

# Yuhua Zhu



## CONTACT INFORMATION

Assistant Professor  
Department of Mathematics  
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## EMPLOYMENT

**University of California - San Diego**, La Jolla, CA  
Assistant Professor, Jul. 2022 – present  
Department of Mathematics and Halicioğlu Data Science Institute  
**Stanford University**, Stanford, CA  
Postdoc Scholar, Mathematics, Aug. 2019 – Aug. 2022 (expected)  
Mentor: **Lexing Ying**  
**Simons Institute**, Berkeley, CA  
Long-Term Participant, Geometric Methods in Optimization and Sampling, Aug. – Dec. 2021

## EDUCATION

**University of Wisconsin-Madison**, Madison, WI  
Ph.D. Candidate, Mathematics, Jul. 2015 – May 2019  
Adviser: **Shi Jin**  
M.A., Mathematics, Sep. 2014 – May 2015  
**Shanghai Jiao Tong University**, Shanghai, China  
B.S., Mathematics, *Graduation with High Distinction*, Sep. 2010 – Jun. 2014

## RESEARCH INTERESTS

Interface of PDEs and optimization algorithms;  
Interface of PDEs and sequential decision-making;  
Numerical and Uncertain Aspects of Kinetic and Hyperbolic equations;  
High Dimensional and Multiscale Computations for Physical and Biological problems;

## PUBLISHED

Shi Jin, **Yuhua Zhu**\* and Enrique Zuazua. 2022. The Vlasov Fokker Planck Equation with High Dimensional Parametric Forcing Term. *Numer. Math.*, 150(2):479–519

**Yuhua Zhu**, Lexing Ying and Zachary Izzo. 2022. Borrowing From the Future: Addressing Double Sampling in Model-free Control. *Mathematical and Scientific Machine Learning, PMLR*, pages 1099–1136. PMLR.

Lexing Ying, **Yuhua Zhu**. 2021. A Note on Optimization Formulations of Markov Decision Processes. *Commun. Math. Sci.*, 20(3):727–745

Jing An, Lexing Ying, **Yuhua Zhu**\*. 2021. Why resampling outperforms reweighting for correcting sampling bias with stochastic gradients. *ICLR*.

**Yuhua Zhu**, Lexing Ying. 2020. A Sharp Convergence Rate for a Model Equation of the Asynchronous Stochastic Gradient Descent. *Commun. Math. Sci.* 19(3), 851-863.

**Yuhua Zhu** and Lexing Ying. 2020. Borrowing From the Future: An Attempt to Address Double Sampling. *Mathematical and Scientific Machine Learning, PMLR 107*:246-268.

Xiaowu Dai and **Yuhua Zhu**\*. 2020. On Large Batch Training and Sharp Minima: A Fokker–Planck Perspective. *J. Stat. Theory Pract.* 14(53).

Jose Carrillo, Shi Jin, Lei Li and **Yuhua Zhu**\*. 2020. A consensus-based global optimization method for high dimensional machine learning problems. *ESAIM: Control, Optimisation and Calculus of Variations* 27, S5.

**Yuhua Zhu**. 2019. A Local Sensitivity and Regularity Analysis for the Vlasov-Poisson-Fokker-Planck System with Multi-dimensional Uncertainty and the Spectral Convergence of the Stochastic Galerkin Method. *Netw. Heterog. Media.* 14(4), 677-707.

Pierre Degond, Shi Jin and **Yuhua Zhu**\*. 2019. An Uncertainty Quantification Approach to the Study of Gene Expression Robustness. *Methods Appl. Anal. (A special issue in honor of the 80th birthday of Prof. Ling Hsiao)*

Shi Jin and **Yuhua Zhu**\*. 2018. Hypocoercivity and Uniform Regularity for the Vlasov-Poisson-Fokker-Planck System with Uncertainty and Multiple Scales. *SIAM J. Math. Anal.* 50, 1790-1816.

**Yuhua Zhu** and Shi Jin. 2017. The Vlasov-Poisson-Fokker-Planck System with Uncertainty and a One-Dimensional Asymptotic-Preserving Method. *SIAM Multiscale Model. Simul.*, 15, 1502-1529.

