Baoyu Zhou

CONTACT INFORMATION

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RESEARCH INTERESTS

Large-scale Nonlinear Optimization, Nonsmooth Optimization, Constrained Stochastic Optimization, Optimization Methods for Machine Learning and Other Applications.

EDUCATION

Lehigh University

Ph.D. in Industrial & Systems Engineering — Aug. 2018 – Present

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.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 – Present

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] J. Larson, M. Menickelly, and **B. Zhou**. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. *SIAM Journal on Optimization*, 31(4):2638-2664, 2021.

[2] 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.

[3] A. S. Berahas, F. E. Curtis, and **B. Zhou**. Limited-Memory BFGS with Displacement Aggregation. *Mathematical Programming*, https://doi.org/10.1007/s10107-021-01621-6, 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**. Inexact Sequential Quadratic Optimization for Minimizing a Stochastic Objective Function Subject to Deterministic Nonlinear Equality Constraints. arXiv 2107.03512, 2021.

Dissertations

[6] **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

[7] 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. Fast, Efficient and Practical Algorithms for Nonlinear Optimization. *Department of Industrial, Manufacturing and Systems Engineering, Texas Tech University, Lubbock, TX, USA*, December 2021.

[2] Baoyu Zhou. An Inexact Sequential Quadratic Method For Nonlinear Equality Constrained Stochastic Optimization. *INFORMS Annual Meeting, Anaheim, CA, USA*, October 2021.

[3] Baoyu Zhou. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. *MOPTA Conference (Virtual), Bethlehem, PA, USA*, August 2021.

[4] Baoyu Zhou. SQP for Nonlinear Equality Constrained Stochastic Optimization. *MOPTA Conference (Virtual), Bethlehem, PA, USA*, August 2021.

[5] Baoyu Zhou. SQP Methods for Equality Constrained Stochastic Optimization. *SIAM Conference on Optimization (Virtual), Spokane, WA, USA*, July 2021.

[6] Baoyu Zhou. Manifold Sampling for Optimizing Nonsmooth Nonconvex Compositions. *SIAM Conference on Computational Science and Engineering (Virtual), Fort Worth, TX, USA*, March 2021.

[7] Baoyu Zhou. Manifold Sampling for Optimizing Nonconvex Piecewise-Smooth Compositions. *INFORMS Annual Meeting (Virtual), National Harbor, MD, USA*, November 2020.

[8] Baoyu Zhou. Limited-Memory BFGS with Displacement Aggregation. *INFORMS Annual Meeting, Seattle, WA, USA*, October 2019.

[9] Baoyu Zhou. Limited-Memory BFGS with Displacement Aggregation. *MOPTA Conference, Bethlehem, PA, USA*, August 2019.

Teaching Experience

Bootcamp Organizer Aug. 2021
Lehigh University, Bethlehem, PA

Bootcamp Instructor Aug. 2021
Lehigh University, Bethlehem, PA

Teaching Assistant Mentor Sept. 2014 – Aug. 2016
Shanghai Jiao Tong University, Shanghai, China

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 — Mar. 2016 – May 2016
Fiat Chrysler Automobiles, Shanghai, China

Technical Assistant Intern — Aug. 2015 – Sept. 2015
Shenyang Blower Works Group Corporation, Shenyang, China

HONORS & AWARDS

SIAM Student Travel Award — 2021

Ph.D. Student of the Year, Lehigh ISE Department — 2021

Van Hoesen Family Best Publication Award, Lehigh ISE Department — 2021

P.C. Rossin Doctoral Fellow, Lehigh Engineering College — 2021

Lehigh University Fellowship — 2018 – 2019

Shanghai Jiao Tong University Outstanding Freshman Scholarship — 2012 – 2016

Shanghai Jiao Tong University Outstanding Academic Scholarship — 2015

MENTORSHIP EXPERIENCE

Ph.D. Students

- Jiahao Shi (University of Michigan) — 2021 – present

  co-supervised with Prof. Albert S. Berahas

  Topics: Accelerating Stochastic Sequential Quadratic Programming for Equality Constrained Optimization using Predictive Variance Reduction

Undergraduate Students

- Zihong Yi (University of Michigan) — 2021 – present

  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

- INFORMS Annual Meeting
  - *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.

Journals Reviewed for (# of articles reviewed)

- Computational Optimization and Applications (2)

- IEEE Transactions on Automatic Control (1)
- Journal of Machine Learning Research (1)
- Journal of Optimization Theory and Applications (1)
- Machine Learning (1)
- Mathematical Programming (1)
- SIAM Journal on Optimization (1)

Conferences Reviewed for (# of articles reviewed)

- 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 AT LEHIGH

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 Leaning; Mining of Large Datasets; Quantum Computing for Optimization

COMPUTER SKILLS

Programming Language: C/C++, Python, MATLAB, R

Software: AMPL, LINGO, Mathematica, LaTeX

Solver: CPLEX, MOSEK, GUROBI, SEDUMI

LANGUAGES

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