

# Fengli Xu

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## Brief Biography

I am currently an Assistant Professor at the Department of Electronic Engineering in Tsinghua University. My research interests lie in the interdisciplinary area of *Artificial Intelligence, Data Science, Social Computing* and *Urban Science*, aiming to develop scientific methods and algorithmic tools to address the long-standing puzzles in the complex networks arising from human dynamics and social interactions. My research focuses on fully exploiting the opportunities offered by recent data explosion, and pushing forward the boundary of human dynamics, urban science and social network research with novel Data Science/AI techniques.

## Education Background

**Tsinghua University** (Sep. 2015 – Jan. 2020)

*Ph.D.* in Department of Electronic Engineering (*Graduate with Distinction*)

Advisor: **Prof. Yong Li**

**Huazhong University of Science and Technology** (Sep. 2011 – Jul. 2015)

*B.S.* in Department of Electronic Engineering (*Graduate with Distinction*)

## Research Experience

**Tsinghua University** (Apr. 2023 – Present)

*Assistant Professor* in Department of Electronic Engineering

**The University of Chicago** (Aug. 2020 – Apr. 2023)

*Postdoc Scholar* in *Mansueto Institute & Knowledge Lab*

Advisor: **Prof. James Evans** and **Prof. Luis Bettencourt**

**Hong Kong University of Science & Technology** (Feb. 2020 – Aug. 2020)

*Postdoc Researcher* in *SyMLab*

Advisor: **Prof. Pan Hui**

**Microsoft Research Asia** (Oct. 2018 – Jan. 2019)

*Research Intern*, with **Prof. Xing Xie** in *Social Computing Group*

**Tencent Inc.** (Dec. 2016 – May 2017)

*Research Scientist Intern*, *Mobile Data Mining Team*

**Georg-August-University of Goettingen** (Jun. 2016 – Sep. 2016)

*Visiting Researcher*, with **Prof. Xiaoming Fu** in *Computer Networks Research Group*

## Honors and Awards

CAAI Rising Star in Social Computing	2023
Mansueto Institute Fellowship	2021
ACM SIGSPATIAL China Chapter Doctoral Dissertation Award	2020
CCF PhD Doctoral Dissertation Award Nominee	2020
Excellent Doctoral Dissertation of Tsinghua University	2020
Outstanding PhD Graduate of Tsinghua University	2020
MSRA Fellowship	2018
Outstanding Oral Presentation Award in Tsinghua PhD Forum	2017
ACM UBICOMP Honorable Mention Award	2016
National Graduate Student Scholarship of China	2016
Outstanding Graduate of Huazhong University of Science and Technology	2015
National Undergraduate Student Scholarship of China	2014

## Publications

### Featured Publications (\* equal contributions):

5. **Fengli Xu**, L. Wu, and J. Evans. Flat Teams Drive Scientific Innovation. *Proceedings of the National Academy of Sciences (PNAS)*, 119.23 (2022): e2200927119.
4. L. Chen\*, **Fengli Xu**\*, Z. Han, K. Tang, P. Hui, J. Evans, and Y. Li. Strategic COVID-19 vaccine distribution can simultaneously elevate social utility and equity. *Nature Human Behavior*, 6.11 (2022): 1503-1514.
3. **Fengli Xu**, Y. Li, D. Jin, J. Lu, and C. Song. Emergence of Urban Growth Patterns from Human Mobility Behavior. *Nature Computational Science*, 1.12 (2021): 791-800.
2. **Fengli Xu**, Q. Yao, P. Hui, and Y. Li. Automorphic Equivalence-aware Graph Neural Network. *Advances in Neural Information Processing Systems (NeurIPS)*, 34 (2021).
1. **Fengli Xu**, Y. Li, and S. Xu. Attentional Multi-graph Convolutional Network for Regional Economy Prediction with Open Migration Data. *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, 2020.

### Journal Publications († corresponding author):

16. Q. Hao, **Fengli Xu**<sup>†</sup>, L. Chen, P. Hui and Y. Li. Hierarchical Multi-agent Model for Reinforced Medical Resource Allocation with Imperfect Information. *ACM Transactions on Intelligent Systems and Technology (TIST)*, 2022.

