

Wen Sun

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Education

Ph.D. in Robotics, Robotics Institute, School of Computer Science, Carnegie Mellon University, USA.

M.S. Computer Science, University of North Carolina at Chapel Hill, USA, 2014.

B.S. Computer Science, Simon Fraser University, Canada, and Zhejiang University, China, 2012 (SFU and ZU Dual Degree).

Employment

July 2020 - present: **Assistant Professor**, Computer Science Department, Cornell University

July 2019 - June 2020: **Postdoctoral Researcher**, Microsoft Research at New York City

August 2014 - June 2019: **Research Assistant**, Robotics Institute, Carnegie Mellon University

Publications

Monograph

Alekh Agarwal, Nan Jiang, Sham Kakade, Wen Sun, "Reinforcement Learning: Theory and Algorithms" (link to the working draft)

Pre-Prints

Kaiwen Wang, Junxiong Wang, Yueying Li, Nathan Kallus, Immanuel Trummer, Wen Sun, JoinGym: An Efficient Query Optimization Environment for Reinforcement Learning, *arXiv*, 2023

Jonathan D. Chang, Kianté Brantley, Rajkumar Ramamurthy, Dipendra Misra, Wen Sun, "Learning to Generate Better Than Your LLM", *arXiv*, 2023

Wenhao Zhan, Masatoshi Uehara, Wen Sun, Jason D. Lee, "How to Query Human Feedback Efficiently in RL", *arXiv*, 2023

Wenhao Zhan, Masatoshi Uehara, Nathan Kallus, Jason D. Lee, Wen Sun, "Provable Offline Reinforcement Learning with Human Feedback", *arXiv*, 2023

Masatoshi Uehara, Masaaki Imaizumi, Nan Jiang, Nathan Kallus, Wen Sun, Tengyang Xie, "Finite Sample Analysis of Minimax Offline Reinforcement Learning: Completeness, Fast Rates and First-Order Efficiency", *Under review for Annual of Statistics*

Journal Publications

Thodoris Lykouris*, Max Simchowitz*, Aleksandrs Slivkins*, Wen Sun*, “Corruption Robust Exploration in Episodic Reinforcement Learning”, in *Mathematics of Operations Research*, 2023

Wen Sun, Jur van den Berg, Ron Alterovitz, “Stochastic Extended LQR: Optimization-based Motion Planning under Uncertainty,” in *IEEE. Transactions on Automation Science and Engineering (TASE)*, 2016.

Wen Sun, Sachin Patil, Ron Alterovitz, “High-Frequency Replanning Under Uncertainty Using Parallel Sampling-Based Motion Planning,” in *IEEE. Transactions on Robotics (TRO)*, 2015.

Refereed Conference Proceedings

Kaiwen Wang, Kevin Zhou, Runzhe Wu, Nathan Kallus, Wen Sun, “The Benefits of Being Distributional: Small-Loss Bounds for Reinforcement Learning”, *Neural Information Processing Systems (NeurIPS)*, 2023

Ayush Sekhari*, Karthik Sridharan*, Wen Sun*, Runzhe Wu*, Contextual Bandits and Imitation Learning via Preference-Based Active Queries, *Neural Information Processing Systems (NeurIPS)*, 2023

Ayush Sekhari*, Karthik Sridharan*, Wen Sun*, Runzhe Wu*, Selective Sampling and Imitation Learning via Online Regression , *Neural Information Processing Systems (NeurIPS)*, 2023

Masatoshi Uehara, Nathan Kallus, Jason D. Lee, Wen Sun, “Refined Value-Based Offline RL under Realizability and Partial Coverage”, *Neural Information Processing Systems (NeurIPS)*, 2023

Masatoshi Uehara, Haruka Kiyohara, Andrew Bennett, Victor Chernozhukov, Nan Jiang, Nathan Kallus, Chengchun Shi, Wen Sun, “Future-Dependent Value-Based Off-Policy Evaluation in POMDPs ”, *Neural Information Processing Systems (NeurIPS) 2023* (Spotlight)

