

Sijie RUAN (阮思捷)

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SHORT BIO

Dr. Sijie RUAN is currently an assistant professor and special associate researcher of Beijing Institute of Technology (BIT). His research interests include urban computing, spatio-temporal data mining, social intelligent governance, and intelligent containment of infectious diseases. He has authored more than 40 referred publications at prestigious international conferences and journals (KDD, ICDE, TKDE, AAAI, UbiComp, WWW) with 15 papers as the primary authors and **1000+** citations (with a **SIGSPATIAL Best Demo Paper Award**). He leads or participates in **7 national projects** and serves as reviewers and program committee for 13 referred journals or conferences, e.g., IMWUT, TITS, KDD, AAAI. He received **Science and Technology Progress Award (First Prize)** of Chinese Institute of Command and Control, **Outstanding Ph.D. Thesis Award** of SIGSPATIAL CHN Chapter, **Graduate Principal Award** Nomination of Xidian University. Before joining BIT, he obtained Ph.D. degree and B.E. degree from Xidian University in 2022 and 2017, respectively, and was a visiting Ph.D. student at Nanyang Technological University as well as research interns at Microsoft Research Asia (MSRA) and JD.com.

WORKING EXPERIENCE

- **School of Computer Science and Technology, Beijing Institute of Technology** Beijing, China
Assistant Professor and Special Associate Researcher Jul. 2022 – Present
- **JD Intelligent Cities Research, JD.com** Beijing, China
Research Intern Jan. 2018 – Jun. 2021
- **School of Computer Science and Technology, Xidian University** Xi'an, Shaanxi, China
Teaching Assistant Sept. 2017 – Nov. 2017
- **Urban Computing Group, Microsoft Research Asia** Beijing, China
Research Intern Jul. 2016 – Aug. 2017

EDUCATION EXPERIENCE

- **School of Computer Science and Technology, Xidian University** Xi'an, Shaanxi, China
Ph.D. in Computer Science; Advisor: Prof. Yu Zheng (IEEE Fellow) Sept. 2017 – Jun. 2022
- **School of Computer Sci. and Eng., Nanyang Technological University** Singapore
Visiting Ph.D. Student; Advisor: Assoc. Prof. Cheng Long Sept. 2019 – Apr. 2022
- **School of Computer Science and Technology, Xidian University** Xi'an, Shaanxi, China
Bachelor of Engineering in Computer Science; Excellent Class; Rank: 1/29 Aug. 2013 – Jul. 2017

GRANTS

Research Grants

- **National Key Research and Development Program of China**, (2023YFC3321505), CNY¥1100K, 2023.11-2026.10, **Co-PI**.
- **National Key Research and Development Program of China**, Research on Intelligent Methods for Societal-Data-Driven Governance of Major Infectious Disease Transmission Risks (2023YFC2308703), CNY¥350K, 2023.12-2026.11, **Co-PI**.
- **National Natural Science Foundation of China**, Research on Methods for Fine-grained Geographical Information Collecting and Urban Space Modeling Driven by Spatio-temporal Big Data (62306033), CNY¥300K, 2024.01-2026.12, **PI**.
- **State Scholarship Fund**, Real-time Delivery Time Prediction Based on Couriers' Trajectories (202006960044), 2021.09-2022.04, USD\$24K, **PI**.
- **Beijing Institute of Technology Research Fund Program for Young Scholars**, Research on Methods of Crowd-sourced Spatio-temporal Data-centric Urban Geospatial Entity Understanding (6120220113), CNY¥400K, 2022.07-2025.12, **PI**.

- **Beijing Institute of Technology Library Research Fund (Key Program)**, Research on Algorithms of Personalized Article Recommendation Based on Multi-sourced Data Fusion, 2023.07-2024.06, CNY\$10K, **PI**.
- **National Natural Science Foundation of China**, Intelligent Analysis of Human Correlation Based on Spatio-temporal Big Data (62076191), CNY¥590K, 2021.01-2024.12, Core Member, 3/10.
- **National Key Research and Development Program of China**, Data Governance, Knowledge Extraction Technology and System for National Central Cities (2019YFB2101800), CNY¥1.972M, 2019.01-2022.12, Member.
- **National Natural Science Foundation of China**, Research on Location Recommendation Techniques for Spatial Moving Objects (61976168), CNY¥630K, 2020.01-2023.12, Member, 8/10.

Education Grants

- **Industry-Academia Cooperation Collaborative Education Program of Ministry of Education**, Teaching Method Reform on Data Science and Algorithms Based on KQGIS, CNY¥50K, 2024.1-2024.12, **PI**.

