

Kai Sun, Ph.D.

Postdoctoral Associate

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Academic Appointments

2025 – present	Postdoctoral Associate, Department of Geography and Resource Management, The Chinese University of Hong Kong, Hong Kong, China
2023 – 2025	Postdoctoral Associate, Department of Geography, University at Buffalo, State University of New York, USA
2021 – 2023	Postdoctoral Associate, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China

Education

2019 – 2021	Visiting PhD student, GIS, Department of Geography, University at Buffalo, State University of New York, USA
2017 – 2021	Ph.D., Cartography and GIS, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China
2014 – 2017	M.S., Cartography and GIS, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China
2010 – 2014	B.Eng., Remote Sensing, School of Remote Sensing and Information Engineering, Wuhan University, China

Research Expertise

Geographic Information Science, Geospatial Artificial Intelligence (GeoAI), Disaster Management, Urban Resilience, Geospatial Analysis and Modeling

Publications (*Corresponding author)

Summary: 14 articles as first author or corresponding author; 1 peer-reviewed book chapter and 1 peer-reviewed conference paper; 3 working papers; total citation so far is 593 *.

Selected Peer-reviewed Journal Articles:

1. **Sun, K.**, Hu, Y., Joseph, K., & Zhou, R. Z., 2025. GALLOC: A GeoAnnotator for Labeling LOCATION descriptions from disaster-related text messages. *International Journal of Geographical Information Science*. In press. (IF = 4.3)

* Citation count is based on Google Scholar: <https://scholar.google.com/citations?user=czTnYJQAAAAJ&hl=en>

2. **Sun, K.**, Zhou, R. Z., Kim, J., & Hu, Y., 2024. PyGRF: An improved Python Geographical Random Forest model and case studies in public health and natural disasters. *Transactions in GIS*, 28(7), 2476-2491. (IF = 2.1)
3. **Sun, K.**, Hu, Y., Ma, Y., Zhou, R.Z. & Zhu, Y., 2023. Conflating point of interest (POI) data: A systematic review of matching methods. *Computers, Environment and Urban Systems*, 103, 101977. (IF = 7.1)
4. **Sun, K.**, Hu, Y., Song, J., & Zhu, Y., 2021. Aligning geographic entities from historical maps for building knowledge graphs. *International Journal of Geographical Information Science*, 35(10), 2078-2107. (IF = 4.3)
5. **Sun, K.**, Zhu, Y., Pan, P., Hou, Z., Wang, D., Li, W., & Song, J., 2019. Geospatial data ontology: the semantic foundation of geospatial data integration and sharing. *Big Earth Data*, 3(3), 269-296.
6. **Sun, K.**, Zhu, Y., & Song, J., 2019. Progress and challenges on entity alignment of geographic knowledge bases. *ISPRS International Journal of Geo-Information*, 8(2), 77-101. (IF = 2.8)
7. **Sun, K.**, Zhu, Y., Pan, P., Luo, K., Wang, D., & Hou, Z., 2016. Research on morphology-ontology and its application in geospatial data discovery. *Journal of Geo-information Science*, 18(8), 1011-1021. (in Chinese)
8. Li, W., **Sun, K.***, Wang, S., Zhu, Y., Dai, X., & Hu, L., 2024. DePNR: A DeBERTa-based deep learning model with complete position embedding for place name recognition from geographical literature. *Transactions in GIS*, 28(5), 993-1020. (IF = 2.1)
9. Qiu, Q., Li, H., Hu, X., Tian, M., Ma, K., Zhu, Y., **Sun, K.***, Li, W., Wang, S., & Xie, Z., 2024. A Knowledge-Guided Spatio-Temporal Correlation Measure Considering Rules and Dependency Syntax for Knowledge Graph Adaptive Representation. *Transactions in GIS*. In press. (IF = 2.1)
10. Zhu, Y., **Sun, K.***, Wang, S., Zhou, C., Lu, F., Lv, H., Qiu, Q., Wang, X. & Qi, Y., 2023. An adaptive representation model for geoscience knowledge graphs considering complex spatiotemporal features and relationships. *Science China Earth Sciences*, 66(11), 2563-2578. (IF = 6.0)
11. Li, W., **Sun, K.***, Zhu, Y., Ding, F., Hu, L., Dai, X., Song, J., Yang, J., Qian, L. & Wang, S., 2023. GeoTPE: A neural network model for geographical topic phrases extraction from literature based on BERT enhanced with relative position embedding. *Expert Systems with Applications*, 235, 121077. (IF = 7.5)
12. Dai, X., Zhu, Y., **Sun, K.***, Zou, Q., Zhao, S., Li, W., Hu, L. & Wang, S., 2023. Examining the spatially varying relationships between landslide susceptibility and conditioning factors using a geographical random forest approach: A case study in Liangshan, China. *Remote Sensing*, 15(6), 1513. (IF = 4.2)
13. Zhu, Y., **Sun, K.***, Hu, X., Lv, H., Wang, X., Yang, J., Wang, S., Li, W., Song, J., Su, N., & Mu, X., 2022. Research and practice on the framework for the construction, sharing, and application of large-scale geoscience knowledge graphs. *Journal of Geo-information Science*, 25(6), 1215-1227. (in Chinese)
14. Zhu, Y., **Sun, K.***, Li, W., Wang, S., Song, J., Cheng, Q., Yang, J., Mu, X., Geng, W., Dai, X., 2021. Comparative analysis and enlightenment of geoscience knowledge graphs: A perspective of construction methods and contents. *Geological Journal of China Universities*, 29(3): 382-394. (in