\*: Alphabetical authorship

SUBMITTED

**Yuhua Zhu**, Lexing Ying and Zachary Izzo. 2022. Continuous-in-time limit for bayesian bandits. *Submitted to Journal of Machine Learning Research.*

Xun Tang, Lexing Ying and **Yuhua Zhu**\*. Operator shifting for model-based policy evaluation. *Submitted to Commun. Math. Sci.*

**Yuhua Zhu**, Lexing Ying. Variational Actor-Critic Algorithms. *Under Minor Revision at ESAIM: COCV.*

Michael Herty, Shi Jin and **Yuhua Zhu**\*. Stabilization of the Vlasov Fokker Planck Equation with Reflective Boundary Condition. *Under Revision at Math. Control Relat. F.*

\*: Alphabetical authorship

HONORS AND AWARDS

**John A. Nohel prize**, (An award to the best applied mathematics thesis at UW-Madison), 2018

**SIAM Travel Award**, SIAM Conference on Uncertainty Quantification, 2018

**Student Research Travel Grants**, University of Wisconsin - Madison, 2017

**Elizabeth S. Hirschfelder Scholarship**, (An award to outstanding female mathematics Ph.D. students), 2016

Scholarships at Shanghai Jiao Tong University

- Best Undergraduate Thesis Award, 2014
- Outstanding Graduate of Shanghai Jiao Tong University, 2014
- Academic Excellence Scholarship Class-A, 2012 & 2013

VISITING EXPERIENCE

**Pierre Degond**, Chair Professor in Applied Mathematics at Imperial College London, Nov-Dec, 2018, London, UK

**Micheal Herty**, Professor of Department of Mathematics Center for Computational Engineering Science (CCES), June, 2018, Aachen, Germany



- Math Colloquium, University of Toronto, 1/2022
- Math Colloquium, Washington University in St. Louis, 1/2022
- Math Colloquium, Emory University, 1/2022
- Math Colloquium, Florida State University, 1/2022
- Math Colloquium, University of North Carolina Chapel Hill, 1/2022
- Math Colloquium, University of California, Davis, 1/2022
- Math Colloquium, University of Illinois Urbana-Champaign, 1/2022
- Math Colloquium, University of Illinois Chicago, 1/2022
- Math Colloquium, University of California, Los Angeles, 12/2022
- Math Colloquium, National University of Singapore, 12/2021
- Math Colloquium, University of Maryland, College Park, 12/2021
- Math Colloquium, Chinese University of Hong Kong, Shenzhen, 12/2021
- Winter Young Mathematician Forum, Shanghai Jiao Tong University, China, 12/2021
- Math Colloquium, Peking University, 12/2021
- Math Colloquium, Chinese Academy of Sciences, 11/2021
- Applied and Computational Mathematics Seminar, University of Wisconsin-Madison, 10/2021
- Applied and Computational Math Seminar, University of Minnesota, 10/2021
- CCAM Seminar, Purdue University, 10/2020
- Applied Math Seminar, Stanford University, 01/2020
- ASA Student Chapter, University of Wisconsin-Madison, 11/2018

#### **Presentations at Conferences**

- SIAM Conference on Optimization, Seattle, WA, 05/2023
- Purpose-driven particle systems, Leiden, Netherlands, 03/2023
- SIAM Conference on Data Science, San Diego, CA, 09/2022
- VII Partial Differential Equations, Optimal Design and Numerics, Benasque, Spain, 08/2022
- GMOS Working Group: Consensus Based Optimization, Simons Institute at University of California Berkeley, 09/2021
- Mathematical and Scientific Machine Learning conference, via Zoom, 08/2021
- Mathematical and Scientific Machine Learning Conference, via Zoom, 07/2020
- The 2nd Annual Meeting of the SIAM Texas Louisiana Section, Dallas, TX, 11/2019  
Young Researchers Workshop: Ki-Net 2012-2019, College Park, MD, 10/2019
- Young Researcher Workshop on Uncertainty Quantification and Machine Learning, Shanghai, China, 06/2019
- Multiscale Computations for Kinetic and Related Problems, Raleigh, NC, 11/2018
- UQ for Kinetic Equations, SIAM Conference on Uncertainty Quantification, Garden Grove, CA, 04/2018
- Young Researchers Workshop: Current Trends in Kinetic Theory, College Park, MD, 10/2017
- Hypocoercivity and Sensitivity Analysis in Kinetic Equations and Uncertainty Quantification, Madison, WI, 10/2017
- International Conference on Uncertainty Quantification in Computational Fluid Dynamics, Shanghai, China, 07/2017
- VII Partial Differential Equations, Optimal Design and Numerics, Benasque, Spain, 08/2017
- Summer School on Applied and Stochastic Analysis for Partial Differential Equations, Shanghai, China, 07/2017

- Boundary Value Problems and Multi-scale Coupling Methods for Kinetic Equations, Madison, WI, 04/2016
- Multi-scale Coupling Methods for Hypersonic Vehicle, Beijing, China, 06/2016
- XVI International Conference on Hyperbolic Problems, Aachen, Germany, 08/2016