PROFESSIONAL APPOINTMENTS

- **Executive Committee Member:** ACM SIGSPATIAL CHN Chapter, Health Statistics and Applications of Big Data of Beijing Association of Preventive Medicine
- **Expert:** China Academic Degrees and Graduate Education Development Center
- **Session Chair:** ICDE (2024), UrbComp (2021)
- **Publicity Chair:** UrbComp (2024)
- **Journal Reviewer:** IMWUT, TITS, CJE, TIST, TBD, TDS
- **Program Committee:** KDD (2023,2024), AAAI (2021), CIKM (2022,2023,2024), MDM (2021,2023), BigData (2024), UrbComp (2020,2021)

HONORS AND AWARDS

- [H1] **The 1st Prize in Science and Technology Progress Award:** Chinese Institute of Command and Control, 2023
- [H2] **Outstanding Ph.D. Thesis Award:** ACM SIGSPATIAL CHN Chapter, Only one in China, 2022
- [H3] **National Scholarship:** Ministry of Education of P.R.C., 0.2%, 2020, 2017, 2016 (3 times)
- [H4] **Best Demo Paper Award:** ACM SIGSPATIAL, 1/27, 2021
- [H5] **Best Demo Paper Runners-up:** ACM SIGSPATIAL, 2017
- [H6] **Graduate Principal Award Nomination:** Xidian University, Only 10 in the university, 0.1%, 2021
- [H7] **Outstanding Graduates:** Education Department of Shaanxi Province, 1%, 2022
- [H8] **The 3rd Prize in JD Outstanding Patent:** JD Group, 4/436, 2021
- [H9] **The 2nd Prize in “TanSuo” Cup Patent Competition:** JD Digits, 2/434, 2020
- [H10] **The 2nd Prize in JDD Hackathon:** JD Digits, 2/238, 2019
- [H11] **The 4th Prize in Global Optimization Challenge:** JD Logistics, 4/46, 2018

PUBLICATIONS (PRIMARY AUTHORS)

- [P1] Shuliang Wang, Xinyu Pan, **Sijie Ruan**[†], Haoyu Han, Ziyu Wang, Hanning Yuan, Jiabao Zhu, Qi Li. *DiffCrime: A Multimodal Conditional Diffusion Model for Crime Risk Map Inference*. **KDD’24**.
- [P2] Shuliang Wang, Song Tang, **Sijie Ruan**[†], Cheng Long, Yuxuan Liang, Qi Li, Ziqiang Yuan, Jie Bao, Yu Zheng. *Urban Sensing for Multi-Destination Workers via Deep Reinforcement Learning*. **ICDE’24**.
- [P3] Shuliang Wang, Ziyu Wang, **Sijie Ruan**[†], Haoyu Han, Keqin Xiong, Hanning Yuan, Ziqiang Yuan, Guoqing Li, Jie Bao, Yu Zheng. *DelvMap: Completing Residential Roads in Maps Based on Couriers’ Trajectories and Satellite Imagery*. **TGRS**, 2024.
- [P4] **Sijie Ruan**, Cheng Long, Jie Bao, Chunyang Li, Zisheng Yu, Ruiyuan Li, Yuxuan Liang, Tianfu He, Yu Zheng. *Learning to Generate Maps from Trajectories*. **AAAI’20**.
- [P5] **Sijie Ruan**, Cheng Long, Xiaodu Yang, Tianfu He, Ruiyuan Li, Jie Bao, Yiheng Chen, Shengnan Wu, Jiangtao Cui, Yu Zheng. *Discovering Actual Delivery Locations from Mis-Annotated Couriers’ Trajectories*. **ICDE’22**.
- [P6] **Sijie Ruan**, Zi Xiong, Cheng Long, Yiheng Chen, Jie Bao, Tianfu He, Ruiyuan Li, Shengnan Wu, Zhongyuan Jiang, Yu Zheng. *Doing in One Go: Delivery Time Inference Based on Couriers’ Trajectories*. **KDD’20**.
- [P7] **Sijie Ruan**, Xi Fu, Cheng Long, Zi Xiong, Jie Bao, Ruiyuan Li, Yiheng Chen, Shengnan Wu, Yu Zheng. *Filling Delivery Time Automatically Based on Couriers’ Trajectories*. **TKDE**, 2023.
- [P8] **Sijie Ruan**, Cheng Long, Zhipeng Ma, Jie Bao, Tianfu He, Ruiyuan Li, Yiheng Chen, Shengnan Wu, Yu Zheng. *Service Time Prediction for Delivery Tasks via Spatial Meta-Learning*. **KDD’22**.
- [P9] **Sijie Ruan**, Jie Bao, Yuxuan Liang, Ruiyuan Li, Tianfu He, Chuishi Meng, Yanhua Li, Yingcai Wu, Yu Zheng. *Dynamic Public Resource Allocation Based on Human Mobility Prediction*. **UbiComp’20**.
- [P10] **Sijie Ruan**, Keqin Xiong, Shuliang Wang, Jing Geng, Jie Bao, Yu Zheng. *A Survey of Urban Geographic Information Inference Driven by Crowdsourced Spatio-Temporal Data (in Chinese)*. **Acta Electronica Sinica**, 2023.

