QISHEN HAN

Fourth-year Ph.D. student in Computer Science

@ hnickc2017@gmail.com +1 (518)961-6538 Edison, NJ

Personal Website Google Scholar in Linkedin 0000-0003-0268-6918

RESEARCH INTEREST

Intersection between theoretical computer science, artificial intelligence, and economics.

Computational Social Choice, Multi-Agent System, Information Elicitation and Aggregation, Algorithmic Game Theory, Fair Division, and Intersection on Large Language Model and Social Choice.

EDUCATION

Ph.D. in Computer Science, Rutgers University-New Brunswick — New Brunswick, NJ USA

Advisor: Lirong Xia and David Pennock — Aug. 2024-Present (May. 2026 Expected)

Ph.D. Student in Computer Science, Rensselaer Polytechnic Institute (RPI) — Troy, NY USA

GPA: 4.0/4.0 — Sept. 2021- Aug. 2024.

- Coursework: Computing and Quantum Computing (recognition letter), Computational Finance (recognition letter), Approximation Algorithm, Machine Learning from Data, Economics and Computing.

B.S. in Intelligence Science and Technology, Peking University — Beijing, China

A member of Turing Honor Class (*Summa Cum Laude*) GPA: 3.71/4.00 — Sept. 2017 – Jun. 2021

- Coursework: Randomized Algorithm (99/100), Algorithmic Game Theory, Intro to Theoretical Computer Science, Information Theory,, Machine Learning, Algorithm Design and Analysis (Honor Track), Probability Theory and Mathematical Statistics, Stochastic Processes.

B.Ec. in Economics (dual degree), Peking University — Beijing, China

GPA: 3.70/4.00 — Sept. 2018 – Jun. 2021.

- Coursework: Principle of Economics (98/100, Top 10 in class of 400), Econometrics, Game Theory and Society (98/100), Investment, Industrial Organization.

PUBLICATIONS

Determining Winners in Elections with Absent Votes [PDF] — **IJCAI-24**

Qishen Han, Amélie Marian, Lirong Xia

Computational Complexity of Verifying the Group No-show Paradox [PDF] — **IJCAI-24**

Farhad Mohsin, **Qishen Han**, Sikai Ruan, Pin-Yu Chen, Francesca Rossi, and Lirong Xia

Average Envy-freeness for Indivisible Items [PDF] — **EAAMO-23**

Qishen Han, Biaoshuai Tao, and Lirong Xia

Accelerating Voting by Quantum Computation [PDF] — **UAI-23**

Ao Liu, **Qishen Han**, Lirong Xia, and Nengkun Yu

The Wisdom of Strategic Voting [Link][PDF] — **EC-23**

Qishen Han, Grant Schoenebeck, Biaoshuai Tao, and Lirong Xia

Anti-Malware Sandbox Games [PDF] — **AAMAS-22**

Sujoy Sikdar, Sikai Ruan, **Qishen Han**, Paween Pitimanaaree, Jeremy Blackthorne, Bulent Yener, Lirong Xia

EXPERIENCE

Research Assistant — Supervised by Prof. Lirong Xia

Rutgers University-New Brunswick — Aug. 2024 to Present

Rensselaer Polytechnic Institute (RPI) — Sept. 2021 - Aug. 2024

Topic: aggregating information and preferences and making informed decisions via strategic voting.

- Theoretically prove the capability of strategic voting to reach decisions favored by the majority even when voters do not know their preferences in the first place, under majority voting and a two-round polling-voting mechanism.

- Propose a family of game theoretical solution concepts to characterize coalitional strategic behavior with bounded coalition size in multi-agent games and apply the concept to study collusion in peer prediction and voting tasks.
- Determine the complexity of determining possible election winners with absent votes and top-truncated ballots under a wide range of common voting rules.

Software Engineer Intern at Digital Insight Institute, Ipsos Group, Shanghai, China Summer 2023

Supervised by Applied Scientist Yao Zhang

A multinational market research and consulting firm with a leading position in the Chinese market.

Project For Little Red Book: AI-driven connection analysis on products and consumption scenarios.

- Summarized and categorized 500 advertising posts under different dimensions of product categories and consumption scenarios via LLM.
- Generate a bipartite relevance graph for product categories and consumption scenarios.

Project for P&G: AI-driven consumer analysis and advertisement consulting via symposium and chat data.

- Developed an LLM-based program that summarizes a symposium record to a Q&A form with a correctness rate of 80%.
- Created and tested LLM-based virtual consumers that inherit tones, preferences, and expertise from real consumer data.
- Developed an input-adapted data-cleaning tool, improving the efficiency of fellow interns.

Teaching Assistants: Introduction to Artificial Intelligence (2024 Spring, RPI, instructed by Prof. Lirong Xia), Introduction to Computer Systems (2019 Spring, Peking University, instructed by Prof. Yasha Wang).

Reviewers: NeurIPS 2024, ICLR 2024.

Awards: Jingjishijie Scholarship (Dec. 2018, Peking University, top 4 in 50).

NON-ARCHIVAL PAPERS

Strong Equilibria in Bayesian Games with Bounded Group Size **Under Review**

Qishen Han, Grant Schoenebeck, Biaoshuai Tao, and Lirong Xia

Likelihood of the Existence of Average Justified Representation **Under Review**

Qishen Han, Biaoshuai Tao, Lirong Xia, and Houyu Zhou

The Art of Two Round Voting **Under Review**

Qishen Han, Grant Schoenebeck, Biaoshuai Tao, and Lirong Xia

Learning to Explain Voting Rules [PDF] **Extended abstract in AAMAS-23**

Inwon Kang, **Qishen Han**, and Lirong Xia

Truthful Information Elicitation from Hybrid Crowds [PDF] **Under Review**

Qishen Han, Sikai Ruan, Yuqing Kong, Ao Liu, Farhad Mohsin, and Lirong Xia

SKILLS

Theoretical Skills
Computational Complexity analysis, Equilibrium analysis, Mechanism Design and analysis, Randomized/Approximation algorithm.

Programming Skills
Languages: Python, C/C++, Matlab
Python Packages: Numpy, Pandas, Scipy, Scikit-learn, Langchain