15. G. Zhang, **Fengli Xu**, Y. Yuan and D. Jin. Understanding the Influence of Social Hubs in Diffusion Processes Driven by Incentivized Friend Invitation. *IEEE Transactions on Computational Social Systems (TCSS)*, 2022.
14. Y. Yuan, **Fengli Xu**, H. Cao, G. Zhang, P. Hui, Y. Li, and D. Jin. Persuade to Click: Context-aware Persuasion Model for Online Textual Advertisement. *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, 2021.
13. **Fengli Xu**, and Y. Li. Survey on user mobility behavior modelling in urban environment. *Journal on Communications (in Chinese)*, 2020, 41(7): 18-28.
12. T. Xia, Y. Li, Y. Yu, **Fengli Xu**, Q. Liao, and D. Jin. Understanding urban dynamics via state-sharing hidden markov model. *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, 33.10 (2020): 3468-3481.
11. **Fengli Xu**, Y. Li, Z. Tu, S. Chang, and H. Huang. No More than What I Post: Preventing Linkage Attacks on Check-in Services. *IEEE Transactions on Mobile Computing (TMC)*, 20.2 (2019): 620-633.
10. **Fengli Xu**, Z. Tu, and Y. Li. Connecting the Dots: User Privacy Is NOT Preserved in ID-removed Cellular Data. *IEEE Transactions on Network and Service Management (TNSM)*, 17.1 (2019): 147-159.
9. H. Cao, **Fengli Xu**, J. Sankaranarayanan, Y. Li, and H. Samet. Habit2vec: Trajectory Semantic Embedding for Living Pattern Recognition in Population. *IEEE Transactions on Mobile Computing (TMC)*, 19.5 (2019): 1096-1108.
8. K. Zhao, Z. Tu, **Fengli Xu**, Y. Li, P. Zhang, D. Pei, L. Su, and D. Jin. Walking without friends: Publishing anonymized trajectory dataset without leaking social relationships. *IEEE Transactions on Network and Service Management (TNSM)*, 16.3 (2019): 1212-1225.
7. Z. Tu, **Fengli Xu**, Y. Li, P. Zhang, and D. Jin. A New Privacy Breach: User Trajectory Recovery From Aggregated Mobility Data. *IEEE/ACM Transactions on Networking (TON)*, 26.3 (2018): 1446-1459.
6. J. Feng, Y. Li, **Fengli Xu**, and D. Jin. A Bimodal Model to Estimate Dynamic Metropolitan Population by Mobile Phone Data. *Sensors*, 18.10 (2018): 3431.
5. Z. Tu, K. Zhao, **Fengli Xu**, Y. Li, L. Su, and D. Jin. Protecting Trajectory From Semantic Attack Considering  $k$ -Anonymity,  $l$ -Diversity, and  $t$ -Closeness. *IEEE Transactions on Network and Service Management (TNSM)*, 16.1 (2018): 264-278.
4. **Fengli Xu**, Y. Li, H. Wang, P. Zhang, and D. Jin. Understanding Mobile Traffic Patterns of Large Scale Cellular Towers in Urban Environment. *IEEE/ACM Transactions on Networking (TON)*, 25.2 (2016): 1147-1161.
3. **Fengli Xu**, Y. Li, M. Chen, and S. Chen. Mobile Cellular Big Data: Link Cyberspace and Physical World with Social Ecology. *IEEE Network*, 30.3 (2016): 6-12.
2. **Fengli Xu**, Y. Lin, J. Huang, D. Wu, H. Shi, J. Song, and Y. Li. Big Data Driven Mobile Traffic Understanding and Forecasting: A Time Series Approach. *IEEE Transaction on Service Computing (TSC)*, 9.5 (2016): 796-805.
1. Y. Li, and **Fengli Xu**. Trace-driven analysis for location-dependent pricing in mobile cellular networks. *IEEE Network*, 30.2 (2016): 40-45.

