

Overview

Research	<p>I am dedicated to advancing responsible AI that benefits both our society and the environment. My research focuses on creating ethical AI systems, including safeguarding AI for trustworthy decision process in high-stakes environments and minimizing the environmental and societal inequities during the AI deployment. Towards this goal, I investigate both algorithmic foundations and empirical methodologies, centered on:</p> <p>Trustworthy Online Algorithms: Addressing fundamental theoretical and algorithmic challenges in online algorithms, towards strict robustness, safety and fairness guarantees.</p> <p>Sustainable AI: Modeling and measuring the resource consumption and environmental footprint during the deployment of AI system, mitigating the negative impacts with principled approaches, including geographical load balancing and hardware reconfiguration.</p> <p>Environmental and Social Fairness: Developing algorithmic solutions to mitigate the environmental and social inequities imposed by emerging AI systems.</p>
Social Impact	<p>To benefit society at large, my research impacts have extended beyond high-quality publications in top academic venues (e.g. ICML, NeurIPS, SIGMETRICS, ACM e-Energy, INFOCOM) and reached the broader society.</p> <p>Promoting awareness of ‘AI sustainability and equity’ among the public</p> <ul style="list-style-type: none">• My research contributes to raising public consciousness about sustainability and equity, being featured in over 1000 leading news outlets across approximately 100 countries, including <i>The Associated Press, The Wall Street Journal, The Washington Post, Bloomberg, Forbes, CNBC, The Times, The Guardian, Scientific American.</i> <p>Informing public policies</p> <ul style="list-style-type: none">• My research on AI sustainability and equity has gained recognition from many international organizations, including the United Nations Educational, Scientific and Cultural Organization (UNESCO, in the UN’s world water development report) and the World Health Organization (WHO, in the WHO guidance on ethics & governance of Artificial Intelligence for health)

Selected Publications

CACM	Pengfei Li , Jianyi Yang, Mohammad A. Islam, Shaolei Ren, “ Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models ”, Communications of the ACM, 2025 (Accepted)
NeurIPS	Pengfei Li , Jianyi Yang, Adam Wierman and Shaolei Ren, “ Robust Learning for Smoothed Online Convex Optimization with Feedback Delay ,” Conference on Neural Information Processing Systems, 2023. [Link]
SIGMETRICS	Pengfei Li* , Jianyi Yang*, and Shaolei Ren, “ Expert-Calibrated Learning for Online Optimization with Switching Costs ,” ACM International Conference on Measurement and Modeling of Computer Systems, 2022. (*equal contribution) [Link]

Education

10/2020 - Present	University of California, Riverside , Riverside, CA, USA Ph.D. in Computer Science (expected 2025/06), Advisor: <i>Dr. Shaolei Ren</i>
06/2024 - Present	California Institute of Technology , Pasadena, CA, USA Visiting Ph.D. in CMS, in collaboration since 2022. Mentor: <i>Dr. Adam Wierman</i>
09/2018-05/2020	Johns Hopkins University , Baltimore, MD, USA M.S.E. in Robotics, Advisor: <i>Dr. Alan Yuille, Dr. Gregory Hager</i> Laboratory for Computational Sensing and Robotics Faculty Scholarship
08/2014-05/2018	Zhejiang University , Hangzhou, Zhejiang, China B.E. major in Electrical Engineering and Automation Outstanding Graduate , minor in Chu Kochen (CKC) Honors College

¹Last updated in 2025/04/09

Selected Honors & Awards

2025	Dissertation Completion Fellowship Award , UC Riverside
2024	Best Notes Paper Award (1 out of 40 notes paper submissions), ACM e-Energy
2020	Dean's Distinguished Fellowship , UC Riverside
2018	LCSR Faculty Scholarship (1 out of 200 applicants), JHU
2018	Outstanding Graduates of Zhejiang University (top 5%), ZJU
2016	First-class Scholarship for Outstanding Students (top 5%), ZJU

Industry Experience

06/2023–09/2023	Nokia Bell Labs , Murray Hill, NJ, USA Research Intern, Mentor: <i>Dr. Matthew Andrews</i> Leveraging diverse IoT sensors to enhance photorealistic digital twins for autonomous warehouse operations
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Full Publications

(* denotes equal contribution)

Journal Papers

CACM	Pengfei Li , Jianyi Yang, Mohammad A. Islam, Shaolei Ren, “ Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models ”, Communications of the ACM, 2025 (Accepted)
POMACS	Jianyi Yang, Pengfei Li , Mohammad J. Islam and Shaolei Ren, “ Online Allocation with Replenishable Budgets: Worst Case and Beyond ”, Proceedings of the ACM on Measurement and Analysis of Computing Systems, Volume 8, Issue 1, Article No. 4, Mar. 2024. [Link]
POMACS	Pengfei Li* , Jianyi Yang*, and Shaolei Ren, “ Expert-Calibrated Learning for Online Optimization with Switching Costs ”, Proceedings of the ACM on Measurement and Analysis of Computing Systems, Volume 6, Issue 2, Article No. 28, Jun. 2022. [Link]