Katie Z Luo, Zhenzhen Liu, Xiangyu Chen, Yurong You, Sagie Benaim, Cheng Perng Phoo, Mark Campbell, Wen Sun, Bharath Hariharan, Kilian Q Weinberger, “Reward Finetuning for Faster and More Accurate Unsupervised Object Discovery”, *Neural Information Processing Systems (NeurIPS) 2023*

Alekh Agarwal*, Yuda Song*, Wen Sun*, Kaiwen Wang*, Mengdi Wang*, Xuezhou Zhang*, “Provable Benefits of Representational Transfer in Reinforcement Learning ”, *Conference on Learning Theory (COLT)*, 2023

Masatoshi Uehara, Ayush Sekhari, Jason D. Lee, Nathan Kallus, Wen Sun, “Computationally Efficient PAC RL in POMDPs with Latent Determinism and Conditional Embeddings”, *International Conference on Machine Learning (ICML)*, 2023

Runzhe Wu, Masatoshi Uehara, Wen Sun, “Distributional Offline Policy Evaluation with Predictive Error Guarantees ”, *International Conference on Machine Learning (ICML)*, 2023

Yihan Du, Longbo Huang, Wen Sun, “Multi-task Representation Learning for Pure Exploration in Linear Bandits”, *International Conference on Machine Learning (ICML)*, 2023

Kaiwen Wang, Nathan Kallus, Wen Sun, “Near-Minimax-Optimal Risk-Sensitive Reinforcement Learning with CVaR ”, *International Conference on Machine Learning (ICML)*, 2023

Yuda Song, Yifei Zhou, Ayush Sekhari, J. Andrew Bagnell, Akshay Krishnamurthy, Wen Sun, “Hybrid RL: Using Both Offline and Online Data Can Make RL Efficient ”, *International Conference on Learning Representations (ICLR)*, 2023

Wenhao Zhan, Masatoshi Uehara, Wen Sun, Jason D. Lee, “PAC Reinforcement Learning for Predictive State Representations”, *International Conference on Learning Representations (ICLR)*, 2023

Masatoshi Uehara, Ayush Sekhari, Jason D. Lee, Nathan Kallus, Wen Sun, "Provably Efficient Reinforcement Learning in Partially Observable Dynamical Systems ", *Neural Information Processing System (NeurIPS) 2022*

Jonathan Chang, Kaiwen Wang, Nathan Kallus, Wen Sun, " Learning Bellman Complete Representations for Offline Policy Evaluation", *International Conference on Machine Learning (ICML) 2022 (Long Talk)*

Xuezhou Zhang, Yuda Song, Masatoshi Uehara, Mengdi Wang, Alekh Agarwal, Wen Sun, "Efficient Reinforcement Learning in Block MDPs: A Model-free Representation Learning Approach", *International Conference on Machine Learning (ICML) 2022*

Yurong You, Katie Z Luo, Cheng Perng Phoo, Wei-Lun Chao, Wen Sun, Bharath Hariharan, Mark Campbell, and Kilian Q. Weinberger, "Learning to Detect Mobile Objects from LiDAR Scans Without Labels", *The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2022*

Anirudh Vemula, Wen Sun, Maxim Likhachev, Drew Bagnell, "On the Effectiveness of Iterative Learning Control ", *Learning for Dynamics & Control Conference (L4DC) 2022*

Yuda Song, Ye Yuan, Wen Sun, Kris Kitani, "Online No-regret Model-Based Meta RL for Personalized Navigation ", *Learning for Dynamics & Control Conference (L4DC) 2022*

Masatoshi Uehara, Xuezhou Zhang, Wen Sun, "Representation Learning for Online and Offline RL in Low-rank MDPs", *International Conference on Learning Representations (ICLR) 2022 (Spotlight)*

Masatoshi Uehara, Wen Sun, "Pessimistic Model-based Offline Reinforcement Learning under Partial Coverage", *International Conference on Learning Representations (ICLR) 2022*

