

# Yiheng Lin

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## RESEARCH KEYWORDS

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Online optimization; Online control; Predictive control; Multi-agent reinforcement learning; Decentralized algorithms; Networked systems.

## EDUCATION

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- **California Institute of Technology (PhD Student)** Pasadena, CA, USA  
*Major in Computing and Mathematical Sciences.* Sep 2020 – Jun 2025 (Expected)  
*Advisors: Adam Wierman and Yisong Yue.*
- **Tsinghua University (Bachelor of Engineering)** Beijing, China  
*Major in Computer Science and Technology (Yao Class).* Aug 2016 – Jun 2020
- **California Institute of Technology (Visiting Scholar)** Pasadena, CA, USA  
*Visiting Undergraduate Research Program (VURP).* Jan 2019 – Aug 2019  
*Advisor: Adam Wierman.*

## WORK EXPERIENCE

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- **Citadel Securities (Summer Internship)** Miami, FL, USA  
*Work on quantitative research.* Jun 2024 – Aug 2024
- **Google DeepMind (Student Researcher)** Remote, USA  
*Work on algorithm design in recommender systems.* Jun 2023 – Oct 2023

## SELECTED HONORS

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- Poster session winner at Citadel Securities PhD Summit 2023 (Citadel Securities, 2023);
- The 2022-2023 class of Amazon/Caltech AI4Science Fellow (Caltech, 2023);
- PIMCO Graduate/Postdoctoral Fellow in Data Science (About 4 graduate/postdoctoral students in CMS and HSS department at Caltech each year.) (Caltech, 2022);
- Two of my paper were accepted as Spotlight (< 3% of all submissions) at NeurIPS 2021 and NeurIPS 2019;
- Kortschak Scholar (Prize fellowship founded by Walter and Marcia Kortschak; About 5 top graduate students in CMS department at Caltech each year.) (CMS, Caltech, 2020);
- Yao Award, Recognition Prize (Grant named after Prof. Andrew Chi-Chih Yao; About 10 recipients in IIS, Tsinghua University each year.) (IIS, Tsinghua University, 2019);
- Scholarship of Scientific Innovation (Tsinghua University, 2019);
- Scholarship of Social Work (IIS, Tsinghua University, 2018);
- Scholarship of Academic Excellence (Tsinghua University, 2017);
- First Prize in China Mathematics Olympiad (top 30) and selected as one of students in Prof. Andrew Chi-Chih Yao's class (About 35 undergraduates each year) (Chinese Mathematical Society, 2015).

1. Ruiyang Jin, Zaiwei Chen, **Yiheng Lin**, Jie Song, and Adam Wierman, “Approximate Global Convergence of Independent Learning in Multi-Agent Systems.” Under submission (2024). [[arXiv](#)]
2. Tianyu Chen, **Yiheng Lin**, Nicolas Christianson, Zahaib Akhtar, Sharath Dharmaji, Mohammad Hajiesmaili, Adam Wierman, and Ramesh K. Sitaraman, “SODA: An Adaptive Bitrate Controller for Consistent High-Quality Video Streaming.” Proceedings of the ACM SIGCOMM 2024 Conference (2024). [[Paper link](#)]
3. **Yiheng Lin**, James A. Preiss, Fengze Xie, Emile Anand, Soon-Jo Chung, Yisong Yue, and Adam Wierman, “Online Policy Optimization in Unknown Nonlinear Systems.” Proceedings of Thirty Seventh Conference on Learning Theory, PMLR (2024). [[arXiv](#)]
4. Lauren Conger, **Yiheng Lin**, Adam Wierman, and Eric Mazumdar, “Characterizing Controllability and Observability for Systems with Locality, Communication, and Actuation Constraints.” To appear at the 63rd IEEE Conference on Decision and Control (2024). [[arXiv](#)]
5. Tongxin Li, **Yiheng Lin**, Shaolei Ren, and Adam Wierman, “Beyond Black-Box Advice: Learning-Augmented Algorithms for MDPs with Q-Value Predictions.” Advances in Neural Information Processing Systems 36 (2023). [[arXiv](#)]
6. Zhaoyi Zhou, Zaiwei Chen, **Yiheng Lin**, and Adam Wierman, “Convergence Rates for Localized Actor-Critic in Networked Markov Potential Games.” Proceedings of the Thirty-Ninth Conference on Uncertainty in Artificial Intelligence, PMLR (2023). [[arXiv](#)]
7. Yizhou Zhang\*, Guannan Qu\*, Pan Xu\*, **Yiheng Lin**, Zaiwei Chen, and Adam Wierman, “Global Convergence of Localized Policy Iteration in Networked Multi-Agent Reinforcement Learning.” Proceedings of the ACM on Measurement and Analysis of Computing Systems (2023). [[arXiv](#)]
8. Yingying Li, James A. Preiss, Na Li, **Yiheng Lin**, Adam Wierman, and Jeff Shamma, “Online Switching Control with Stability and Regret Guarantees.” The fifth Annual Conference on Learning for Dynamics and Control (2023). [[arXiv](#)]
9. **Yiheng Lin**, James A. Preiss, Emile Anand, Yingying Li, Yisong Yue, and Adam Wierman, “Online Adaptive Policy Selection in Time-Varying Systems: No-Regret via Contractive Perturbations.” Advances in Neural Information Processing Systems 36 (2023). [[arXiv](#)]
10. Sungho Shin, **Yiheng Lin**, Guannan Qu, Adam Wierman, and Mihai Anitescu, “Near-Optimal Distributed Linear-Quadratic Regulator for Networked Systems.” SIAM Journal on Control and Optimization (2023). [[arXiv](#)]
11. Tongxin Li, Ruixiao Yang, Guannan Qu, **Yiheng Lin**, Adam Wierman, and Steven Low, “Certifying Black-Box Policies With Stability for Nonlinear Control.” IEEE Open Journal of Control Systems (2023). [[arXiv](#)]
12. **Yiheng Lin**, Yang Hu, Guannan Qu, Tongxin Li, and Adam Wierman, “Bounded-Regret MPC via Perturbation Analysis: Prediction Error, Constraints, and Nonlinearity.” Advances in Neural Information Processing Systems 35 (2022). [[arXiv](#)]
13. **Yiheng Lin**, Judy Gan, Guannan Qu, Yash Kanoria, and Adam Wierman, “Decentralized Online Convex Optimization in Networked Systems.” Proceedings of the 39th International Conference on Machine Learning (2022). [[arXiv](#)]
14. Weici Pan, Guanya Shi, **Yiheng Lin**, and Adam Wierman, “Online Optimization with Feedback Delay and Nonlinear Switching Cost.” Proceedings of the ACM on Measurement and Analysis of Computing Systems (2022). [[arXiv](#)]

