Bohan Zhou

Contact Information

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University of California, Santa Barbara.
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Research Interests

optimal transport, scientific machine learning, foundations of data science, variational inference, information geometry, calculus of variations, partial differential equations.

Education

Department of Mathematics, UC Davis, USA

PhD in Applied Mathematics (Sep 2014 - June 2020)
- Advisor: Qinglan Xia
- Dissertation : From optimal transport to optimal mixing flows and vice versa.

Department of Mathematics, UC Davis, USA

M.S. in Applied Mathematics (Sep 2014 - Dec 2016)
- Initial Advisor: Joseph Biello, Steve Shkoller

Department of Mathematics, Zhejiang University, P.R.China

B.S. in Mathematics & Applied Mathematics (Sep 2010 - June 2014)
- Advisor: Zhi (George) Lin
- Math & Applied Math (Elite Students) in Chu Kochen Honors College

Academic Appointments

Department of Mathematics, UCSB, USA

Visiting Assistant Professor (Sep 2023 - current)
- Mentor: Matt Jacobs.

Department of Mathematics, Dartmouth College, USA

Byrne Instructor in Applied Mathematics (Sep 2020 - June 2023)
- Mentor: Anne Gelb

Publications
Preprint
Expository paper

1. Qinglan Xia and B. Zhou.
   The existence of minimizers for an isoperimetric problem with Wasserstein penalty term in unbounded domains. Advances in Calculus of Variations (2021).
   (https://doi.org/10.1515/acv-2020-0083).
2. B Zhou.
   A note on the equivalence between various mixing scales.
   ArXiv: 2210.10932.
3. B. Zhou and Matt Parno.
   Efficent and exact multimariginal optimal transport with pairwise costs. Journal of Scientific Computing (2024).
   (https://doi.org/10.1007/s10915-024-02572-8).
4. Matt Parno and B. Zhou.
   Python Package: MMOT2D.
   (https://simda-muri.github.io/mmot/).
5. B. Zhou.
   Connections between Bressan's Mixing Conjecture, the Branched Optimal Transport and Combinatorial Optimization.

ArXiv: 2403.02433 (Submitted to the special issue of Journal of Combinatorics on 'Curvature of graphs and applications'.)

6. B. Zhou, Shu Liu, Xinzhe Zuo and Wuchen Li
Accelerated Markov chain Monte Carlo algorithms on discrete states.
ArXiv: 2505.12599 (Under revision, Journal of Machine Learning Research.)
7. Kaheon Kim, B. Zhou and Changbo Zhu and Xiaohui Chen
Sobolev Gradient Ascent for Optimal Transport: Barycenter Optimization and Convergence Analysis.
ArXiv: 2505.13660 (Submitted to International Conference on Learning Representations (ICLR 2026)).
8. Matt Jacobs and B. Zhou.
The Signed Wasserstein Barycenter
Preprint Upon Request.
9. Elie Abdo, Jingyang Shu and B. Zhou.
Dynamics of Two Quasi-Geostrophic PV Sheets.
In preparation.

Student Mentorship

Undergraduate research project on *Exact methods to computational optimal transport in Python*, UCSB (2024 Summer-2025 Summer).

- Shirley Bao (Placement: grad student at Yale) and Wenxuan Xu (Placement: grad student at Brown).
- Github Page: `https://inarihimeko.github.io/BFOT/intro.html`.

Undergraduate research project on *Wasserstein distances between random vectors*, UCSB (2024 Spring-2025 Winter).

- Yijia Lyu (Placement: grad student at Yale).

Grad Research project on *Despeckling problem*, Dartmouth College (2021-2023).

- PhD student Jonathan Lindbloom (joint with Prof. Gelb and Prof. Lee)

Undergraduate research project on *Computational optimal transport*, Dartmouth College (2021-2023).

- Tyler Chen (Placement: MD Student at Carle Illinois College of Medicine).

Teaching Experiences

Math: Calculus; Calculus for the Social and Life Sciences; Differential Equations; Elementary Algebra; Abstract Linear Algebra; Real Analysis.

Computation: Matrix Analysis; Computational Tools for Numerical Analysis; Numerical Methods.

Data: Probability; Introduction to Statistics; Computational Optimal Transport.