### Conference Publications († corresponding author):

33. L. Chen, **Fengli Xu**<sup>†</sup>, Q. Hao, P. Hui, and Y. Li. Getting Back on Track: Understanding COVID-19 Impact on Urban Mobility and Segregation with Location Service Data. *International AAAI Conference on Web and Social Media (ICWSM)*, 17 (2022): 126-136.
32. Q. Hao, W. Huang, **Fengli Xu**, K. Tang, and Y. Li. Reinforcement Learning Enhances the Experts: Large-scale COVID-19 Vaccine Allocation with Multi-factor Contact Network. *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (SIGKDD)*, (2022): 4684-4694.
31. Y. Zhang, **Fengli Xu**<sup>†</sup>, T. Xia, and Y. Li. Quantifying the Causal Effect of Individual Mobility on Health Status in Urban Space. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 5.4 (2021): 1-30.

30. Q. Hao, **Fengli Xu**<sup>†</sup>, L. Chen, P. Hui, and Y. Li. Hierarchical Reinforcement Learning for Scarce Medical Resource Allocation with Imperfect Information. *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (SIGKDD)*, 2021.
29. **Fengli Xu**, G. Zhang, Y. Yuan, H. Huang, D. Yang, D. Jin, and Y. Li. Understanding the Invitation Acceptance in Agent-initiated Social E-commerce. *International AAAI Conference on Web and Social Media (ICWSM)*. Vol. 15. 2021.
28. J. Piao, G. Zhang, **Fengli Xu**, Z. Chen, Y. Zheng, C. Gao, and Y. Li. Bringing Friends into the Loop of Recommender Systems: An Exploratory Study. *ACM on Human-Computer Interaction (CSCW)*, 5.CSCW2 (2021): 1-26.
27. Z. Chen, H. Cao, Y. Deng, X. Gao, J. Piao, **Fengli Xu**, Y. Zhang, and Y. Li. Learning from Home: A Mixed-Methods Analysis of Live Streaming Based Remote Education Experience in Chinese Colleges during the COVID-19 Pandemic. *SIGCHI Conference on Human Factors in Computing Systems (SIGCHI)*, 2021.
26. Z. Han, H. Fu, **Fengli Xu**, Z. Tu, Y. Yu, P. Hui, and Y. Li. Who Will Survive and Revive Undergoing the Epidemic: Analyses about POI Visit Behavior in Wuhan via Check-in Records. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 5.2 (2021): 1-20.
25. J. Piao, G. Zhang, **Fengli Xu**, Z. Chen, and Y. Li. Predicting Customer Value with Social Relationships via Motif-based Graph Attention Networks. *The Web Conference (WWW)*, 2021.
24. G. Zhang, Y. Li, Y. Yuan, **Fengli Xu**, H. Cao, Y. Xu, and D. Jin. Community Value Prediction in Social E-commerce. *The Web Conference (WWW)*, 2021.
23. Y. Zhang, **Fengli Xu**<sup>†</sup>, T. Li, V. Kostakos, P. Hui, and Y. Li. Passive Health Monitoring Using Large Scale Mobility Data. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 5.1 (2021): 1-23.
22. T. Xia, Y. Qi, J. Feng, **Fengli Xu**, F. Sun, D. Guo, and Y. Li. AttnMove: History Enhanced Trajectory Recovery via Attentional Network. *AAAI Conference on Artificial Intelligence (AAAI)*, 35.5 (2021).
21. **Fengli Xu**, Z. Lin, T. Xia, D. Guo, and Y. Li. SUME: Semantic-enhanced Urban Mobility Network Embedding for User Demographic Inference. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 4.3 (2020): 1-25.
20. Z. Lin, S. Lyu, H. Cao, **Fengli Xu**, Y. Wei, H. Samet, and Y. Li. HealthWalks: Sensing Fine-grained Individual Health Condition via Mobility Data. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 4.4 (2020): 1-26.
19. Z. Han, **Fengli Xu**, J. Shi, Y. Shang, H. Ma, P. Hui, and Y. Li. Genetic Meta-Structure Search for Recommendation on Heterogeneous Information Network. *ACM International Conference on Information and Knowledge Management (CIKM)*, 2020.
18. Z. Chen, H. Cao, **Fengli Xu**, M. Cheng, T. Wang, and Y. Li. Understanding the Role of Intermediaries in Online Social E-commerce: An Exploratory Study of Beidian. *ACM on Human-Computer Interaction (CSCW)*, 4.CSCW2 (2020): 1-24.
17. Z. Chen, H. Cao, H. Wang, and **Fengli Xu**, V. Kostakos, and Y. Li. Will You Come Back/Check-in Again? Understanding Characteristics Leading to Urban Revisitation and Re-check-in. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 4.3 (2020): 1-27.
16. Q. Hao, L. Chen, **Fengli Xu**<sup>†</sup>, and Y. Li. Understanding the Urban Pandemic Spreading of COVID-19 with Real World Mobility Data. *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, 2020.
15. J. Feng, Z. Yang, **Fengli Xu**, H. Yu, M. Wang, and Y. Li. Learning to Simulate Human Mobility. *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (SIGKDD)*, 2020.