Ye Yuan, Yuda Song, Zhengyi Luo, Wen Sun, Kris Kitani, "Transform2Act: Learning a Transform-and-Control Policy for Efficient Agent Design", *International Conference on Learning Representations (ICLR) 2022 (Oral)*

Yurong You, Katie Luo, Xiangyu Chen, Junan Chen, Wei-Lun Chao, Wen Sun, Bharath Hariharan, Mark Campbell, and Kilian Q Weinberger, "Hindsight is 20/20: Leveraging Past Traversals to Aid 3D Perception ", *International Conference on Learning Representations (ICLR) 2022*

Xuezhou Zhang, Yiding Chen, Jerry Zhu, Wen Sun, "Corruption-Robust Offline Reinforcement Learning", *International Conference on Artificial Intelligence and Statistics (AISTATS) 2022*

Jonathan Chang, Masatoshi Uehara, Dhruv Sreenivas, Rahul Kidambi, Wen Sun, "Mitigating Covariate Shift in Imitation Learning via Offline Data Without Great Coverage ", in *Neural Information Processing Systems (NeurIPS) 2021*

Rahul Kidambi, Jonathan Chang, Wen Sun, "MOBILE: Model-Based Imitation Learning From Observation Alone", in *Neural Information Processing Systems (NeurIPS), 2021*

Xuezhou Zhang, Yiding Chen, Xiaojin Zhu, Wen Sun, "Robust Policy Gradient against Strong Data Corruption ", *International Conference on Machine Learning (ICML), 2021*

Simon Du*, Sham M. Kakade*, Jason D. Lee*, Shachar Lovett*, Gaurav Mahajan*, Wen Sun*, Ruosong Wang, "Bilinear Classes: A Structural Framework for Provable Generalization in RL ", *International Conference on Machine Learning (ICML), 2021 (Long Talk)*

Luke Wang, Yiwei Bai, Wen Sun, Thorsten Joachims, "Fairness of Exposure in Stochastic Bandits", *International Conference on Machine Learning (ICML), 2021*

Yuda Song, Wen Sun, "PC-MLP: Model-based Reinforcement Learning with Policy Cover Guided Exploration", *International Conference on Machine Learning (ICML)*, 2021

Thodoris Lykouris*, Max Simchowitz*, Aleksandrs Slivkins*, Wen Sun*, "Corruption robust exploration in episodic reinforcement learning", *Conference on Learning Theory (COLT)*, 2021

Alekh Agarwal*, Mikael Henaff*, Sham Kakade*, Wen Sun*, "PC-PG: Policy Cover Directed Exploration for Provable Policy Gradient Learning," in *Neural Information Processing Systems (NeurIPS)* 2020

Alekh Agarwal*, Sham Kakade*, Akshay Krishnamurthy*, Wen Sun*, "FLAMBE: Structural Complexity and Representation Learning of Low Rank MDPs," in *Neural Information Processing Systems (NeurIPS)* 2020 (Oral)

Sham Kakade*, Akshay Krishnamurthy*, Kendall Lowrey*, Motoya Ohnishi*, Wen Sun*, "Information Theoretic Regret Bounds for Online Nonlinear Control," in *Neural Information Processing Systems (NeurIPS)* 2020

Wenhao Luo, Wen Sun, Ashish Kapoor, "Multi-Robot Collision Avoidance under Uncertainty with Probabilistic Safety Barrier Certificates," in *Neural Information Processing Systems (NeurIPS)* 2020 (Spotlight)

Kiante Brantley*, Miroslav Dudik*, Thodoris Lykouris*, Sobhan Miryoosefi*, Max Simchowitz*, Aleksandrs Slivkins*, Wen Sun*, "Constrained Episodic Reinforcement Learning in Concave-convex and Knapsack Settings," in *Neural Information Processing Systems (NeurIPS)* 2020

Yuda Song, Aditi Mavalankar, Wen Sun, Sicun Gao, "Provably Efficient Model-based Policy Adaptation," in *International Conference on Machine Learning (ICML)*, 2020