Talks & Poster Presentations

IPAM workshop on Sampling, Inference and Data-Driven Physical Modeling in Scientific Machine Learning. Los Angeles, CA. (July 2025)

OSU Mathematics Seminars and Colloquia. Stillwater, OK. (Apr 2025)

USC Probability and Statistics Seminar. Los Angeles, CA. (Apr 2025)

Mathematics of Data, Dynamics and Life Sciences Conference. Irvine, CA. (Mar 2025)

AMS Western Sectional Meeting 2024 Fall. Riverside, CA. (Oct 2024)

ICERM workshop on Interacting Particle Systems: Analysis, Control, Learning and Computation. Providence, RI. (May 2024)

Applied & Computational Mathematics Seminar. Dartmouth, NH. (May 2024)

Joint Mathematics Meetings 2024. San Francisco, CA. (Jan 2024)

Workshop on Scientific Computing and Large Data. Columbia, SC. (Dec 2023)

Oberwolfach Workshop on Variational and Information Flows in ML and OT. Oberwolfach, German. (Nov 2023)

Seminars on Optimal Transport. Santa Barbara, CA. (Oct 2023)

Mathematic Research Committee on Ricci Curvatures of Graphs and Applications to Data Science. Buffalo, NY. (June 2023)

ICERM workshop on Optimal Transport in Data Science. Providence, RI. (May 2023)

New Hampshire Postdoc Research Day. Durham, NH. (April 2023)

Summer school on Analysis and Applied Math. Münster, Germany. (Sep 2022)

SIAM annual meeting. Pittsburgh, PA. (July 2022)

PIMS-IFDS-NSF Summer school on Optimal Transport. Seattle, WA. (June 2022)

Dartmouth Colloquium. Hanover, NH. (May 2022)

2022 NSF FRG Workshop on Discrete Shapes at Harvard CMSA. Boston, MA. (May 2022)

Recent Developments in Geometric Measure Theory and its Applications on the occasion of Bob Hardt's retirement. Rice University, TX. (March 2022)

MURI annual meeting. Dartmouth College, NH. (October 2021)

Analysis Seminar. University of Rochester, PA. (Zoom, November 2020)

Mathematical Research Seminar. Zu Chongzhi Center for Mathematics and Computational Sciences, Duke Kunshan, China. (Zoom, June 2020)

Academic Services

Referee for Annals of Statistics, SIAM Journal on Mathematics of Data Science, Qeios, Journal of Scientific Computing, Foundation of Data Science, International Congress of Chinese Mathematicians.

Organizer of AMS 2026 Spring Eastern Sectional Meeting. (March 2026)

Organizer of Applied Math, PDE & Data Science Seminar, UCSB. (Sep 2023 - Spring 2025)

Section Chair for Southern California Applied Mathematics Symposium (SOCAMS), UCSD. (April 2024)

Section Chair for SIAM Conference on Uncertainty Quantification, Atlanta. (April, 2022)

Organizer of Applied & Computational Mathematics Seminar, Dartmouth College. (Sep 2020 - June 2021, Sep 2022 - June 2023)

Diversity And Community Services

Participant for ESCALA's Culturally Responsive Practices for STEM Faculty Teaching Latinx Students. (August, 2025)

Participant for The Mathematics of Opportunity: Beyond Limits hosted by Just Equations. (Apr, 2025)

Participant for Research Mentor Training hosted by CIMER and Dartmouth. (May, 2023)

Volunteer for Sonia Kovalevsky Day for middle & high school girls and their teachers. (May, 2023)

Selection Committee for Essay Contest on "Biographies of Contemporary Women in Mathematics". (Feb, 2022)

Hearing board of Academic Honor and Conduct, Dartmouth. (Winter 2021)

Honors and Awards

March 2025	Travel Support, UCI.
May 2024 and May 2023	Travel Support, ICERM.
Nov 2023	Travel Support, Oberwolfach.
April 2022	SIAM Early Career Travel Award.
March 2022	Travel Support, Rice.
Jan 2020	Travel Support, EPFL.
June 2019	Travel Support, i$\mathbb{N}\delta$AM.
Feb 2019, Sep 2022	Travel Support, Mathematics Münster.
2018-2020	Departmental Travel Award, UC Davis.
2017	Graduate Program Fellowship, UC Davis.

Reference

- Prof. Matt Jacobs (VAP mentor), UCSB, majaco@ucsb.edu
- Prof. Anne Gelb (postdoc mentor), Dartmouth College, annegelb@math.dartmouth.edu
- Prof. Qinglan Xia (PhD advisor), UC Davis, qlxia@math.ucdavis.edu
- Prof. Katy Craig (on research), UCSB, kcraig@math.ucsb.edu
- Prof. Chris Ograin (on teaching), UCSB, ograin@ucsb.edu
- Prof. John Voight (on teaching), University of Sydney (previous at Dartmouth), jvoight@gmail.com
- Lecturer Emeritus Lawrence J Marx (on teaching), UC Davis, marx@math.ucdavis.edu