

# Ao Liu

Ph.D., Computer Science



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Personal Website



aoliu.cs@gmail.com



Google Scholar

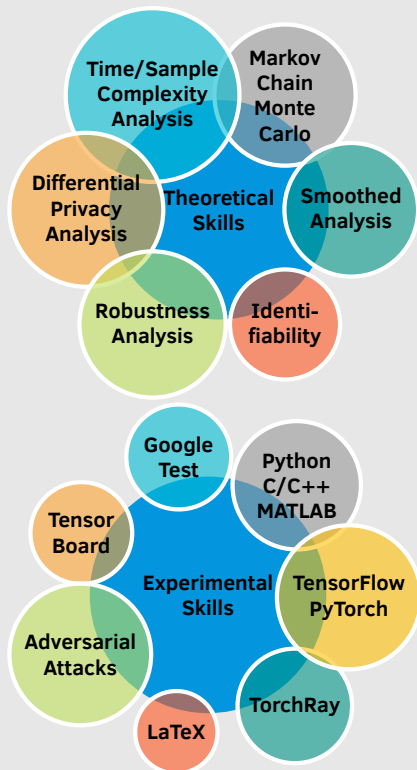


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## Research Fields

Recommendation Systems  
Learning to Rank  
Differential Privacy  
Computational Social Choice  
Robust and Explainable AI  
Quantum Computation

## Skills



## Services and Awards

Journal Reviewer: *Information Sciences*, *Sankhya B*, and *TMLR*

Conference Reviewer:  
*NeurIPS* (20-23), *AAAI* (21&22), *ICML* (22&23), *ICLR* (23&24) and *IJCAI-22*

RPI-IBM AI Horizon Scholarship

RPI Presidential Graduate Research Fellowship

## Education

**Ph.D., Computer Science, Rensselaer Polytechnic Institute (RPI)** Troy, NY USA  
Advisor: Lirong Xia GPA: 4.00/4.00 Jan. 2018 – May 2023  
Thesis: *Group Decision Makings from Partial Preferences* [\[Link\]](#)

**M.Eng., Material Engineering, Rensselaer Polytechnic Institute** Troy, NY USA  
Advisor: Chaitanya Ullal GPA: 3.83/4.00 Aug. 2015 – May 2018

**B.S., Mathematics and Physics, Tsinghua University** Beijing, China  
*Academic Talent Program* GPA: 85/100, Rank 8/50 Aug. 2010 – May 2014  
*Minor in Computer Technology* GPA: 84/100, 28 credits Sep. 2012 – May 2014

## Work Experience

**Research Software Engineer at Google, Sunnyvale** 07/2023- present  
Design and Research Efficient and Effective Recommendation Systems

**Research Intern at Google, Mountain View** Summer 2022  
Project: A More Accurate Position Bias Estimator for Unbiased Learning to Rank

**Visiting Scholar at MIT-IBM Watson AI Lab** Fall 2019 and Summer 2020  
Project: Certifiably Robust Interpretation via Rényi Differential Privacy

## Accepted Conference Papers

**Accelerating Voting by Quantum Computation** [\[PDF\]](#) UAI-23  
[Ao Liu](#), Qishen Han, Lirong Xia, and Nengkun Yu

**Differentially Private Condorcet Voting** [\[PDF\]](#) AAAI-23  
Zhechen Li, [Ao Liu](#), Lirong Xia, Yongzhi Cao, and Hanpin Wang Oral presentation

**The Semi-Random Likelihood of Doctrinal Paradoxes** [\[PDF\]](#) AAAI-22  
[Ao Liu](#), and Lirong Xia

**Learning Mixtures of Random Utility Models with Features from Incomplete Preferences** [\[PDF\]](#) IJCAI-22  
Zhibing Zhao, [Ao Liu](#), and Lirong Xia Oral presentation

**How Private Are Commonly-Used Voting Rules?** [\[PDF\]](#) UAI-20  
[Ao Liu](#), Yun Lu, Lirong Xia, and Vassilis Zikas Oral presentation

**Let It Snow: Adding Pixel Noise to Protect the Users Identity** ETRA-20 Adjunct  
Brendan John, [Ao Liu](#), Lirong Xia, Sanjeev Koppal, and Eakta Jain [\[Link\]](#)

**Near-Neighbor Methods in Random Preference Completion** [\[PDF\]](#) AAAI-19  
[Ao Liu](#), Qiong Wu, Zhenming Liu, and Lirong Xia Oral presentation

**Learning Plackett-Luce Mixture from Partial Preferences** [\[PDF\]](#) AAAI-19  
[Ao Liu](#), Zhibing Zhao, Chao Liao, Pinyan Lu, and Lirong Xia Oral presentation

**Differential Privacy for Eye-Tracking Data** [\[PDF\]](#) ETRA-19  
[Ao Liu](#), L. Xia, A. Duchowski, R. Bailey, K. Holmqvist, and E. Jain Oral presentation

**Excitatory post-synaptic current and synaptic plasticity of semiconducting polymer/electrolyte system** [\[Link\]](#) NVMTS-15  
Oct. 2015  
F. Zeng, F. Li, J. Zhang, Y. Hu, W. Dong, S. Lu, and [Ao Liu](#)

**Influence of ionic size to the pulse responses of semiconducting polymer/electrolyte hetero-junctions** [\[Link\]](#) NVMTS-15  
Oct. 2015  
F. Li, F. Zeng, J. Zhang, Y. Hu, W. Dong, S. Lu, and [Ao Liu](#)