Conference Papers

SIGMETRICS	Pengfei Li* , Jianyi Yang*, Adam Wierman, and Shaolei Ren, “ Learning-Augmented Decentralized Online Convex Optimization in Networks ”, ACM International Conference on Measurement and Modeling of Computer Systems, 2025. [Link]
NeurIPS	Jianyi Yang, Pengfei Li , Adam Wierman, Shaolei Ren, “ Online Budgeted Matching with General Bids ”, Conference on Neural Information Processing Systems, 2024. (Accepted)
ICML	YeJia Liu, Jianyi Yang, Pengfei Li , Tongxin Li, Shaolei Ren, “ Building Socially-Equitable Public Models ”, International Conference on Machine Learning, 2024. (acceptance rate: 27.0%) [Link]
eEnergy	Pranjol Sen Gupta, Md Rajib Hossen, Pengfei Li , Shaolei Ren, Mohammad A. Islam, “ A dataset for research on water sustainability ”, ACM International Conference on Future Energy Systems, 2024. (Best Notes Paper Award , 1 out of 40 notes paper submissions) [Link]
eEnergy	Pengfei Li , Jianyi Yang, Adam Wierman, Shaolei Ren, “ Towards Environmentally Equitable AI via Geographical Load Balancing ”, ACM International Conference on Future Energy Systems, 2024. (acceptance rate: 28.2%) [Link]
SIGMETRICS	Jianyi Yang, Pengfei Li , Mohammad J. Islam and Shaolei Ren, “ Online Allocation with Replenishable Budgets: Worst Case and Beyond ”, ACM International Conference on Measurement and Modeling of Computer Systems, 2024. (acceptance rate: 15.2%) [Link]
NeurIPS	Pengfei Li , Jianyi Yang, Adam Wierman and Shaolei Ren, “ Robust Learning for Smoothed Online Convex Optimization with Feedback Delay ”, Conference on Neural Information Processing Systems, 2023. (acceptance rate: 26.1%) [Link]
NeurIPS	Jianyi Yang, Pengfei Li , Tongxin Li, Adam Wierman and Shaolei Ren, “ Anytime-Constrained Reinforcement Learning with Policy Prior ”, Conference on Neural Information Processing Systems, 2023. (acceptance rate: 26.1%) [Link]

ICML	Pengfei Li , Jianyi Yang and Shaolei Ren, “ Learning for Edge-Weighted Online Bipartite Matching with Robustness Guarantees ”, International Conference on Machine Learning, 2023. (acceptance rate: 27.9%) [Link]
INFOCOM	Pengfei Li , Jianyi Yang, and Shaolei Ren, “ Robustified Learning for Online Optimization with Memory Costs ”, IEEE International Conference on Computer Communications, 2023. (acceptance rate: 19%) [Link]
SIGMETRICS	Pengfei Li* , Jianyi Yang*, and Shaolei Ren, “ Expert-Calibrated Learning for Online Optimization with Switching Costs ,” ACM International Conference on Measurement and Modeling of Computer Systems, 2022. (acceptance rate: 18%) [Link]
ECCV	He Chen*, Pengfei Guo*, Pengfei Li , Gim Hee Lee and Gregory S. Chirikjian. “ Multi-person 3D Pose Estimation in Crowded Scenes Based on Multi-View Geometry ”, European Conference on Computer Vision (ECCV), 2020. (Spotlight Representation , acceptance rate: 5%) [Link]
VTC-Fall	Xianyu Chang, Chaoqun Yang, Xiufang Shi, Pengfei Li , Zhiguo Shi and Jiming Chen. “ Feature Extracted DOA Estimation Algorithm Using Acoustic Array for Drone Surveillance ”, IEEE 87th Vehicular Technology Conference (VTC-Fall), 2018. [Link]
Workshop Papers	
HotCarbon	YeJia Liu*, Pengfei Li* , Daniel Wong, and Shaolei Ren, “ Geographical Server Relocation: Opportunities and Challenges ”, Workshop on Sustainable Computer Systems (HotCarbon), concurrent with OSDI, 2024 [Link]
HotEthics	Pengfei Li* , YeJia Liu*, Jianyi Yang, and Shaolei Ren, “ Towards Socially and Environmentally Responsible AI ”, Workshop on Hot Topics in Ethical Computer Systems, concurrent with ASPLOS, 2023. [Link]
ASILOMAR	Jianyi Yang, Tongxin Li, Pengfei Li , Adam Wierman, and Shaolei Ren, “ Learning for Online Competitive Control with Policy Priors ”, The Asilomar Conference on Signals, Systems, and Computers, 2023.
CVPRW	Qiuxiao Chen, Pengfei Li , Meng Xu and Xiaojun Qi. “ Sparse Activation Maps for Interpreting 3D Object Detection ”, Safe Artificial Intelligence for Automated Driving (CVPRW) 2021, Best Paper Finalist [Link]

Professional Services

Reviewer/PC	ICML 2025, NeurIPS 2024, AAAI 2024, ICDCS 2024, IEEE Transactions on Mobile Computing, IEEE Systems Journal IEEE/ACM Transactions on Networking, IEEE Transactions on Green Communications and Networking
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Teaching

2021 Fall	Teaching Assistant , University of California, Riverside
2022 Winter	CS-010B Introduction to CS for Science, Mathematics, and Engineering II - C++
2022 Spring	
2020 Spring	Course Assistant , Johns Hopkins University CSCI-601.461 Computer Vision