

Yuhua Zhu



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EMPLOYMENT	University of California - Los Angeles , Los Angeles, CA Assistant Professor, Jul. 2024 – present Department of Statistics and Data Science University of California - San Diego , La Jolla, CA Assistant Professor, Jul. 2022 – Jun. 2024 Department of Mathematics Halıcıoğlu Data Science Institute Stanford University , Stanford, CA Postdoc Scholar, Mathematics, Aug. 2019 – June. 2022 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, <i>Graduation with High Distinction</i> , Sep. 2010 – Jun. 2014	
RESEARCH INTERESTS	My research focuses on the interface between partial differential equations and machine learning. I am particularly interested in using differential equations to understand and design efficient reinforcement learning algorithms, non-convex optimization algorithms and generative algorithms.	
PUBLISHED	Nicolás García Trillos, Aditya Kumar Akash, Sixu Li, Konstantin Riedl, Yuhua Zhu *. 2025. Defending Against Diverse Attacks in Federated Learning Through Consensus-Based Bi-Level Optimization. <i>Philosophical Transactions A</i> , to appear Jose A. Carrillo, Nicolas Garcia Trillos, Sixu Li, Yuhua Zhu *. 2024. FedCBO: Reaching Group Consensus in Clustered Federated Learning through Consensus-based Optimization. <i>Journal of Machine Learning Research.</i> , 25(215):1–51. Yuhua Zhu , Lexing Ying and Zachary Izzo. 2023. Continuous-in-time Limit for Bayesian Bandits. <i>Journal of Machine Learning Research</i> , 24(305): 1–35. Xun Tang, Lexing Ying and Yuhua Zhu *. 2023. Operator Shifting for Model-based Policy Evaluation. <i>Commun. Math. Sci.</i> , to appear.	

- Yuhua Zhu** and Lexing Ying. 2023. Variational Actor-Critic Algorithms. *ESAIM: COCV*, 29(20):26.
- Yuhua Zhu**. 2022. Applications of Fokker Planck Equations in Machine Learning Algorithms. *Advances in Numerical Methods for Hyperbolic Balance Laws and Related Problems*, pages 213–234.
- 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 and **Yuhua Zhu**. 2021. A Note on Optimization Formulations of Markov Decision Processes. *Commun. Math. Sci.*, 20(3):727–745
- Jing An, Lexing Ying and **Yuhua Zhu***. 2021. Why Resampling Outperforms Reweighting for Correcting Sampling Bias with Stochastic Gradients. *ICLR*.
- Yuhua Zhu** and 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

PREPRINT

- Nicolás García Trillos, Sixu Li, Konstantin Riedl, **Yuhua Zhu***. 2024. CB²O: Consensus-Based Bi-Level Optimization.
- Wenlong Mou, **Yuhua Zhu***. 2024. On Bellman Equations for Continuous-time Policy Evaluation: High-order Discretization and Function Approximation.
- Yuhua Zhu**. 2024. PhiBE: A PDE-based Bellman Equation for Continuous Time Policy Evaluation.
- Jose Carrillo, Shi Jin, Haoyu Zhang, **Yuhua Zhu***. 2024. An Interacting Particle Consensus Method for Constrained Global Optimization.

*: Alphabetical authorship

GRANT	<p>Interacting particle system for nonconvex optimization. Jul. 2024–Jun. 2027</p> <ul style="list-style-type: none">- National Science Foundation Award #2529107.- Total Amount: \$249,999 .- Role: Single PI. <p>Development of machine learning technology for matching under a variety of realistic and large-scale preference structures. Jun. 2021–Nov. 2021</p> <ul style="list-style-type: none">- National Science Foundation IIP Award #2133869.- Total Amount: \$50,000. PI: Lexin Li.- Role: Technology Lead (similar to Co-PI).	
TEACHING	<p>University of California - Los Angeles, La Jolla, CA</p> <ul style="list-style-type: none">• STATS 201C: Advanced Modeling and Inference, Spring 2024• STATS 219: Introduction to Reinforcement Learning, Winter 2024 <p>University of California - San Diego, La Jolla, CA</p> <ul style="list-style-type: none">• DSC 291: Partial Differential Equation and Machine Learning, Spring 2024• MATH 173B: Optimization Methods for Data Science II, Winter 2023• DSC 180: Data Science Project, Fall 2022 <p>Supervise four undergraduate students to complete a data science project.</p> <p>Stanford University, Stanford, CA</p> <ul style="list-style-type: none">• Tutorial on Reinforcement Learning, Fall 2020• Tutorial on Multiscale Modeling, Spring 2021 <p>University of Wisconsin-Madison, Madison, WI</p> <p>Teaching Assistant</p> <p>Graded, held weekly office hours, and taught weekly recitation sections.</p> <ul style="list-style-type: none">• Math 211: Calculus, Spring 2018• Math 234: Calculus and Analytic Geometry III, Spring 2017• Math 222: Calculus and Analytic Geometry II, Fall 2016• Math 222: Calculus and Analytic Geometry II, Spring 2016• Math 222: Calculus and Analytic Geometry II, Fall 2015	<p>2022 – present</p> <p>2022 – present</p> <p>2019 – 2021</p> <p>2015–2018</p>