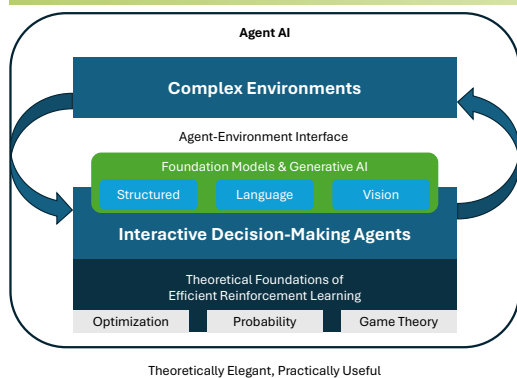


**Interests:** Reinforcement Learning, Trustworthy AI Agent, Probability, Optimization

## Education

- **The Chinese University of Hong Kong (CUHK)**, Shenzhen  
*Ph.D. in Computer Science and Information Engineering.* March 2025 (expected)  
**Supervisor:** [Zhi-Quan \(Tom\) Luo](https://en.wikipedia.org/wiki/Zhi-Quan_Tom_Luo) [https://en.wikipedia.org/wiki/Zhi-Quan\\_Tom\\_Luo](https://en.wikipedia.org/wiki/Zhi-Quan_Tom_Luo)  
**Committee:** *Hongyuan Zha, Xinyun Chen, Baoxiang Wang, John C.S. Lui, Benjamin Van Roy (Stanford & Google DeepMind)*
- **Huazhong University of Science and Technology (HUST)**, Wuhan 2020  
*M.S. in Computer Science. 1st/134 overall, 1st/26 in Computer Theory and Software specialization.*  
*B.E. in Computer Science with Honor. Outstanding Graduate.*

## Research Vision



My research focuses on developing **trustworthy AI agents** that operate reliably in complex, uncertain, and dynamic environments involving human interaction. By advancing methods in **uncertainty** representation, **RL** and **LLM** reasoning & agent, I bridge foundational theory, scalable algorithms, modern computation tools and real-world decision-making. For more details, please visit my [research highlights](#) on my webpage.

## Representative Publications

### Conference Proceedings

- 1 **Yingru Li** and Zhi-Quan Luo. “Prior-dependent analysis of posterior sampling reinforcement learning with function approximation”. In: *AISTATS*. 2024. arXiv: [2403.11175 \[stat.ML\]](#).
- 2 **Yingru Li**, Jiawei Xu, Lei Han, and Zhi-Quan Luo. “Q-Star Meets Scalable Posterior Sampling: Bridging Theory and Practice via HyperAgent”. In: *ICML*. 2024. arXiv: [2402.10228 \[cs.LG\]](#).
- 3 Ziniu Li, **Yingru Li**, Yushun Zhang, Tong Zhang, and Zhi-Quan Luo. “HyperDQN: A Randomized Exploration Method for Deep Reinforcement Learning”. In: *ICLR*. Corresponding author. 2022.
- 4 Qing Wang, **Yingru Li**, Jiechao Xiong, and Tong Zhang. “Divergence-Augmented Policy Optimization”. In: *NeurIPS*. Vol. 32. Co-first author. 2019.

### Journal Articles

- 5 Kun He, **Yingru Li**, Sucheta Soundarajan, and John E. Hopcroft. “Hidden community detection in social networks”. In: *Information Sciences* 425 (2018). Corresponding author, pp. 92–106. ISSN: 0020-0255. DOI: <https://doi.org/10.1016/j.ins.2017.10.019>.

### Preprints

- 6 **Yingru Li**. *Simple, Unified Analysis of Johnson-Lindenstrauss with Applications*. Preprint. Presentation at ICML 2024 Workshop “High-dimensional Learning Dynamics 2024: The Emergence of Structure and Reasoning”. arXiv: [2402.10232 \[stat.ML\]](#).

- 7 **Yingru Li**, Liangqi Liu, Hao Liang, Wenqiang Pu, and Zhi-Quan Luo. *Optimistic Thompson Sampling for No-Regret Learning in Unknown Games*. Preprint. Presentation at ICML 2023 Workshop "The Many Facets of Preference-Based Learning". arXiv: [2402.09456 \[cs.LG\]](#).
- 8 **Yingru Li**, Jiawei Xu, Baoxiang Wang, and Zhi-Quan Luo. *Scalable Exploration via Ensemble++*. Preprint. An early version "Adaptive Foundation Models for Online Decisions: HyperAgent with Fast Incremental Uncertainty Estimation" presented at ICML 2024 Workshops: (1) "Aligning Reinforcement Learning Experimentalists and Theorists"; (2) "Automated Reinforcement Learning: Exploring Meta-Learning, AutoML, and LLMs". arXiv: [2407.13195 \[cs.LG\]](#).
- 9 **Yingru Li**. *Probability Tools for Sequential Random Projection*. Preprint. Presentation at ICML 2024 Workshop "High-dimensional Learning Dynamics 2024: The Emergence of Structure and Reasoning". 2024. arXiv: [2402.14026 \[math.ST\]](#).

## Under Preparation

- 10 **Yingru Li**, Xiaoxiao Liu, Benyou Wang, and Zhi-Quan Luo. "Multi-turn Actor-critic Language Agents for Hospital Outpatient Referral". 2024.
- 11 Fei Yu, **Yingru Li**, Benyou Wang, and Zhi-Quan Luo. "Uncertainty-guided Search for Multi-step Reasoning in LLMs". Co-first author. 2024.

