

# Baoyu Zhou

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<b>CONTACT INFORMATION</b>	Harper Center 5807 S Woodlawn Avenue Chicago, IL 60637	+1 (551) 228-9835 baoyu.zhou@chicagobooth.edu <a href="https://baoyuzhou18.github.io">https://baoyuzhou18.github.io</a>
<b>RESEARCH INTERESTS</b>	Huge-scale Linear Optimization, Large-scale Nonlinear Optimization, Constrained Stochastic Optimization, Nonsmooth Optimization, Optimization Methods for Machine Learning	
<b>ACADEMIC POSITIONS</b>	<b>Postdoctoral Researcher</b> <b>The University of Chicago</b> , Chicago, IL <i>Booth School of Business</i> Supervisor: Prof. Haihao (Sean) Lu Topics: Huge-scale Linear Optimization	Aug. 2022 – present
<b>EDUCATION</b>	<b>Lehigh University</b> Ph.D. in Industrial & Systems Engineering 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 <b>Shanghai Jiao Tong University</b> B.S.E. in Mechanical Engineering <b>The Chinese University of Hong Kong</b> Undergraduate Exchange Student	Aug. 2018 – May 2022 Aug. 2016 – May 2018 Aug. 2012 – Aug. 2016 Jan. 2015 – Apr. 2015
<b>RESEARCH EXPERIENCE</b>	<b>Research Assistant</b> <b>Lehigh University</b> , Bethlehem, PA <i>Department of Industrial &amp; Systems Engineering</i> Supervisor: Prof. Frank E. Curtis Topics: Large-scale Nonlinear Optimization, Constrained Stochastic Optimization <b>Research Intern</b> <b>Facebook, Inc.</b> , New York, NY <i>Facebook AI Research</i> Supervisor: Dr. Aaron Defazio Topics: Nonconvex and Stochastic Optimization with Deep Learning Applications. <b>Givens Associate</b> <b>Argonne National Laboratory</b> , Lemont, IL <i>Mathematics and Computer Science Division</i> Supervisor: Dr. Jeffrey M. Larson Topics: Composite Nonsmooth Optimization under Derivative-Free Setting. <b>Visiting Research Assistant</b> <b>Northwestern University</b> , Evanston, IL <i>Department of Industrial Engineering and Management Sciences</i> Supervisor: Prof. Andreas Wächter Topics: Quadratic Programming with Bound Constraints.	Aug. 2018 – May 2022 May 2021 – Aug. 2021 May 2020 – Aug. 2020 June 2017 – Aug. 2017

**PUBLISHED  
JOURNAL  
ARTICLES**

- [1] A. S. Berahas, F. E. Curtis, and **B. Zhou**. Limited-Memory BFGS with Displacement Aggregation. *Mathematical Programming*, 194(1):121-157, 2022.
- [2] J. Larson, M. Menickelly, and **B. Zhou**. Manifold Sampling for Optimizing Nonsmooth Non-convex Compositions. *SIAM Journal on Optimization*, 31(4):2638-2664, 2021.
- [3] 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.
- [4] 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.

**PAPERS  
UNDER  
REVIEW**

- [5] 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.
- [6] 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.
- [7] A. S. Berahas, R. Bollapragada, and **B. Zhou**. An Adaptive Sampling Sequential Quadratic Programming Method for Equality Constrained Stochastic Optimization. arXiv 2206.00712, 2022.
- [8] A. S. Berahas, J. Shi, Z. Yi, and **B. Zhou**. Accelerating Stochastic Sequential Quadratic Programming for Equality Constrained Optimization using Predictive Variance Reduction. arXiv 2204.04161, 2022.
- [9] 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.

**PREPRINTS**

- [10] A. Defazio, **B. Zhou**, and L. Xiao. Grad-GradaGrad? A Non-Monotone Adaptive Stochastic Gradient Method. arXiv 2206.06900, 2022.

**DISSERTATIONS**

- [11] **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.
- [12] **B. Zhou**. Quadratic Optimization for Nonsmooth Optimization Algorithms: Thoery and Numerical Experiments. Master Thesis, Department of Industrial & Systems Engineering, Lehigh University, Bethlehem, PA, USA, 2018.