## Patents

**Certifiably Robust Interpretation** US 2022/0067505 A1  
[Ao Liu](#), Sijia Liu, Bo Wu, Lirong Xia, Qi Cheng Li, and Chuang Gan

**Interpretation Maps with Guaranteed Robustness** US 2021/0383497 A1  
[Ao Liu](#), Sijia Liu, Abhishek Bhandwaladar, Chuang Gan, Lirong Xia, and Qi Cheng Li

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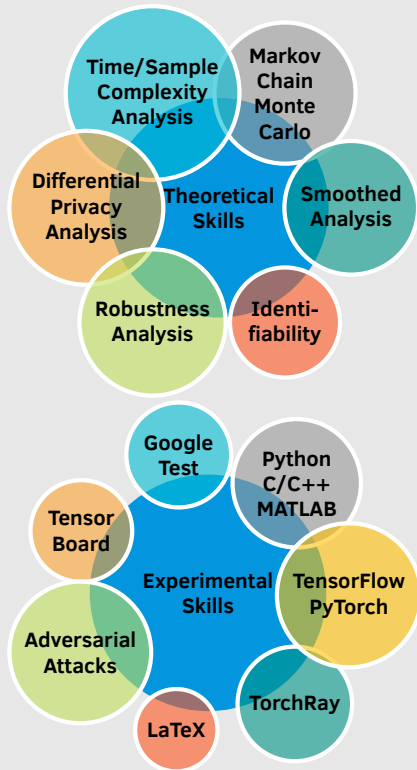


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**RPI-IBM AI Horizon Scholarship**

**RPI Presidential Graduate Research Fellowship**

## Accepted Journal Papers

**Certifiably Robust Interpretation via Rényi Differential Privacy**

*Ao Liu*, Xiaoyu Chen, Sijia Liu, Lirong Xia, and Chuang Gan

Also in proceedings of **AAAI-23 Journal Track**

**AIJ**  
[Link] [ArXiv]  
Oral presentation

**Learning to Design Fair and Private Voting Rules** [PDF]

Farhad Mohsin, *Ao Liu*, Pin-Yu Chen, Francesca Rossi, and Lirong Xia

Also in proceedings of **IJCAI-23 Journal Track**

**JAIR**  
Oral presentation

**Simulation of pulse responses of lithium salt-doped poly-ethyleneoxide** [Link]

*Ao Liu*, F. Zeng, Y. Hu, S. Lu, W. Dong, X. Li, C. Chang, and D. Guo

**J. Polym. Sci. B: Polymer Physics**  
Cover paper finalist  
Apr. 2016

**Thresholds of frequency selectivity of Pt/poly (3-hexylthiophene-2,5-diyl)/polyethylene oxide+Mg<sup>2+</sup>/Pt heterojunctions** [Link]

F. Zeng, S. Lu, W. Dong, *Ao Liu*, X. Li, and C. Chang

**Solid State Ionics**  
Feb. 2016

**Effect of heavy-ion on frequency selectivity of semiconducting polymer/electrolyte heterojunction** [Link]

W. Dong, F. Zeng, S. Lu, X. Li, C. Chang, *Ao Liu*, F. Pan, and D. Guo

**RSC Advances**  
Nov. 2015

**Frequency-dependent learning achieved using semiconducting polymer/electrolyte composite cells** [Link]

W. Dong, F. Zeng, S. Lu, *Ao Liu*, X. Li, and F. Pan

**Nanoscale**  
Sep. 2015

**Controlling Ion Conductance and Channels to Achieve Synaptic-like Frequency Selectivity** [Link]

S. Lu., F. Zeng, W. Dong, *Ao Liu*, X. Li, and J. Luo

**Nano-Micro Letters**  
Dec. 2014

**Optical fiber sensor based on the short-range surface plasmon polariton mode** [Link]

X. Wang, F. Liu, *Ao Liu*, B. Fan, K. Cui, X. Feng, W. Zhang, and Y. Huang

**Chinese Optics Letters**  
Jan. 2014

## Non-Archival Papers

**Smoothed Differential Privacy** [PDF]

*Ao Liu*, Yu-Xiang Wang, and Lirong Xia

**Under Review**

**Trading Off Voting Axioms for Privacy** [PDF]

Zhechen Li, *Ao Liu*, Lirong Xia, Yongzhi Cao, and Hanpin Wang

**Under Review**

**Truthful Information Elicitation from Hybrid Crowd** [PDF]

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

**Under Review**

**Group Decisions from Natural Language-Based Preferences** [PDF] **COMSOC-21**

Farhad Mohsin, L. Luo, W. Ma, I. Kang, Z. Zhao, *Ao Liu*, R. Vaish, and Lirong Xia

## Services, Awards, and Teaching

**Journal Reviewer:** *Information Sciences*, *Sankhya B*, and *TMLR*

**Conference Reviewer:** *NeurIPS* (20,21,22&23), *ICML* (22&23), *AAAI* (21&22), *ICLR* (23&24), and *IJCAI-22*

**RPI-IBM AI Horizon Scholarship**

Supported by Rensselaer-IBM Artificial Intelligence Research Collaboration

Sep. 2019 – May 2022

**RPI Presidential Graduate Research Fellowship**

A One-Year Fellowship for Outstanding Graduate Students [Certificate]

Sep. 2016 – May 2017

**Teaching Assistant of CSCI 4150: Introduction to AI**

Instructor: Lirong Xia

Spring 2023

**Guest Lecture at CSCI 4967/6967: Economics and Computation**

Apr. 2021

**Teaching Assistant of MATH 1020: Calculus II**

Instructor: David A. Schmidt

Fall 2017