# Baoyu Zhou

CONTACT INFORMATION	2860 IOE Building 1205 Beal Avenue Ann Arbor, MI 48109	+1 (551) 228-9835 zbaoyu@umich.edu https://baoyuzhou18.github.io	
RESEARCH INTERESTS	Large-scale Continuous Optimization, Constrained Stochastic Optimization, Nonsmooth Optimiza- tion, Optimization Methods for Machine Learning		
ACADEMIC POSITIONS	Postdoctoral Researcher The University of Michigan, Ann An Department of Industrial and Operation Supervisor: Prof. Albert S. Berahas The University of Chicago, Chicago, Booth School of Business Supervisor: Prof. Haihao (Sean) Lu Topics: Two-stage Stochastic Programm	Aug. 2022 – present bor, MI s Engineering IL ing, Convex Constrained Optimization	
EDUCATION	<ul> <li>Lehigh University</li> <li>Ph.D. in Industrial &amp; Systems Engineering Advisor: Prof. Frank E. Curtis Doctoral Committee: Frank E. Curtis Nocedal (Northwestern), Daniel P. Rob</li> <li>M.S. in Industrial &amp; Systems Engineering</li> <li>Shanghai Jiao Tong University</li> <li>B.S.E. in Mechanical Engineering</li> <li>The Chinese University of Hong Kong Undergraduate Exchange Student</li> </ul>	Aug. 2018 – May 2022 (Lehigh), Albert S. Berahas (U of Michigan), Jorge inson (Lehigh), and Luis Nunes Vicente (Lehigh) Aug. 2016 – May 2018 Aug. 2012 – Aug. 2016 Jan. 2015 – Apr. 2015	
RESEARCH EXPERIENCE	<ul> <li>Research Assistant <ul> <li>Lehigh University, Bethlehem, PA</li> <li>Department of Industrial &amp; Systems Eng</li> <li>Supervisor: Prof. Frank E. Curtis</li> <li>Topics: Large-scale Nonlinear Optimizat</li> </ul> </li> <li>Research Intern <ul> <li>Facebook, Inc., New York, NY</li> <li>Facebook, AI Research</li> <li>Supervisor: Dr. Aaron Defazio</li> <li>Topics: Nonconvex and Stochastic Optim</li> </ul> </li> <li>Givens Associate <ul> <li>Argonne National Laboratory, Lemo</li> <li>Mathematics and Computer Science Div</li> <li>Supervisor: Dr. Jeffrey M. Larson</li> <li>Topics: Composite Nonsmooth Optimizat</li> </ul> </li> </ul>	Aug. 2018 – May 2022 gineering ion, Constrained Stochastic Optimization May 2021 – Aug. 2021 nization with Deep Learning Applications. May 2020 – Aug. 2020 ont, IL ision	
	Visiting Research Assistant Northwestern University, Evanston,	June 2017 – Aug. 2017 IL	

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

PUBLISHED JOURNAL ARTICLES

# 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 Nonconvex 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.
- PUBLISHED CONFERENCE ARTICLES

### WORKING PAPERS

- [6] J. C. N. Liang, H. Lu, and B. Zhou. Online Ad Procurement in Non-stationary Autobidding Worlds. Thirty-seventh Conference on Neural Information Processing Systems, 2023.
- [7] J. R. Birge, H. Lu, and B. Zhou. On the Convergence of L-shaped Algorithms for Two-Stage Stochastic Programming. arXiv 2309.01244, 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** [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

- Baoyu Zhou. Next Generation Algorithms for Constrained Stochastic Optimization. School of Computing and Augmented Intelligence, Arizona State University, Tempe, AZ, USA, January 2024.
- [2] Baoyu Zhou. Next Generation Algorithms for Constrained Stochastic Optimization. Department of Economics and Business, Colorado School of Mines, Golden, CO, USA, January 2024.
- [3] Baoyu Zhou. Next Generation Algorithms for Constrained Stochastic Optimization. Operations Research and Industrial Engineering Program, The University of Texas at Austin, Austin, TX, USA, January 2024.
- [4] Baoyu Zhou. Next Generation Algorithms for Constrained Stochastic Optimization. Department of Mathematics, Florida State University, Tallahassee, FL, USA, January 2024.
- [5] Baoyu Zhou. New Understandings on L-shaped Methods for Two-Stage Stochastic Programming. INFORMS Annual Meeting, Phoenix, AZ, USA, October 2023.
- [6] Baoyu Zhou. New Understandings on L-shaped Methods for Two-Stage Stochastic Programming. Cornell Young Researcher Workshop, Ithaca, NY, USA, October 2023. (poster)
- [7] Baoyu Zhou. Methods for Constrained Stochastic Optimization: Theory and Practice. Argonne National Laboratory, Lemont, IL, USA, September 2023.
- [8] Baoyu Zhou. Inexact Bundle Methods for Two-Stage Stochastic Programming. MOPTA Conference, Bethlehem, PA, USA, August 2023.
- [9] Baoyu Zhou. Inexact Bundle Methods for Two-Stage Stochastic Programming. School of Mathematics, The University of Edinburgh, Edinburgh, Scotland, July 2023.
- [10] Baoyu Zhou. Inexact Bundle Methods for Two-Stage Stochastic Programming. SIAM Conference on Optimization, Seattle, WA, USA, June 2023.
- [11] Baoyu Zhou. SQP Methods for Deterministically Constrained Stochastic Optimization. Department of Systems and Industrial Engineering, The University of Arizona, Tucson, AZ, USA, February 2023.
- [12] Baoyu Zhou. SQP Methods for Inequality Constrained Stochastic Optimization. INFORMS Annual Meeting, Indianapolis, IN, USA, October 2022.
- [13] Baoyu Zhou. SQP Methods for Deterministically Constrained Stochastic Optimization. FutureBAProf Workshop, The University of Iowa, Iowa City, IA, USA, August 2022.
- [14] Baoyu Zhou. SQP Methods for Inequality Constrained Stochastic Optimization. International Conference on Continuous Optimization, Bethlehem, PA, USA, July 2022.
- [15] 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.
- [16] Baoyu Zhou. An Inexact Sequential Quadratic Method For Nonlinear Equality Constrained Stochastic Optimization. INFORMS Annual Meeting, Anaheim, CA, USA, October 2021.
- [17] Baoyu Zhou. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. MOPTA Conference, Bethlehem, PA, USA, August 2021.
- [18] Baoyu Zhou. SQP for Nonlinear Equality Constrained Stochastic Optimization. MOPTA Conference, Bethlehem, PA, USA, August 2021.
- [19] Baoyu Zhou. SQP Methods for Equality Constrained Stochastic Optimization. SIAM Conference on Optimization, Spokane, WA, USA, July 2021.
- [20] Baoyu Zhou. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. SIAM Conference on Computational Science and Engineering, Fort Worth, TX, USA, March 2021.
- [21] Baoyu Zhou. Manifold Sampling for Optimizing Nonconvex Piecewise-Smooth Compositions. INFORMS Annual Meeting, National Harbor, MD, USA, November 2020.

