

# Kai Yan

CSL 130, 1308 W Main St, Urbana, IL 61801, United States

✉ kaiyan3@illinois.edu | 🏠 Kaiyan289.github.io/ | 💻 github.com/Kaiyan289 | 🔗 linkedin.com/in/%E5%BC%80-%E9%A2%9C-18b7931b1

## Research Interest

My research interest is deep learning for better decision making. I have worked on the following fields: 1) reinforcement learning with demonstrations / imitation learning, 2) multi-agent reinforcement learning, 3) prediction-and-optimization algorithms, 4) decision transformer, 5) LLM agent, 6) LLM many-shot in-context learning.

## Education

### University of Illinois Urbana-Champaign

Ph.D. in Computer Science

Urbana, Illinois, US

Sept 2021 - Current

### Peking University

B.S. in Computer Science

Beijing, China

Sept 2017 - Jun 2021

- Member of the Turing Class honor program; graduate with *Summa Cum Laude*
- Serve as the vice president of the student union for the school of EECS; organize multiple large events with hundreds of participants

## Academic Experience

### University of Illinois Urbana-Champaign

Graduate Research Assistant (Co-advised by Prof. Alexander G. Schwing and Prof. Yuxiong Wang)

Urbana, Illinois, US

Sept 2021 - 15th May, 2026 (Estimated)

- Work on demonstration-guided reinforcement learning, imitation learning and Large Language Model reasoning / decision-making
- Experience in normalizing flows, convex optimization, optimal transport, decision transformer and LLM with MCTS search

### Robotics Institute @ Carnegie Mellon University

Visiting Student for Summer Research (Advised by Prof. Changliu Liu)

Remote

Jun 2020 - Jan 2021

- Build a pandemic simulator with reinforcement learning agents as individuals
- Design algorithm for million-level multi-agent training; use Cython for parallelization & acceleration

### National Engineering Laboratory for Video Technology @ Peking University

Undergraduate Research Student (Advised by Prof. Zongqing Lu)

Beijing, China

Jun 2019 - Feb 2020

- Work on adversarial agent in multi-agent systems
- Extensively read papers in reinforcement learning, multi-agent systems and algorithmic game theory, and implement RL algorithms from scratch
- Write a survey on algorithmic game theory and reinforcement learning

### AILab @ Peking University

Undergraduate Research Student (Advised by Prof. Wenxin Li)

Beijing, China

Nov 2018 - Mar 2019

- Study *Introduction to Reinforcement Learning* and papers on Reinforcement Learning
- Program the judge for the game *Tank2* on Botzone, an AI platform for education and the judge is extensively used for freshmen's course projects

## Industry Experience

### ByteDance US

Student Researcher (Advised by Dr. Jiecao Chen)

San Jose, US

Jun 2024 -

- Working on building many-shot in-context learning benchmarks and supervised finetuning for LLM self-plan

### Microsoft Research Asia

Research Intern (Co-advised by Dr. Jie Yan and Dr. Chuan Luo)

Beijing, China

Sept 2020 - Jun 2021

- Design an prediction-and-optimization surrogate framework for linear/quadratic optimization problems with  $\max(\cdot, 0)$  operator, where the parameterized objective needs to be predicted from data
- Awarded *Stars of Tomorrow* title

## Teaching Experience

### University of Illinois Urbana-Champaign

Teaching Assistant (Computational Photography)

Urbana, Illinois, US

Jan 2024 - May 2024

- Host Office hours every week, grade homework and set up midterm exam

- Host a 2-hour seminar of 15 students each week, revising classes and introducing cutting-edge applications of the knowledge taught in class
- Teach how to write & organize lecture notes; grade homework every week