**TECHNICAL  
REPORTS**

- [13] 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. SQP Methods for Deterministically Constrained Stochastic Optimization. *Department of Systems and Industrial Engineering, The University of Arizona, Tucson, AZ, USA*, February 2023.
- [2] Baoyu Zhou. SQP Methods for Inequality Constrained Stochastic Optimization. *INFORMS Annual Meeting, Indianapolis, IN, USA*, October 2022.
- [3] Baoyu Zhou. SQP Methods for Deterministically Constrained Stochastic Optimization. *FutureBAProf Workshop, The University of Iowa, Iowa City, IA, USA*, August 2022.

- [4] Baoyu Zhou. SQP Methods for Inequality Constrained Stochastic Optimization. *International Conference on Continuous Optimization, Bethlehem, PA, USA*, July 2022.
- [5] 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.
- [6] Baoyu Zhou. An Inexact Sequential Quadratic Method For Nonlinear Equality Constrained Stochastic Optimization. *INFORMS Annual Meeting, Anaheim, CA, USA*, October 2021.
- [7] Baoyu Zhou. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. *MOPTA Conference (Virtual), Bethlehem, PA, USA*, August 2021.
- [8] Baoyu Zhou. SQP for Nonlinear Equality Constrained Stochastic Optimization. *MOPTA Conference (Virtual), Bethlehem, PA, USA*, August 2021.
- [9] Baoyu Zhou. SQP Methods for Equality Constrained Stochastic Optimization. *SIAM Conference on Optimization (Virtual), Spokane, WA, USA*, July 2021.
- [10] Baoyu Zhou. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. *SIAM Conference on Computational Science and Engineering (Virtual), Fort Worth, TX, USA*, March 2021.
- [11] Baoyu Zhou. Manifold Sampling for Optimizing Nonconvex Piecewise-Smooth Compositions. *INFORMS Annual Meeting (Virtual), National Harbor, MD, USA*, November 2020.
- [12] Baoyu Zhou. Limited-Memory BFGS with Displacement Aggregation. *INFORMS Annual Meeting, Seattle, WA, USA*, October 2019.
- [13] Baoyu Zhou. Limited-Memory BFGS with Displacement Aggregation. *MOPTA Conference, Bethlehem, PA, USA*, August 2019.

## TEACHING EXPERIENCE

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

## PROFESSIONAL EXPERIENCE

<b>Cost Engineer Intern</b> <b>Fiat Chrysler Automobiles, Shanghai, China</b>	Mar. 2016 – May 2016
<b>Technical Assistant Intern</b> <b>Shenyang Blower Works Group Corporation, Shenyang, China</b>	Aug. 2015 – Sept. 2015

## HONORS & AWARDS

<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

**MENTORSHIP  
EXPERIENCE**

**Ph.D. Students**

- Jiahao Shi (University of Michigan) 2021 – present  
*co-supervised with Prof. Albert S. Berahas*  
 Topics: Algorithms for Constrained Stochastic and Derivative-Free Optimization

**Undergraduate Students**

- Zihong Yi (University of Michigan) 2021 – 2022  
*co-supervised with Prof. Albert S. Berahas*  
 Topics: Accelerating Stochastic Sequential Quadratic Programming for Equality Constrained Optimization using Predictive Variance Reduction

**ACADEMIC  
SERVICE**

**Professional Affiliations**

- Society for Industrial and Applied Mathematics (SIAM) 2021 – present
- Institute for Operations Research and Management Sciences (INFORMS) 2018 – present

**Professional Community Service**

- Vice President, Lehigh University INFORMS Student Chapter 2020 – 2021

**Organized Conference Sessions**

- ICCOPT Conference
  - *Advances in Nonlinear Optimization*, Bethlehem, PA, USA, July 2022.
  - *Large-Scale, Nonlinear, and Stochastic Optimization IV*, 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–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)
- Journal of Machine Learning Research (1)
- Journal of Optimization Theory and Applications (1)

- Machine Learning (1)
- Management Science (1)
- Mathematical Programming (1)
- Mathematical Programming Computation (1)
- Mathematics of Computation (1)
- Optimization Methods and Software (2)
- SIAM Journal on Optimization (2)

**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*)