Zhaolin Ren

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Harvard University	Expected 2025
PhD Candidate in Applied Mathematics (Advisor: Prof. Na Li)	
Stanford University	2019
• MS in Statistics	
 BS in Mathematics (with Distinction) 	

Research interest

Education

- Model-free optimization (zeroth-order, Bayesian optimization)
- Representation learning
- Reinforcement learning and stochastic control
- Applications of control, optimization and reinforcement learning in real-world systems, such as bioengineering and fluid control.

Publications

Preprints and submitted manuscripts

- Ren Liu*, **Zhaolin Ren***, Xinhe Zhang*, Qiang Li, Wenbo Wang, Zuwan Lin, Richard T. Lee, Jie Ding, Na Li, Jia Liu. "An AI cyborg system for enhancing organoid maturation" (2024). In preparation for submission at *Nature*. (*: equal contribution)
- Saba Zerefa, **Zhaolin Ren**, Haitong Ma, and Na Li. "Distributed Thompson Sampling under constrained communication" (2024). Under joint review at *IEEE Control Systems Letters* and *American Control Conference (ACC)*.
- **Zhaolin Ren** and Na Li. "Minimizing the Thompson Sampling Regret-to-Sigma Ratio (TS-RSR): a provably efficient algorithm for batch Bayesian Optimization" (2024). Under review at *SIAM Journal for Optimization*.
- **Zhaolin Ren**, Runyu Zhang, Dai Bo and Na Li. "Scalable network representation for network multiagent control" (2024). Under review.

Published articles

- Haitong Ma, **Zhaolin Ren**, Bo Dai and Na Li. "Skill transfer and discovery for sim-to-real learning: A representation-based viewpoint." In *International Conference on Intelligent Robots and Systems (IROS)* (2024).
- Shen Li, Yuyang Zhang, **Zhaolin Ren**, Claire Liang, Na Li, and Julie A Shah. "Enhancing Preference-based Linear Bandits via Human Response Time". Accepted at *NeurIPS* (2024).
- Runyu Zhang, **Zhaolin Ren**, and Na Li. "Gradient play in stochastic games: stationary points, convergence, and sample complexity." Accepted at *Transactions on Automatic Control*.
- **Zhaolin Ren**, Yujie Tang, and Na Li. "Escaping saddle points in zeroth-order optimization: the power of two-point estimators." In *International Conference on Machine Learning* (2023).
- Tongzheng Ren*, Zhaolin Ren*, Haitong Ma, Na Li and Bo Dai. "Stochastic nonlinear control

via finite-dimensional spectral dynamic embedding." Journal version under submission at *Transactions on Automatic Control*. Conference version accepted at the 62nd IEEE Conference on Decision and Control (2023). (*: equal contribution)

- Zhaolin Ren, Yang Zheng, Maryam Fazel, and Na Li. "On controller reduction in Linear Quadratic Gaussian control with performance bounds." In *Learning for Dynamics and Control Conference* (2023).
- Yujie Tang, **Zhaolin Ren**, and Na Li. "Zeroth-order feedback optimization for cooperative multi-agent systems." In *Automatica* (2023).
- Aoxiao Zhong, Hao He, **Zhaolin Ren**, Na Li, and Quanzheng Li. "FedDAR: Federated Domain-Aware Representation Learning." In *International Conference on Learning Representations* (2023).
- **Zhaolin Ren**, Aoxiao Zhong, and Na Li. "LQR with Tracking: A Zeroth-order Approach and Its Global Convergence." In *American Control Conference (ACC)* (2021).
- **Zhaolin Ren**, Zhengyuan Zhou, Linhai Qiu, Ajay Deshpande, and Jayant Kalagnanam. "Delay-Adaptive Distributed Stochastic Optimization." In *Proceedings of the AAAI Conference on Artificial Intelligence* (2020).

Talks and presentations

- "Scalable network representation for network multiagent control" INFORMS Annual Meeting, Oct. 2024
- "Scalable network representation for network multiagent control" Allerton Conference on Communication, Control and Computing, Sep. 2024
- "Stochastic nonlinear control via finite-dimensional spectral dynamic embedding." IEEE Conference on Decision and Control, Dec. 2023
- "Escaping saddle points in zeroth-order optimization: the power of two-point estimators." SIAM Conference on Optimization (OP23), June 2023
- "LQR with Tracking: A Zeroth-order Approach and Its Global Convergence." American Control Conference (ACC), May 2021

Teaching and mentoring

- Teaching assistant for Harvard Eng-Sci 150 (Probability with Engineering Applications), Spring 2023
 - Teaching evaluation score: 5.0/5.0
- Teaching assistant for Harvard AM 121 (Introduction to Linear Optimization), Fall 2020 Teaching evaluation score: 4.8/5.0
- Mentored a first-year PhD student on their first PhD project on distributed Bayesian Optimization (2024).
- Mentored a Harvard undergraduate on their undergraduate thesis on federated reinforcement learning (2022).

Academic service

- Reviewer for Systems and Control Letters
- Reviewer for Transactions on Automatic Control
- Reviewer for Learning for Dynamics & Control (L4DC)