

# Haolun Wu

Ph.D. candidate, Computer Science  
Mila - Quebec AI Institute  
McGill University  
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## Research Interests

Information Retrieval · Recommender System · Fairness · Continual Learning · Bandit Algorithm

## Academic Training & Diplomas

2021-present **Ph.D. Computer Science**, Mila & McGill University, Montreal, Canada.

I am honored to work with:

[Xue \(Steve\) Liu](#) (Fellow of Canadian Academy of Engineering, Fellow of IEEE)

[Fernando Diaz](#) (Google Research Scientist, CIFAR AI Chair, Mila Core Industry Member)

[Laurent Charlin](#) (CIFAR AI Chair, Mila Core Academic Member)

*Expected graduation: Jun. 2025.*

2019-2021 **M.Sc. Computer Science**, Mila & McGill University, Montreal, Canada.

Thesis title: Balancing Fairness in Multi-stakeholder Recommendation via Multi-Objective Optimization. Published at [ACM Transactions on Information Systems \(TOIS\)](#).

2018-2018 **International Exchange**, University of California, San Diego, San Diego, USA.

2015-2019 **B.E. Computer Science and Engineering**, Northeastern University, Shenyang, China.

Excellent Graduation Thesis. Outstanding Graduate. Outstanding Student for all years.

## Relevant Industrial Experience

Nov. 2022- **Research Intern**, Google Research, Mountain View, USA.

Feb. 2023 Mentor: [Maryam Karimzadehgan](#)

- Research on topics (1) Multi-interest embedding, (2) Uncertainty embedding, and (3) Provider fairness in recommendation.

Jun. 2021- **Support Researcher, PhD Intern**, Huawei Noah's Ark Lab, Montreal, Canada.

Jun. 2022 Mentor: [Yingxue Zhang](#)

- Conduct one project on efficiently training the implicit feedback data for recommendation through adaptively learning the data importance.
- Conduct one project on efficiently utilizing auxiliary information in recommendation through self-supervised learning and contrastive alignment.

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## Publications - Click [this link](#) to reach my Google Scholar profile.

### Journal Articles

- TOIS 2022 Haolun Wu, Chen Ma, Bhaskar Mitra, Fernando Diaz, and Xue Liu. **“A Multi-objective Optimization Framework for Multi-stakeholder Fairness-aware Recommendation”**. ACM Transactions on Information Systems (TOIS).

### Conference Proceedings

- ICDE 2023 Haolun Wu, Chen Ma, Yingxue Zhang, Xue Liu, and Mark Coates. **“Self-supervised Contrastive Alignment for Tag-enhanced Recommendation”**. For the 39th IEEE International Conference on Data Engineering (ICDE 2023). Anaheim, USA. Apr. 2023.
- CIKM 2022 Haolun Wu, Chen Ma, Yingxue Zhang, Xue Liu, and Mark Coates. **“Adapting Triplet Importance of Implicit Feedback for Personalized Recommendation”**. In the 31st ACM International Conference on Information and Knowledge Management (CIKM 2022). Atlanta, USA. Oct. 2022.
- SIGIR 2022 Haolun Wu, Bhaskar Mitra, Chen Ma, Fernando Diaz, and Xue Liu. **“Joint Multisided Exposure Fairness for Recommendation”**. In the 45th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2022, acceptance rate:  $161/794 = 20\%$ ). Madrid, Spain. Jul. 2022.
- AAAI 2021 Chen Ma, Liheng Ma, Yingxue Zhang, Haolun Wu, Xue Liu, and Mark Coates. **“Knowledge-Enhanced Top-K Recommendation in Poincaré Ball”**. In the 35th AAAI Conference on Artificial Intelligence (AAAI 2021, acceptance rate:  $1692/7911 = 21.4\%$ ). Virtual. Feb. 2021.
- AUTEEE 2019 Haolun Wu, Yunfei Feng. **“A Pioneering Scalable Self-driving Car Simulation Platform”**. In the IEEE 2nd International Conference on Automation, Electronics and Electrical Engineering (AUTEEE 2019). Shenyang, China. Nov. 2019.
- SMC 2018 Chong Fu, Yufu Shan, Muyang He, Ziyuan Yu, Haolun Wu. **“A New Medical Image Encryption Algorithm Using Multiple 1-D Chaotic Maps”**. In the IEEE International Conference on Systems, Man, and Cybernetics (SMC 2018). Miyazaki, Japan. Oct. 2018.
- ICCAIRO 2018 Yufu Shan, Muyang He, Ziyuan Yu, Haolun Wu. **“Pixel Level Image Encryption Based on Semantic Segmentation”**. In the IEEE International Conference on Control, Artificial Intelligence, Robotics and Optimization (ICCAIRO 2018). Prague, Czech Republic. May. 2018.

### Patents

- Patent US 2022 Haolun Wu, Chen Ma, Yingxue Zhang, Mark Coates. **“Recommendation System With Adaptive Thresholds for Neighborhood Selection”**. US20220253722A1.
- IP Australia 2017 Haolun Wu, Haodong Lai, Yutao Liu, Wentao Zhou, and Qinlai Li. **“A Method For Real-Time Image Style Transfer Based On Conditional Generative Adversarial Networks ”**. AU2017101166A4.

