

Education

- 2015–2018 **Ph.D in Computer Science.**
Major: Theoretical Machine Learning
School of Computing and Information Sciences, Florida International University, FL
- 2013–2015 **M.S. in Physics.**
Major: Theoretical Physics
Department of Physics, University of Massachusetts, Dartmouth, MA
- 2008–2011 **M.S. in Mathematics.**
Major: Pure Mathematics
Thesis: Nekhoroshev Estimates for Infinite-Dimensional Reversible System with Chain Structure,
Advisor: Xiaoping Yuan
School of Mathematical Science, Fudan University, Shanghai, China
- 2002–2006 **B.S. in Mathematics.**
Major: Pure and Applied Mathematics
School of Mathematical Science, Ocean University of China, Qingdao, China

Academic Appointments

- Jan'2019–
Present **Postdoctoral Scholar (Hosted by Michael I. Jordan).**
Department of Electrical Engineering & Computer Science
University of California, Berkeley

Research Interests

- First-order optimization
- Reinforcement learning, stochastic control and differential game
- Geometrical analysis in fluid dynamics
- Stochastic dynamics under quasi-periodic potential
- Mathematical theory of turbulence and geostrophic turbulence
- Nonlinear Landau damping and KAM theory
- Quantum Hall Effect
- Many-Body Localization: Stability and Chaos

Publications

- **Acceleration via Symplectic Discretization of High-Resolution Differential Equations.**
Bin Shi, Simon S. Du, Weijie J. Su and Michael I. Jordan
Thirty-third Conference on Neural Information Processing Systems, 2019
- **A Conservation Law Method in Optimization.**
Bin Shi, Tao Li and Sundaraja S. Iyengar
The Tenth Workshop on Optimization for Machine Learning
Thirty-first Conference on Neural Information Processing Systems, 2017

- **Mathematical Theories of Machine Learning - Theory and Applications.**

Bin Shi and Sundaraja S. Iyengar
Springer International Publishing, 2020

Preprints

- **Understanding the Acceleration Phenomenon via High-Resolution Differential Equations.**

Bin Shi, Simon S. Du, Michael I. Jordan, and Weijie J. Su
arXiv preprint arXiv:1810.08907, Major Revision in Mathematical Programming

- **On Learning Rates and Schrödinger Operators.**

Bin Shi, Weijie J. Su and Michael I. Jordan
arXiv preprint arXiv:2004.06977, under review of Journal of Machine Learning Research

- **Conjugate and Cut Points in Ideal Fluid Motion.**

Theodore D. Drivas, Gerard Misiołek, **Bin Shi** and Tsuyoshi Yoneda
under review of Journal Annales Mathématiques du Québec, special volume in honor of Professor Shnirelman's 75th birthday

In Preparation

- **On the Hyperparameters in SGD with Momentum.**

Bin Shi

- **Inverse Energy Transfer in the 2D Incompressible Euler Equations.**

Theodore D. Drivas, Gerard Misiołek, **Bin Shi** and Tsuyoshi Yoneda

- **Spectral Theory for Fokker-Planck Equation with Quasi-Periodic Potential.**

Bin Shi and Yunfeng Shi

- **Spectral Theory for Kinetic Fokker-Planck Equation with Quasi-Periodic Potential.**

Bin Shi and Yunfeng Shi

Professional Experience

Journal Review **SIAM Journal on Optimization**, **IEEE Access**

Conf. Review **Neurpis**

Work Experience

2015-2018 Teaching Assistant in Florida International University

- Computer Programming I (COP-2210)
- Computer Programming II (COP-3337)
- Introduction to Algorithms (COT-5407)
- Theory of Computation (COT-5310)

2013-2015 Research Assistant in University of Massachusetts, Dartmouth

2013 Temporary Research Staff in Institute of Oceanology, Chinese Academy of Sciences, China

2008-2011 Teaching Assistant in Fudan University

- Mathematical Analysis
- Riemannian Geometry
- Partial Differential Equations
- Mathematical Method of Classical Mechanics

References: Optimization and Machine Learning

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Pehong Chen Distinguished Professor
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Department of Statistics
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References: Pure Mathematics

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