## Professional Experience

- Shenzhen Research Institute of Big Data**, Shenzhen, China 2023 - present  
*Research Assistant*  
 - Innovated game-theoretic algorithms for signal sensing, earning **Best Student Paper Award**.  
 - Contributed to HuatuoGPT agent for multi-turn outpatient referral, now operational in 16 hospitals.
- Tencent AI & Robotics X**, Shenzhen, China 2019 - 2022  
*Research Intern, Agent Center. Topic: Data-efficient Reinforcement Learning (RL)*  
 - High-throughput distributed actor-learner system. Stable off-policy policy optimization (NeurIPS).  
 - Develop HyperAgent on scalable exploration & uncertainty estimation for Deep RL, achieving 7x data efficiency and 20x computation reduction. (Published in ICML; **Best Paper** in 2024 Daoyuan forum).
- SenseTime Research**, Peking, China 2018  
*Computer Vision Trainee Researcher*  
 Continual learning system for multi-label image classification adapting to new labels in data streams.
- Department of Computer Science, Cornell University**, Ithaca, NY 2017  
*Undergraduate Research Assistant*  
 Spearheaded research in hidden community detection, a novel graph-theoretic concept, with Turing award winner John E. Hopcroft. (Published in Information Sciences)
- Microsoft Research Lab**, Asia 2016  
*Research Intern in Theory Center*  
 Influence maximization and learning in social networks. Received Award of Excellence in Internship.

## Awards

- Best Paper Award**, in the 3rd doctoral and postdoctoral Daoyuan academic forum, 2024.
- Best Student Paper**, in IEEE Sensor Array and Multichannel Signal Processing Workshop, 2024.
- SRIBD Ph.D. Fellowship** (Gold Class), by Shenzhen Research Institute of Big Data (SRIBD), 2023.
- Presidential Ph.D. Fellowship**, by The Chinese University of Hong Kong, Shenzhen, 2019–2023.
- Tencent AI Ph.D. Fellowship**, by Tencent & The Chinese University of Hong Kong, Shenzhen, 2018.
- National Scholarship**, by Huazhong University of Science and Technology, 2018.

## Awards (continued)

- **Qiming Star Award (Selected as one of 5 recipients out of 7,112 undergraduates.)**, by Huazhong University of Science and Technology, 2016. **Reports:** [1] [Newspaper](#). [2] [HUST Online](#).
- **First Prize**, in Parallel computation and Application Contest (PAC) held by Intel and CCF, 2015.
- **First Prize**, in China National Mathematics Olympiad (Province-level Math League), 2012.

## Selected Oral Presentations

- **Exploartion at Scale: Theory, Algorithms & Applications**  
a.k.a. "Scalable Exploration Algorithms and LLM Reasoning"  
a.k.a. "HyperAgent: Advancing Scalable Exploration through Fast Uncertainty Estimation in RL"  
a.k.a. "Q\* meets Thompson Sampling: Scaling up Exploration via HyperAgent"  
*Invited talk* in 2024 INFORMS Annual Meeting, Seattle, Oct. 20, 2024.  
*Invited talk* at MIT, Jul. 30, 2024.  
*Invited talk* in International Symposium on Mathematical Programming (ISMP), Montréal, Jul. 25, 2024.  
*Invited talk* at RLChina.org, Jun. 25, 2024.  
*Invited talk* at Princeton University, May 2, 2024.  
*Invited talk* in INFORMS Optimization Society (IOS) Conference, Rice University, Mar. 23, 2024.  
*Contributed talk*, in the third doctoral and postdoctoral Daoyuan academic forum, Jan. 13, 2024.
- **No-Regret Learning in Unknown Game with Applications**  
*Invited talk* in RL Theory Student Workshop at Nanjing University, Aug. 23, 2022.  
*Contributed Talk* in the second doctoral and postdoctoral Daoyuan academic forum, Aug. 20, 2022.
- **HyperDQN: A Randomized Exploration Method for Deep Reinforcement Learning**  
*Contributed Talk* in NeurIPS Workshop Ecological Theory of Reinforcement Learning, Dec. 14, 2021

## Academic Service

- **Reviewer** for Conference on Neural Information Processing Systems (NeurIPS) [12 papers], International Conference on Learning Representations (ICLR) [5 papers]; ICLR Workshop "Bridging the Gap Between Practice and Theory in Deep Learning" [2 papers], ICML Workshop "Aligning Reinforcement Learning Experimentalists and Theorists" [2 papers]. NeurIPS Workshop BDU Reviewers [2 papers]. AISTATS 2025 Conference Reviewers
- **Chair** for [RL Seminar](#) in The Chinese University of Hong Kong, Shenzhen, China (Spring 2019, Summer 2020, Fall 2020, Spring 2021, Summer 2021, Fall 2021, Spring 2022, Fall 2022.); for 2 sessions in INFORMS Annual Meeting 2024 on "Integrating Generative AI with Sequential Decision-making".

## Teaching

- **Stochastic Processes** (STA/DDA4001) Fall 2018
- **Optimization II** (MAT3220) Spring 2019
- **Distributed and Parallel Computing** (CSC4005) Fall 2019
- **Reinforcement Learning** (DDA6105/CIE6023) Fall 2020
- **Matrix Analysis** (CIE6002) Spring 2021
- **Deep Learning and Their Applications** (MDS6224) Spring 2022

My teaching duties include delivering weekly tutorials, correcting assignments, and running laboratory sessions when required, **all in English**.

## Beyond Academia

I enjoy photography. I often play tennis and swim, and occasionally play golf. These activities allow me to live in the moment and help me find physical and spiritual freedom.