLmDS) Workshop, AAAI 2023 (1)
- Optimization for Machine Learning (OPT) Workshop, NeurIPS 2022 (3)
- New Frontiers in Federated Learning (NFFL) Workshop, NeurIPS 2021 (3)
- Optimization for Machine Learning (OPT) Workshop, NeurIPS 2021 (3)
- Optimization for Machine Learning (OPT) Workshop, NeurIPS 2020 (4)

**COURSES**

Convex Analysis; Planning & Scheduling in Manufacturing & Services; Optimization Models & Applications; Nonlinear Optimization; Random Processes & Applications; Intro to Math Optimization; Real Analysis I; Discrete Optimization; Computational Methods in Optimization; Dynamic Programming; Applied Operations Research; Optimization Methods in Machine Learning; Mining of Large Datasets; Quantum Computing for Optimization

**COMPUTER SKILLS**

**Programming Language:** C/C++, Julia, MATLAB, Python, R  
**Software:** AMPL, LINGO, Mathematica, L<sup>A</sup>T<sub>E</sub>X  
**Solver:** CPLEX, MOSEK, GUROBI, SEDUMI

**LANGUAGES**

Mandarin (*native language*), English (*bilingual proficiency*)

**REFERENCES**

**Albert S. Berahas**

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University of Michigan  
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**Frank E. Curtis**

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