15. **Yiheng Lin\***, Yang Hu\*, Guanya Shi\*, Haoyuan Sun\*, Guannan Qu\*, and Adam Wierman, “Perturbation-based Regret Analysis of Predictive Control in Linear Time Varying Systems.” *Advances in Neural Information Processing Systems* 34 (2021). (Spotlight, < 3%). [[arXiv](#)]
16. **Yiheng Lin**, Guannan Qu, Longbo Huang, and Adam Wierman, “Multi-Agent Reinforcement Learning in Stochastic Networked Systems.” *Advances in Neural Information Processing Systems* 34 (2021). [[arXiv](#)]
17. Guanya Shi\*, **Yiheng Lin\***, Soon-Jo Chung, Yisong Yue, and Adam Wierman, “Online Optimization with Memory and Competitive Control.” *Advances in Neural Information Processing Systems* 33 (2020). [[arXiv](#)]
18. Guannan Qu, **Yiheng Lin**, Adam Wierman, and Na Li, “Scalable Multi-Agent Reinforcement Learning for Networked Systems with Average Reward.” *Advances in Neural Information Processing Systems* 33 (2020). [[arXiv](#)]
19. **Yiheng Lin**, Gautam Goel, and Adam Wierman, “Online Optimization with Predictions and Non-convex Losses.” *Proceedings of the ACM on Measurement and Analysis of Computing Systems* (2020). [[arXiv](#)]
20. Gautam Goel\*, **Yiheng Lin\***, Haoyuan Sun\*, and Adam Wierman, “Beyond Online Balanced Descent: An Optimal Algorithm for Smoothed Online Optimization.” *Advances in Neural Information Processing Systems* 32 (2019). (Spotlight, < 3%). [[arXiv](#)]

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#### TALKS AND PRESENTATIONS

- Invited talk at Washington University in St. Louis. Host: Chongjie Zhang (WashU, Oct 2024);
- Invited talk at University of California, San Diego. Host: Yang Zheng (UCSD, Feb 2024);
- Invited presentation at 2023 INFORMS Annual Meeting (Phoenix, AZ, USA, Oct 2023);
- Invited talk at Harvard University. Host: Na Li (Harvard, Aug 2023);
- Invited talk at University of California, Santa Barbara. Host: Yu-Xiang Wang (UCSB, Nov 2022);
- Invited talk at Johns Hopkins University. Host: Enrique Mallada (JHU, Jul 2022);
- Short oral presentation at ICML 2022 (Baltimore, MA, USA, Jul 2022);
- Short oral presentation at NeurIPS 2021 (Virtual, Dec 2021);
- Invited presentation at 2021 Asilomar Conference on Signals, Systems, and Computers (Virtual, Nov 2021);
- Invited presentation at 2021 INFORMS Annual Meeting (Virtual, Oct 2021);
- Long oral presentation at ACM SIGMETRICS 2020 (Virtual, Jun 2020).

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#### ACADEMIC SERVICES

- **Journal Reviewer**

I served as a reviewer for journals including the IFAC journal *Automatica*, *Artificial Intelligence*, the IEEE *Transactions on Pattern Analysis and Machine Intelligence*, the IEEE *Transactions on Automatic Control*, and the IEEE/ACM *Transactions on Networking*.

- **Conference Reviewer**

I served as a reviewer for NeurIPS 2021-2024, ICML 2022-2024, ICLR 2022-2023, CDC 2024.

## MENTORING AND TEACHING

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- **Undergraduate Researcher Mentoring**

Emile Anand                               2022 - 2023 (Currently Georgia Tech PhD)

Yang Hu                                       2021 - 2022 (Currently Harvard PhD)

- **Teaching Assistant**

TA for CMS 144 “Networks: Structures and Economics” in the winter term of 2021-2022 at Caltech.