Yiheng Lin

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Research Keywords

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

Education

- **California Institute of Technology (PhD Student)** — Pasadena, CA, USA
  Major in Computing and Mathematical Sciences. Advisors: Adam Wierman and Yisong Yue. — *Sep 2020 – Now*
- **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). Advisor: Adam Wierman. — *Jan 2019 – Aug 2019*

Selected Honors

- 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 IIIS, Tsinghua University each year.) (IIIS, Tsinghua University, 2019);
- Scholarship of Scientific Innovation (Tsinghua University, 2019);
- Scholarship of Social Work (IIIS, 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).

Publications and Preprints

- Y. Zhang*, G. Qu*, P. Xu*, **Y. Lin**, Z. Chen, and A. Wierman, "Global Convergence of Localized Policy Iteration in Networked Multi-Agent Reinforcement Learning." To appear in ACM SIGMETRICS 2023 (2023). **[arXiv]**
- Y. Li, J. A. Preiss, N. Li, **Y. Lin**, A. Wierman, and J. Shamma, "Online Switching Control with Stability and Regret Guarantees." Under submission (2023). **[arXiv]**
- **Y. Lin**, J. A. Preiss, E. Anand, Y. Li, Y. Yue, and A. Wierman, "Online Adaptive Controller Selection in Time-Varying Systems: No-Regret via Contractive Perturbations." Under submission (2022). **[arXiv]**
- **Y. Lin**, H. Yang, G. Qu, and A. Wierman, "Bounded-Regret MPC via Perturbation Analysis: Prediction Error, Constraints, and Nonlinearity." Advances in Neural Information Processing Systems 35 (2022). **[arXiv]**

- T. Li, R. Yang, G. Qu, **Y. Lin**, S. Low, and A. Wierman, "Equipping Black-Box Policies with Model-Based Advice for Stable Nonlinear Control." To appear in IEEE Open Journal of Control System (2022). [**arXiv**]
- S. Shin, **Y. Lin**, G. Qu, A. Wierman, and M. Anitescu, "Near-Optimal Distributed Linear-Quadratic Regulator for Networked Systems." To appear in SIAM Journal on Control and Optimization (2022). [**arXiv**]
- **Y. Lin**, J. Gan, G. Qu, Y. Kanoria, and A. Wierman, "Decentralized Online Convex Optimization in Networked Systems." In International Conference on Machine Learning (2022). [**arXiv**]
- W. Pan, G. Shi, **Y. Lin**, and A. Wierman, "Online optimization with feedback delay and nonlinear switching cost." Proceedings of the ACM on Measurement and Analysis of Computing Systems, 6(1), pp.1-34 (2022). [**arXiv**]
- **Y. Lin***, Y. Hu*, H. Sun*, G. Shi*, G. Qu*, and A. Wierman, "Perturbation-based Regret Analysis of Predictive Control in Linear Time Varying Systems." Advances in Neural Information Processing Systems 34 (2021). (Spotlight, $< 3\%$). [**arXiv**]
- **Y. Lin**, G. Qu, L. Huang, and A. Wierman, "Multi-Agent Reinforcement Learning in Stochastic Networked Systems." Advances in Neural Information Processing Systems 34 (2021). [**arXiv**]
- G. Shi*, **Y. Lin***, S. Chung, Y. Yue, and A. Wierman, "Online Optimization with Memory and Competitive Control." Advances in Neural Information Processing Systems 33 (2020). [**arXiv**]
- G. Qu, **Y. Lin**, A. Wierman, and N. Li, "Scalable Multi-Agent Reinforcement Learning for Networked Systems with Average Reward." Advances in Neural Information Processing Systems 33 (2020). [**arXiv**]
- **Y. Lin**, G. Goel, and A. Wierman, "Online Optimization with Predictions and Non-convex Losses." Proceedings of the ACM on Measurement and Analysis of Computing Systems, 4(1), pp.1-32 (2020). [**arXiv**]
- G. Goel*, **Y. Lin***, H. Sun*, and A. Wierman, "Beyond Online Balanced Descent: An Optimal Algorithm for Smoothed Online Optimization." Advances in Neural Information Processing Systems 32 (2019). (Spotlight, $< 3\%$). [**arXiv**]

Talks and Presentations

- 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).

Academic Services

- **Journal Reviewer**
  I served as a reviewer for journals including Artificial Intelligence, the IEEE Transactions on Automatic Control, and the IEEE/ACM Transactions on Networking in 2022.
- **Conference Reviewer**
  I served as a reviewer for ICLR 2023, NeurIPS 2022, ICML 2022, ICLR 2022, and NeurIPS 2021.

Mentoring and Teaching

- **Undergraduate Mentoring**

Emile Anand	SURF, 2022 & 2023
Yang Hu	SURF, 2021 & 2022

- **Teaching Assistant**
  TA for CMS 144 "Networks: Structures and Economics" in the winter term of 2021-2022.