- [P11] Zhenghong Wang*, **Sijie Ruan***, Tianqiang Huang*, Haoyi Zhou, Shanghang Zhang, Yi Wang, Leye Wang, Yu Liu. *A Lightweight Multi-Layer Perceptron for Efficient Multivariate Time Series Forecasting*. **KBS**, 2024.
- [P12] Xiaodu Yang, **Sijie Ruan**[†], Yinliang Yue, Bo Sun[†]. *Plaintext-aware Encrypted Traffic Detection Network for Identifying Cobalt Strike HTTPS Traffics*. *Computer Networks*, 2024.
- [P13] Yue Hu, **Sijie Ruan**[†], Yuting Ni, Huajun He, Jie Bao, Ruiyuan Li, Yu Zheng. *SALON: A Universal Stay Point-Based Location Analysis Platform (Demo Paper)*. **SIGSPATIAL'21 (Best Demo Paper Award)**.
- [P14] **Sijie Ruan**, Ruiyuan Li, Jie Bao, Tianfu He, Yu Zheng. *CloudTP: A Cloud-based Flexible Trajectory Preprocessing Framework (Demo Paper)*. **ICDE'18**.
- [P15] Huimin Ren, **Sijie Ruan**[†], Ye Yuan, Yanhua Li[†], Jie Bao, Tianfu He, Huajun He, Chuishi Meng, Yu Zheng. *A Novel Approach for Company Real Workplace Identification via E-commercial Data (Short Paper)*. **SIGSPATIAL'23**.

OTHER PUBLICATIONS (BY AUTHOR ORDER)