Kiante Brantley, Wen Sun, Mikael Henaff, "Disagreement-Regularized Imitation Learning," in *International Conference on Representation Learning (ICLR)*, 2020 (Spotlight)

Liyiming Ke, Sanjiban Choudhury, Matt Barnes, Wen Sun, Gilwoo Lee, Siddhartha Srinivasa, "Imitation Learning as f-Divergence Minimization," in *International Workshop on the Algorithmic Foundations of Robotics (WAFR)*, 2020

Huaian Diao*, Rajesh Jayaram*, Zhao Song*, Wen Sun*, David P. Woodruff*, "Optimal Sketching for Kronecker Product Regression and Low Rank Approximation," in *Neural Information Process Systems (NeurIPS)*, 2019

Yuzhe Ma, Xuezhou Zhang, Wen Sun, Jerry Zhu, "Policy Poisoning in Batch Reinforcement Learning and Control," in *Neural Information Process Systems (NeurIPS)*, 2019

Wen Sun, Anirudh Vemula, Byron Boots, J. Andrew Bagnell, "Provably Efficient Imitation Learning from Observation Alone," in *International Conference on Machine Learning (ICML)*, 2019 (Long Talk)

Wen Sun, Alina Beygelzimer, Hal Daumé III, John Langford, Paul Mineiro, "Contextual Memory Tree," in *International Conference on Machine Learning (ICML)*, 2019 (Long Talk)

Wen Sun, Nan Jiang, Akshay Krishnamurthy, Alekh Agarwal, John Langford, "Model-based RL in CDPs: PAC bounds and Exponential Improvements over Model-free Approaches," in *Conference on Learning Theory (COLT)*, 2019.

Anirudh Vemula, Wen Sun, J. Andrew Bagnell, "Contrasting Exploration in Parameter and Action Space: A Zeroth-Order Optimization Perspective," in *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2019.

Wen Sun, Geoffrey Gordon, Byron Boots, J. Andrew Bagnell, "Dual Policy Iteration," in *Neural Information Processing Systems (NeurIPS)*, 2018

Ahmed Hefny, Zita Marinho, Wen Sun, Siddhartha Srinivasa, Geoffrey Gordon, "Recurrent Predictive State Policy Networks," in *International Conference on Machine Learning (ICML)*, 2018

Wen Sun, J. Andrew Bagnell, Byron Boots, "Truncated Horizon Policy Search: Combining Reinforcement Learning and Imitation Learning," in *International Conference on Learning Representation (ICLR)*, 2018.

Huaian Diao*, Zhao Song*, Wen Sun*, David Woodruff*, "Sketching for Kronecker Product Regression and P-splines," in *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2018. (Oral)

Wen Sun, Arun Venkatraman, Geoff Gordon, Byron Boots, J. Andrew Bagnell, "Deeply AggreVaTeD: Differentiable Imitation Learning for Sequential Prediction," in *International Conference on Machine Learning (ICML)*, 2017.

Wen Sun, Debadeepta Dey, Ashish Kapoor, "Safety-Aware Algorithms for Adversarial Contextual Bandits," in *International Conference on Machine Learning (ICML)*, 2017.

Arun Venkatraman, Nicholas Rhinehart, Wen Sun, Lerrel Pinto, Martial Hebert, Byron Boots, Kris M. Kitani, J. Andrew Bagnell, "Predictive-State Decoders: Encoding the Future into Recurrent Networks," in *Neural Information Processing Systems (NIPS)*, 2017

Wen Sun, Nitesh Sood, Debadeepta Dey, Gireeja Ranade, Siddharth Prakash, Ashish Kapoor, "No-Regret Replanning Under Uncertainty," in *International Conference on Robotics and Automation (ICRA)*, 2017

Hanzhang Hu, Wen Sun, Arun Venkatraman, Martial Hebert, and J. Andrew Bagnell, "Online Gradient Boosting on Stochastic Data Streams", in *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2017.

Wen Sun, Arun Venkatraman, Byron Boots, J. Andrew Bagnell, "Learning to Filter with Predictive State Inference Machines," in *International Conference on Machine Learning (ICML)*, 2016.