14. H. Cao, Z. Chen, **Fengli Xu**, Y. Li, and T. Wang. When Your Friends Become Sellers: An Empirical Study of Social Commerce Site Beidian. *International AAAI Conference on Web and Social Media (ICWSM)*, Vol. 14. 2020.
13. **Fengli Xu**, J. Lian, Z. Han, Y. Li, Y. Xu, and X. Xie. Relation-Aware Graph Convolutional Networks for Agent-Initiated Social E-Commerce Recommendation. *Conference on Information and Knowledge Management (CIKM)*, 2019.
12. **Fengli Xu**, Z. Han, J. Piao, and Y. Li. "I Think You'll Like It": Modelling the Online Purchase Behavior in Social E-commerce. *ACM on Human-Computer Interaction (CSCW)*, 3.CSCW (2019): 1-23.
11. H. Cao, Z. Chen, **Fengli Xu**, Y. Li, and V. Kostakos. Revisitation in Urban Space vs. Online: A Comparison across POIs, Websites, and Smartphone Apps. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 2.4 (2018): 1-24.
10. **Fengli Xu**, Z. Tu, H. Huang, S. Chang, F. Sun, D. Guo, and Y. Li. No More than What I Post: Preventing Linkage Attacks on Check-in Services. *The Web Conference (WWW)*, 2019.
9. T. Xia, Y. Yu, **Fengli Xu**, F. Sun, D. Guo, D. Jin, and Y. Li. Understanding Urban Dynamics via State-sharing Hidden Markov Model. *The Web Conference (WWW)*, 2019.
8. **Fengli Xu**, T. Xia, H. Cao, Y. Li, F. Sun, and F. Meng. Detecting Popular Temporal Modes in Population-scale Unlabelled Trajectory Data. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 2.1 (2018): 1-25.
7. **Fengli Xu**, G. Zhang, J. Huang, Y. Li, D. Yang, B. Zhao, and F. Meng. Understanding Motivations behind Inaccurate Check-ins. *ACM on Human-Computer Interaction (CSCW)*, 2.CSCW (2018): 1-22.
6. D. Yu, Y. Li, **Fengli Xu**, P. Zhang, and V. Kostakos. Smartphone App Usage Prediction Using Points of Interest. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 1.4 (2018): 1-21.
5. **Fengli Xu**, Z. Tu, Y. Li, P. Zhang, X. Fu, and D. Jin. Trajectory Recovery From Ash: User Privacy Is NOT Preserved in Aggregated Mobility Data. *International Conference on World Wide Web (WWW)*, 2017.
4. Z. Tu, K. Zhao, **Fengli Xu**, Y. Li, L. Su, and D. Jin. Beyond k-anonymity: protect your trajectory from semantic attack. *IEEE International Conference on Sensing, Communication, and Networking (SECON)*, 2017.
3. J. Huang, **Fengli Xu**, Y. Lin, and Y. Li. On the Understanding of Interdependency of Mobile App Usage. *IEEE International Conference on Mobile Ad Hoc and Sensor Systems (MASS)*, 2017.
2. **Fengli Xu**, J. Feng, P. Zhang, and Y. Li. Context-aware Real-time Population Estimation for Metropolis. *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UBICOMP)*, 2016.
1. M. Zhang, **Fengli Xu**, and Y. Li. Mobile Traffic Data Decomposition for Understanding Human Urban Activities. *IEEE International Conference on Mobile Ad Hoc and Sensor Systems (MASS)*, 2016.