- [O1] Huimin Ren, **Sijie Ruan**, Yanhua Li, Jie Bao, Chuishi Meng, Ruiyuan Li, Yu Zheng. *MTrajRec: Map-Constrained Trajectory Recovery via Seq2Seq Multi-task Learning*. **KDD'21**.
- [O2] Qianxiong Xu, **Sijie Ruan**, Cheng Long, Liang Yu, Chen Zhang. *Traffic Speed Imputation with Spatio-Temporal Attentions and Cycle-Perceptual Training*. **CIKM'22**.
- [O3] Ruiyuan Li, **Sijie Ruan**, Jie Bao, Yanhua Li, Yingcai Wu, Liang Hong, Yu Zheng. *Efficient Path Query Processing over Massive Trajectories on the Cloud*. **TBD**, 2018.
- [O4] Kaijun Liu, **Sijie Ruan**, Qianxiong Xu, Cheng Long, Nan Hu, Nan Xiao, Liang Yu, Sinno Pan. *Modeling Trajectories with Multi-task Learning (Short Paper)*. **MDM'22**.
- [O5] Ruiyuan Li, **Sijie Ruan**, Jie Bao, Yanhua Li, Yingcai Wu, Yu Zheng. *Querying Massive Trajectories by Path on the Cloud (Short Paper)*. **SIGSPATIAL'17**.
- [O6] Ruiyuan Li, **Sijie Ruan**, Jie Bao, Yu Zheng. *A Cloud-Based Trajectory Data Management System (Demo Paper)*. **SIGSPATIAL'17 (Best Demo Paper Runners-up)**.
- [O7] Huajun He, Ruiyuan Li, **Sijie Ruan**, Tianfu He, Jie Bao, Tianrui Li, Yu Zheng. *TraSS: Efficient Trajectory Similarity Search Based on Key-Value Data Stores*. **ICDE'22**.
- [O8] Jie Bao, Tianfu He, **Sijie Ruan**, Yanhua Li, Yu Zheng. *Planning Bike Lanes based on Sharing-Bikes' Trajectories*. **KDD'17**.
- [O9] Tianfu He, Jie Bao, **Sijie Ruan**, Ruiyuan Li, Yanhua Li, Hui He, Yu Zheng. *Interactive Bike Lane Planning using Sharing Bikes' Trajectories*. **TKDE**, 2020.
- [O10] Chenyu Hou, Bin Cao, **Sijie Ruan**, Jing Fan. *TLDS: A Transfer Learning based Delivery Station Location Selection Pipeline*. **TIST**, 2021.
- [O11] Zheng Zhu, Huimin Ren, **Sijie Ruan**, Boyang Han, Jie Bao, Ruiyuan Li, Yanhua Li, Yu Zheng. *ICFinder: A Ubiquitous Approach to Detecting Illegal Hazardous Chemical Facilities with Truck Trajectories (Short Paper)*. **SIGSPATIAL'21**.
- [O12] Zhipeng Ma, Chuishi Meng, Huimin Ren, **Sijie Ruan**, Jie Bao, Xiaoting Wang, Tianrui Li, Yu Zheng. *SAInf: Stay Area Inference of Vehicles using Surveillance Camera Records*. **KDD'23**.
- [O13] Ruiyuan Li, Huajun He, Rubin Wang, **Sijie Ruan**, Tianfu He, Jie Bao, Junbo Zhang, Liang Hong, Yu Zheng. *TrajMesa: A Distributed NoSQL-Based Trajectory Data Management System*. **TKDE**, 2023.
- [O14] Tianfu He, Jie Bao, Ruiyuan Li, **Sijie Ruan**, Yanhua Li, Li Song, Hui He, Yu Zheng. *What is the Human Mobility in a New City? Transfer Mobility Knowledge Across Cities*. **WWW'20**.
- [O15] Yuxuan Liang, Kun Ouyang, Lin Jing, **Sijie Ruan**, Ye Liu, Junbo Zhang, Yu Zheng. *UrbanFM: Inferring Fine-Grained Urban Flows*. **KDD'19**.
- [O16] Tianfu He, Jie Bao, Ruiyuan Li, **Sijie Ruan**, Yanhua Li, Chao Tian, Yu Zheng. *Detecting Illegal Vehicle Parking Events using Sharing Bikes' Trajectories*. **KDD'18**.
- [O17] Xiaodu Yang, Xiuwen Yi, Shun Chen, **Sijie Ruan**, Junbo Zhang, Yu Zheng, Tianrui Li. *You Are How You Use: Catching Gas Theft Suspects among Diverse Restaurant Users*. **CIKM'20**.
- [O18] Ruiyuan Li, Jie Bao, Huajun He, **Sijie Ruan**, Tianfu He, Liang Hong, Zhongyuan Jiang, Yu Zheng. *Discovering Real-time Reachable Area using Trajectory Connections*. **DASFAA'20**.
- [O19] Cong Zhang, Yanhua Li, Jie Bao, **Sijie Ruan**, Tianfu He, Hui Lu, Zhihong Tian, Cong Liu, Chao Tian, Jianfeng Lin, Xianen Li. *Effective Recycling Planning for Dockless Sharing Bikes*. **SIGSPATIAL'19**.
- [O20] Ruiyuan Li, Huajun He, Rubin Wang, **Sijie Ruan**, Yuan Sui, Jie Bao, Yu Zheng. *TrajMesa: A Distributed NoSQL Storage Engine for Big Trajectory Data (Short Paper)*. **ICDE'20**.
- [O21] Huaxu Han, Shuliang Wang, Hanning Yuan, **Sijie Ruan**. *CD-BNN: Causal Discovery with Bayesian Neural Network*. **ADMA'23**.
- [O22] Kun Ouyang, Yuxuan Liang, Ye Liu, Zekun Tong, **Sijie Ruan**, Yu Zheng, David S. Rosenblum. *Fine-Grained Urban Flow Inference*. **TKDE**, 2022.
- [O23] Ruiyuan Li, Huajun He, Rubin Wang, Yuchuan Huang, Junwen Liu, **Sijie Ruan**, Tianfu He, Jie Bao, Yu Zheng. *JUST: JD Urban Spatio-Temporal Data Engine*. **ICDE'20**.
- [O24] Kang Luo, Yuanshao Zhu, Wei Chen, Kun Wang, Zhengyang Zhou, **Sijie Ruan**, Yuxuan Liang. *Towards Robust Trajectory Representations: Isolating Environmental Confounders with Causal Learning*. **IJCAI'24**.
- [O25] Ruiyuan Li, Rubin Wang, Junwen Liu, Zisheng Yu, Huajun He, Tianfu He, **Sijie Ruan**, Jie Bao, Chao Chen, Fuqiang Gu, Liang Hong, Yu Zheng. *Distributed Spatio-Temporal k Nearest Neighbors Join*. **SIGSPATIAL'21**.
- [O26] Tianfu He, Guochun Chen, Chuishi Meng, Huajun He, Zheyi Pan, Yexin Li, **Sijie Ruan**, Huimin Ren, Ye Yuan, Ruiyuan Li, Junbo Zhang, Jie Bao, Hui He, Yu Zheng. *POI Alias Discovery in E-commerce Delivery Address Data using User Check-ins (Short Paper)*. **SIGSPATIAL'21**.