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## In Submission or Under Review

### Conference Proceedings

- WSDM 2023 Ziqi Zhao, Wei Guo, Haolun Wu, Yingxue Zhang, Jianye Hao, and Ruiming Tang. **“Coarse-to-Fine Multi-Interest Learning Framework for Multi-Behavior Recommendation”**. For the 16th ACM International Conference on Web Search and Data Mining (WSDM 2023).
- Under Construction Haolun Wu, Bowei He, Chen Ma, and Xue Liu. **Bandit Algorithms for Diversity and Fairness in Online Recommendation.**

## Survey Papers

Haolun Wu, Yansen Zhang, Chen Ma, Bhaskar Mitra, Fernando Diaz, Nick Craswell, Charles Clarke, and Xue Liu. **“Diversity in Search and Recommendation: A Survey”**.

Haolun Wu, Hillary Tao, Jose Diaz, Peng Xu, Shuo Wang, and Xue Liu. **“Intelligent Techniques in Dynamic Call Routing: A Survey”**.

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## Grants & Fellowships

**Total funding: \$211,000. Total share of funding: \$105,500.**

- 2022 MSR-Mila Collaboration Grant (\$66,000, share 50%)  
Lead PI: Xue (Steve) Liu; Industrial Mentor: John Winn, Bhaskar Mitra  
Title: Neural Knowledge Modeling  
Funding Body: Microsoft Research
- 2022 MITACS Accelerate Fellowship (\$90,000, share 50%)  
Lead PI: Xue (Steve) Liu; Industrial Mentor: Shuo Wang  
Title: Fairness-aware Matching for Dynamic Predictive Behavior Matching  
Funding Body: Bell Canada, MITACS
- 2020 MSR-Mila Collaboration Grant (\$55,000, share 50%)  
Lead PI: Xue (Steve) Liu; Industrial Mentor: Fernando Diaz  
Title: [Two-sided Recommendation with Fairness](#)  
Funding Body: Microsoft Research

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## Honors & Awards

**Total award amount: \$34,400.**

- 2022 GREAT Award (\$1,000), *McGill University*
- 2022 Grad Excellence Award (\$7,000), *McGill University*
- 2022 SIGIR Student Travel Grant. (\$1,350+\$850)
- 2021 Apple Scholars PhD Fellowship Nominee (1 out of 3 students at *McGill University*)
- 2020 Grad Excellence Award (\$12,600), *McGill University*
- 2019 Excellent Graduation Thesis, *Northeastern University*
- 2016-2019 Outstanding Student (\$2,400), *Northeastern University*
- 2017 HUAWEI Scholarship (\$1,000), *Huawei Technologies Co., Ltd.*
- 2017 First Prize, *CUMCM (Contemporary Undergraduate Mathematical Contest in Modelling)*
- 2017 MCM/ICM Meritorious Winner, *COMAP (Consortium for Mathematics and Its Application)*
- 2016 Yao Tianshun Scholarship (\$1,000, 2 out of 250 students), *Northeastern University*
- 2014 First Prize (rank 18<sup>th</sup> in Sichuan Province), *CMS (Chinese Mathematical Association)*

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## Community

- **Founder and Organizer**

- I co-found and organize a reading group [DEFIRST](#) at *Mila - Quebec AI Institute* and the *Vector Institute* to build an interdisciplinary forum of researchers, students and professors alike, across both industry and academia, who work at the intersection of IR, Search, Fairness, and Trustworthy AI.

- **Session Chair**

- SIGIR 2022 (Session: Collaborative Filtering)
- **Reviewer**
  - AAAI 2022
  - SIGIR 2022
  - TKDD 2022

## **Talk, Lecture & Mentorship**

- **Talk and Lecture**
  - **Teach:** *"Applications of Machine Learning in Real World Systems"* (COMP 597 & 598).  
Head: Xue (Steve) Liu. McGill University. Winter 2021 & 2022.
  - **Talk:** *"Multi-FR: A Multi-Objective Optimization Method for Achieving Two-sided Fairness in E-commerce Recommendation"*, Microsoft Bing.  
Head: [Nick Craswell](#). Oct. 2021.
  - **Talk:** *"Joint Multisided Exposure Fairness for Search and Recommendation"*.  
Microsoft Bing. Apr. 2022; Bell Canada. Aug. 2022; Mila. Sep. 2022.
- Mentored / Collaborated with several undergraduate and junior graduate students. (2022-)
  - Hillary Tao (McGill)
  - Yansen Zhang (CityU of Hong Kong)
  - Rui Song (McGill)
  - Evelyn Cao (McGill)

## **Coding Skills**

I am proficient in **Python** and **Pytorch**, also familiar with **Tensorflow**.

## **Life Skills**

- I am a certificated **clarinet player**. I was a member of Musicians Association of Sichuan, China. My advisor was Yi Zhu, who is now a Deputy Director of the Music Department of Sichuan University.
- I am also a master in **Chinese Calligraphy**. My advisor was Jialin Zheng, who is now a Vice Chairman of Sichuan Calligraphers Association and Vice Chairman of Chengdu Calligraphers Association.

## **References**

- **Xue (Steve) Liu**  
Fellow of the Canadian Academy of Engineering (FCAE); Fellow of the IEEE (FIEEE)  
Professor & William Dawson Scholar  
*School of Computer Science, McGill University, Montreal, Canada*  
Associate Member, Mila - Quebec AI Institute  
  
VP R&D, Chief Scientist / Co-Director  
*Samsung AI Center, Montreal, Canada*  
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- **Fernando Diaz**  
Research Scientist  
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Industrial Core Member at Mila  
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