### Talks & Presentations

- Labor Division and Team Structure in Scientific Collaboration. CAAI BDSC 2023. Invited Talk. 17/07/2023
- Spatiotemporal Data Intelligence for Complex Urban Social Systems. SpatialDI 2023, ACM Sigspatial China. Invited Keynote. 15/04/2023
- Flat Teams Drive Scientific Innovation. The Science of Team Science Workshop, NetSci 2022. Invited Talk. 16/07/2022
- Flat Teams Drive Scientific Innovation. Swarma Club. Invited Lecture. 25/06/2022

- The Emergence of Urban Dynamic from Human Mobility Behavior. Institute of Urban Environment, Chinese Academy of Sciences. Invited Talk. 21/02/2022
- Hidden Hierarchy in Scientific Teams and Research Output. Center for Science of Science and Innovation (CSSI), Northwestern University. Invited Talk. 25/08/2021
- Human Mobility Behavior Modeling in Urban Space. ACM Sigspatial China, Dissertation Award Ceremony. Invited Talk. 20/04/2021
- Structure of Research Team and Scientific Output. Department of Sociology, Zhejiang University, Invited Talk. 22/10/2021.
- Policy-Aware Mobility Model Explains the Growth of COVID-19 within U.S. Cities. International conference on social computation (ICSC), Invited Talk. 15/12/2020
- Strategic COVID-19 Vaccine Distribution Can Simultaneously Improve Social Utility and Equity. Knowledge Lab, University of Chicago, Seminar. 11/10/2021
- Human Mobility in Urban Space: COVID-19 Risk and City Structure. Mansueto Institute for Urban Innovation, University of Chicago, Seminar. 23/02/2021
- Data-driven Human Dynamic Modeling. Computer Science and Engineering Department, Hongkong Univ. of Sci.& Tech., Seminar. 08/08/2020
- Automorphic Equivalence-aware Graph Neural Network. Conference on Neural Information Processing Systems (NeurIPS), online. Conference Presentation. 07/12/2021.
- Understanding the Invitation Acceptance in Agent initiated Social E-commerce. International AAI Conference on Web and Social Media (ICWSM), online. Conference Presentation. 10/06/2021
- Attentional Multi-graph Convolutional Network for Regional Economy Prediction with Open Migration Data. ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), online. Conference Presentation. 23/08/2020

## Professional Activity

### **Organizing Committee:**

Research Summit of Urban Science, Aug. 05-06, 2023.

International Conference for Computational Social Science (IC2S2), Jul. 19-22, 2022.

### **(Senior) PC Member:**

International Joint Conference on Artificial Intelligence(IJCAI), 2020, 2021, 2022, 2023.

The Web Conference(WWW), 2021, 2022.

AAAI Conference on Artificial Intelligence(AAAI), 2021, 2022, 2023.

ACM International Conference on Web Search and Data Mining(WSDM), 2021, 2022, 2023.

CPD Workshop (UBICOMP), 2019, 2020.

AppLens Workshop (UBICOMP), 2019.

### **Conference External Reviewing:**

International Conference on Database Systems for Advanced Applications(DASFAA), 2021.

International Joint Conference on Pervasive and Ubiquitous Computing(UBICOMP), 2017~2021.

ACM SIGKDD Conference on Knowledge Discovery and Data Mining(KDD), 2019.

International World Wide Web Conference(WWW), 2017, 2018, 2019.

International AAAI Conference on Web and Social Media(ICWSM), 2017.

IEEE International Conference on Computer Communications(INFOCOM), 2017.

ACM Internet Measurement Conference(IMC), 2016, 2017, 2018.

**Journal Reviewing:**

The Proceedings of the National Academy of Sciences (PNAS), 2021, 2022.

Nature Communications, 2021.

ACM Transactions on Intelligent Systems and Technology (TIST), 2021.

IEEE Transactions on Network and Service Management (TNSM), 2018, 2019, 2020.

IEEE Transactions on Mobile Computing (TMC), 2017, 2019.

IEEE Communications Magazine, 2017.

IEEE Transactions on Services Computing (TSC), 2017.