Wen Sun, Roberto Capobianco, Geoffrey J. Gordon, J. Andrew Bagnell, Byron Boots, "Learning to Smooth with Bidirectional Predictive State Inference Machines," in *Uncertainty in Artificial Intelligence (UAI)*, 2016.

Wen Sun, J. Andrew Bagnell, "Online Bellman Residual and Temporal Difference Algorithms with Predictive Error Guarantees," in *Sister-Conference Best Paper Track, Joint Conference on Artificial Intelligence (IJCAI) 2016*.

Arun Venkatraman, Wen Sun, Martial Hebert, Byron Boots, and J. Andrew Bagnell, "Inference Machines for Nonparametric Filter Learning," in *International Joint Conference on Artificial Intelligence (IJCAI)*, 2016.

Arun Venkatraman, Wen Sun, Martial Hebert, J. Andrew Bagnell, Byron Boots, "Online Instrumental Variable Regression with Applications to Online Linear System Identification," in *AAAI Conference on Artificial Intelligence (AAAI)*, 2016.

Wen Sun, J. Andrew Bagnell, "Online Bellman Residual Algorithms with Predictive Error Guarantees," in *Uncertainty in Artificial Intelligence (UAI)*, 2015. (Best Student Paper Award)

Wen Sun, Islam Khalil, Sarthak Misra, Ron Alterovitz, "Motion Planning for Paramagnetic Microparticles under Motion and Sensing Uncertainty," in *International Conference on Robotics and Automation (ICRA)*, 2014.

Wen Sun, Luis Torres, Jur van den Berg, Ron Alterovitz, “Safe Motion Planning for Imprecise Robotic Manipulators by Minimizing Probability of Collision,” in *International Symposium of Robotics Research (ISRR)*, 2013.

(* indicates α - β order)

Funding

NSF IIS, RI: Small: Towards Provably Efficient Representation Learning in Reinforcement Learning via Rich Function Approximation (\$384,616), 2022-2025, PI

DARPA, CASTLE: LaNCer: LeArning Network CyBERagents (\$3M), 2022-2026, co-PI

Cornell Infosys Collaboration: (\$ 100K), 2023-2025, PI.

Teaching Experience

Instructor: CS 4780 Introduction to Machine Learning, Cornell, Fall 2022,2023.

Instructor: CS 4789 Introduction to Reinforcement Learning, Cornell, Spring 2021.

Instructor: CS 6789 Foundations of Reinforcement Learning, Cornell, Fall 2020,Fall 2021, Spring 2023.

Teaching Assistant: ROB 16831 Statistical Techniques in Robotics, CMU, Fall 2017.

Guest Lecturer: ROB 16831 Statistical Techniques in Robotics, CMU, Fall 2017 & 2018, Spring 2018.

Professional Service

Journal and Conference Article Reviewing

Area Chair, Neural Information Processing Systems (NeurIPS), 2021, 2022,2023

Area Chair, International Conference on Machine Learning (ICML), 2023

Senior Program Committee, Association for the Advancement of Artificial Intelligence, AAAI, 2020, 2021

Reviewer, Operation Research, 2021

Reviewer, Journal of Artificial Intelligence Research, 2020

Reviewer, Symposium on Foundations of Computer Science (FOCS), 2019

Reviewer, International Conference on Machine Learning (ICML), 2019, 2020

Reviewer, Neural Information Processing Systems (NeurIPS), 2016, 2018 (**Ranked among top 200 reviewers**), 2019, 2020

Reviewer, International Conference on Artificial Intelligence and Statistics (AISTATS), 2019

Reviewer, Conference on Artificial Intelligence (AAAI), 2019

Reviewer, Asian Conference on Machine Learning (ACML), 2019

Reviewer, Conference of Robot Learning (CORL), 2018

Reviewer, Robotics: Science and Systems (RSS), 2016

Reviewer, International Conference on Intelligent Robots and Systems (IROS), 2014,2015,2016

Reviewer, International Conference on Robotics and Automation (ICRA), 2016, 2017, 2018