## Publications & Preprints

---

### Conference

- **Kai Yan**, Alexander G. Schwing and Yuxiong Wang. Reinforcement Learning Gradients as Vitamin for Online Finetuning Decision Transformers. In NeurIPS, 2024. (Spotlight; top 2% submission)
- Andy Zhou, **Kai Yan**, Michal Shlapentokh-Rothman, Haohan Wang, Yuxiong Wang. Language Agent Tree Search Unifies Reasoning Acting and Planning in Language Models, In ICML, 2024. (Github > 650 Stars; integrated in LangChain; invited talk @ Autogen Discord)
- **Kai Yan**, Alexander G. Schwing and Yuxiong Wang. Offline Imitation from Observation via Primal Wasserstein State Occupancy Matching. In ICML, 2024.
- **Kai Yan**, Alexander G. Schwing and Yuxiong Wang. A Simple Solution for Offline Imitation from Observations and Examples with Possibly Incomplete Trajectories. In NeurIPS, 2023.
- **Kai Yan**, Alexander G. Schwing and Yuxiong Wang. CEIP: Combining Explicit and Implicit Priors for Reinforcement Learning with Demonstrations. In NeurIPS, 2022.
- **Kai Yan**, Jie Yan, Chuan Luo, Liting Chen, Qingwei Lin and Dongmei Zhang. A Surrogate Objective Framework for Prediction+Optimization with Soft Constraints. In NeurIPS, 2021.

### Preprints

- **Kai Yan**<sup>1</sup>, Zhenggang Tang<sup>1</sup>, Liting Sun, Wei Zhan, Changliu Liu. A Microscopic Pandemic Simulator for Pandemic Prediction Using Scalable Million-Agent Reinforcement Learning. arXiv:2108.06589, 2021.
- **Kai Yan**<sup>1</sup>, Yunlong Lu<sup>1</sup>. Algorithms in Multi-Agent Systems: A Holistic Perspective from Reinforcement Learning and Game Theory. arXiv:2001.06487, 2020.

## Honors & Awards

---

Feb. 2023	<b>Graduate College Conference Presentation Award</b> , University of Illinois at Urbana-Champaign	Urbana, Illinois, US
Jul. 2021	<b>Stars of Tomorrow</b> , Microsoft Research Asia	Beijing, China
Nov. 2020	<b>John Hopcroft Scholarship</b> , Center on Frontiers of Computing Studies (CFCS) @ PKU	Beijing, China
Dec. 2019	<b>National Scholarship &amp; Merit Student</b> , Peking University	Beijing, China
Jan. 2019	<b>Meritorious Winner</b> , International Mathematical Contest in Modeling (MCM)	Remote
Sept. 2018	<b>Founder Scholarship &amp; Merit Student</b> , Peking University	Beijing, China
Apr. 2018	<b>2nd Award</b> , PKU ACM Campus	Beijing, China
Jul. 2016	<b>Silver Medal</b> , National Olympiad in Informatics (NOI)	Mianyang, China
May. 2016	<b>Silver Award</b> , Asian-Pacific Informatics Olympiad (APIO)	Beijing, China

## Services

---

### Reviewer

- AAAI Conference on Artificial Intelligence (**AAAI**), 2025
- Transactions on Machine Learning Research (**TMLR**), 2024 (subreviewer)
- IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023-2024
- Neural Information Processing Systems (**NeurIPS**), 2023-2024
- International Conference on Learning Representations (**ICLR**), 2024-2025
- International Conference on Machine Learning (**ICML**), 2024
- European Conference on Computer Vision (**ECCV**), 2024

### Misc.

- Vice President of the PKU EECS Student Union, 2019-2020

---

<sup>1</sup>Equal contribution.

# Invited Talks

---

Oct. 2024 **Guest Lecturer on Agentic Foundation Models**, University of Michigan

Sep. 2024 **Talks on Language Agent Tree Search (LATS)**, AutoGen Discord Channel

Online

Online

# Skills

---

**Programming & Software**

Python (Pytorch for deep learning, CVXPY / Gurobi / Google ORTools for optimization and Cython for high-performance), C/C++, Java, Matlab, HTML/CSS, JavaScript (Node.js), Qt,  $\LaTeX$ , Microsoft Office, Wireshark

**Language**

English (Professional with TOEFL 117/120), Chinese (Native)