	[22] Baoyu Zhou. Limited-Memory BFGS with Displacement Meeting, Seattle, WA, USA, October 2019.	Aggregation. INFORMS Annual	
	[23] Baoyu Zhou. Limited-Memory BFGS with Displacement A Bethlehem, PA, USA, August 2019.	Aggregation. MOPTA Conference,	
TEACHING EXPERIENCE	Bootcamp Organizer and Instructor Lehigh University, Bethlehem, PA	Aug. 2021	
	Teaching Assistant Mentor Shanghai Jiao Tong University, Shanghai, China	Sept. 2014 – Aug. 2016	
	Undergraduate Teaching Assistant Shanghai Jiao Tong University, Shanghai, China VV156: Honors Calculus II	Fall 2013, Spring 2014, Fall 2015	
	VM240: Intro to Dynamics and Vibrations	Summer 2015	
PROFESSIONAL EXPERIENCE	Cost Engineer Intern Fiat Chrysler Automobiles, Shanghai, China	Mar. 2016 – May 2016	
	Technical Assistant Intern Shenyang Blower Works Group Corporation, Shenyan	Aug. 2015 – Sept. 2015 ng, China	
HONORS & AWARDS	Elizabeth V. Stout Dissertation Award, Lehigh Universi SIAM Student Travel Award	ity 2022 2021	
	Van Hoesen Family Best Publication Award, Lehigh ISE	E Department 2021	
	P.C. Rossin Doctoral Fellow, Lehigh University	2021	
	Ph.D. Student of the Year, Lehigh ISE Department	2021	
	Lehigh University Fellowship	2018 - 2019	
	Outstanding Freshman Scholarship, Shanghai Jiao Tong	<b>University</b> 2012 – 2016	
	Outstanding Academic Scholarship, Shanghai Jiao Tong	University 2015	
MENTORSHIP EXPERIENCE	Ph.D. Students		
	• Wanping Dong (University of Michigan)	2023 - present	
	co-supervised with Prof. Albert S. Berahas		
	Topics: Algorithms for Large-Scale Stochastic Optimization with General Constraints		
	• Jinwen Yang (University of Chicago)	2023 - present	
	co-supervised with Prot. Haihao (Sean) Lu		
	Topics: Quasi-Newton methods for Constrained Optimization Problems		
	• Jianao Shi (University of Michigan)	2021 – present	
	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 Professiona

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.
- INFORMS Optimization Society Conference
- Methods for Large-Scale Nonlinear and Stochastic Optimization (I-III), Houston, TX, USA, March 2024.
- 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	(4)
• EURO Journal on Computational Optimization	(1)
• 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)
• Journal of Scientific Computing	(1)
• Machine Learning	(1)
• Management Science	(2)
• Mathematical Programming	(2)

	• Mathematical Programming Computation	(1)	
	• Mathematics of Computation	(1)	
	• Optimization Methods and Software	(2)	
	• SIAM Journal on Mathematics of Data Science	(1)	
	• SIAM Journal on Matrix Analysis and Applications	(1)	
	• SIAM Journal on Optimization	(4)	
	Conferences Reviewed for $(\# \text{ of articles reviewed})$		
	• When Machine Learning meets Dynamical Systems: Theory and Applications (I Workshop, AAAI 2023	MLmDS) (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; Dynami Programming; Applied Operations Research; Optimization Methods in Machine Leaning; Mining of Large Datasets; Quantum Computing for Optimization		
COMPUTER SKILLS	Programming Language: C/C++, Julia, MATLAB, Python, R		
	Software: AMPL, LINGO, Mathematica, $IAT_EX$		

Solver: CPLEX, MOSEK, GUROBI, SEDUMI