Ao Liu

Ph.D., Computer Science

- (+1) 518-233-4797
- Personal Website
- aoliu.cs@gmail.com
- Google Scholar
- LinkedIn

—— Research Fields ——

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

—— Skills ——

Time/Sample Complexity Analysis · Markov Chain Monte Carlo · Differential Privacy Analysis · Theoretical Skills · Smoothed Analysis · Robustness Analysis · Identi-fiability

Google Test · Python C/C++ MATLAB · Tensor Board · Experimental Skills · TensorFlow PyTorch · Adversarial Attacks · LaTeX · TorchRay

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, Mountain View   *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 Papers in Computer Science

Smoothed Differential Privacy [PDF]   *TMLR*
Ao Liu, Yu-Xiang Wang, and Lirong Xia

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

Certifiably Robust Interpretation via Rényi Differential Privacy   *AIJ*
Ao Liu, Xiaoyu Chen, Sijia Liu, Lirong Xia, and Chuang Gan   [Link] [ArXiv]
Also in proceedings of **AAAI-23 Journal Track**   Oral presentation

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

Learning to Design Fair and Private Voting Rules [PDF]   *JAIR*
Farhad Mohsin, *Ao Liu*, Pin-Yu Chen, Francesca Rossi, and Lirong Xia
Also in proceedings of **IJCAI-23 Journal Track**   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

Non-Archival Papers in Computer Science

Trading Off Voting Axioms for Privacy [PDF]   *Under Review*
Zhechen Li, *Ao Liu*, Lirong Xia, Yongzhi Cao, and Hanpin Wang

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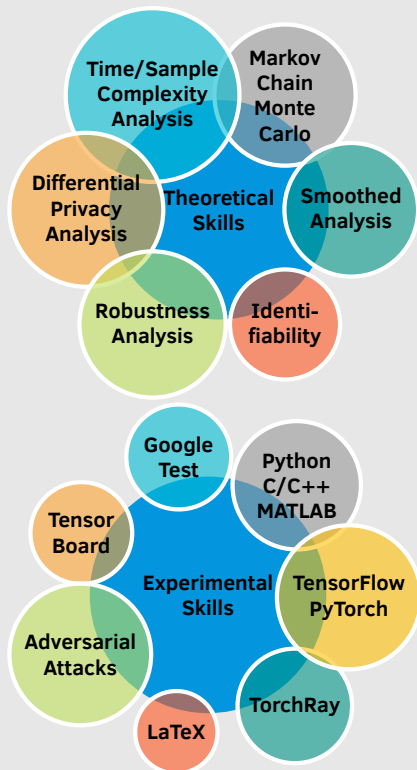Personal Website

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Google Scholar

LinkedIn

—— Research Fields ——

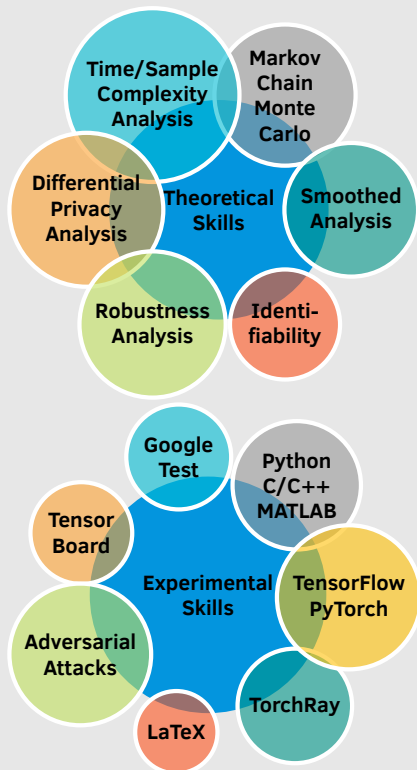**Recommendation Systems**
Learning to Rank
Differential Privacy
Computational Social Choice
Robust and Explainable AI
Quantum Computation

—— Skills ——

—— Services and Awards ——

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

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

Truthful Information Elicitation from Hybrid Crowd [PDF]   *Under Review*
Qishen Han, Sikai Ruan, *Ao Liu*, Farhad Mohsin, Lirong Xia, and Yuqing Kong

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

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 Bhandwaldar, Chuang Gan, Lirong Xia, and Qi Cheng Li

Accepted Papers in Material Physics

Simulation of pulse responses of   *J. Polym. Sci. B: Polymer Physics*
lithium salt-doped poly-ethyleneoxide [Link]   *Cover paper finalist*
Ao Liu, F. Zeng, Y. Hu, S. Lu, W. Dong, X. Li, C. Chang, and D. Guo   *Apr. 2016*

Thresholds of frequency selectivity of Pt/poly   *Solid State Ionics*
(3-hexylthiophene-2,5-diyl)/polyethylene oxide+Mg^{2+}/Pt heterojunctions [Link]
F. Zeng, S. Lu, W. Dong, *Ao Liu*, X. Li, and C. Chang   *Feb. 2016*

Effect of heavy-ion on frequency selectivity of semiconducting   *RSC Advances*
polymer/electrolyte heterojunction [Link]   *Nov. 2015*
W. Dong, F. Zeng, S. Lu, X. Li, C. Chang, *Ao Liu*, F. Pan, and D. Guo

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

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

Frequency-dependent learning achieved using semiconducting   *Nanoscale*
polymer/electrolyte composite cells [Link]   *Sep. 2015*
W. Dong, F. Zeng, S. Lu, *Ao Liu*, X. Li, and F. Pan

Controlling Ion Conductance and Channels to Achieve   *Nano-Micro Letters*
Synaptic-like Frequency Selectivity [Link]   *Dec. 2014*
S. Lu., F. Zeng, W. Dong, *Ao Liu*, X. Li, and J. Luo

Optical fiber sensor based on the short-range surface   *Chinese Optics Letters*
plasmon polariton mode [Link]   *Jan. 2014*
X. Wang, F. Liu, *Ao Liu*, B. Fan, K. Cui, X. Feng, W. Zhang, and Y.Huang

Services, Awards, and Teaching

Journal Reviewer : Information Sciences, TMLR, ACM ToIS, and Sankhya B

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

RPI-IBM AI Horizon Scholarship   *Sep. 2019 – May 2022*
Supported by Rensselaer-IBM Artificial Intelligence Research Collaboration

RPI Presidential Graduate Research Fellowship   *Sep. 2016 – May 2017*
A One-Year Fellowship for Outstanding Graduate Students [Certificate]

Teaching Assistant of *CSCI 4150: Introduction to AI*   *Spring 2023*
Instructor: Lirong Xia

Guest Lecture at *CSCI 4967/6967: Economics and Computation*   *Apr. 2021*

Teaching Assistant of *MATH 1020: Calculus II*   *Fall 2017*
Instructor: David A. Schmidt