Chinese)

15. Kim, J., Hu, Y., Elhami-Khorasani, Negar., **Sun, K.**, & Zhou., R. Z, 2025. Assessment of deep learning models integrated with weather and environmental variables for wildfire spread prediction and a case study of the 2023 Maui fires. *Natural Hazards*. In press. (IF = 3.7)
16. Zhou, R. Z., Hu, Y., **Sun, K.**, Muldoon, R., Clark, S. & Joseph, K., 2025. Explainable GeoAI and statistical analysis reveal complementary insights about disparities of 311 help requests during the 2022 Buffalo blizzard. *International Journal of Disaster Risk Reduction*, 126, 105635. (IF = 4.5)
17. Wang, S., Yan, X., Zhu, Y., Song, J., **Sun, K.**, Li, W., Hu, L., Qi, Y., & Xu, H., 2022. New era for geo-parsing to obtain actual locations: A novel toponym correction method based on remote sensing images. *Remote Sensing*, 14(19), 4725. (IF = 4.2)
18. Qiu, Q., Xie, Z., Wang, S., Zhu, Y., Lv, H., & **Sun, K.**, 2022. ChineseTR: A weakly supervised toponym recognition architecture based on automatic training data generator and deep neural network. *Transactions in GIS*, 26(3), 1256-1279. (IF = 2.1)
19. Li, W., **Sun, K.**, Zhu, Y., Song, J., Yang, J., Qian, L., & Wang, S., 2021. Analyzing the research evolution in response to COVID-19. *ISPRS International Journal of Geo-Information*, 10(4), 237-260. (IF = 2.8)
20. Yang, J., Zhu, Y., Song, J., Lu, F., **Sun, K.**, & Li, W., 2018. A precise description approach on the result of automatic data matching for geo-spatial model. *Journal of Geo-information Science*, 20(6), 744-752. (in Chinese)
21. Zhu, Y., Zhu, A. X., Song, J., Yang, J., Feng, M., **Sun, K.**, Zhang J., Hou Z., & Zhao, H., 2017. Multidimensional and quantitative interlinking approach for linked geospatial data. *International Journal of Digital Earth*, 10(9), 923-943. (IF = 3.7)
22. Zhu, Y., Zhu, A. X., Feng, M., Song, J., Zhao, H., Yang, J., Zhang Q., **Sun K.**, Zhang J., & Yao, L., 2017. A similarity-based automatic data recommendation approach for geographic models. *International Journal of Geographical Information Science*, 31(7), 1403-1424. (IF = 4.3)
23. Li, W., Zhu, Y., Song, J., **Sun, K.**, & Yang, J., 2017. Geospatial data provenance-ontology and its application in data linking. *Journal of Geo-information Science*, 19(10), 1261-1269. (in Chinese)

Peer-reviewed Book Chapter:

1. **Sun, K.**, Hu, Y., Gaurish L., & Zhou, R. Z., 2023. Spatial cross-validation for GeoAI, In: S. Gao, Y. Hu, and W. Li (Eds), *Handbook of Geospatial Artificial Intelligence*, Taylor & Francis Group.

Peer-reviewed Conference Article:

1. **Sun, K.**, Zhu, Y., Pan, P., Luo, K., Wang, D., & Hou, Z., 2015. Morphology-ontology of geospatial data and its application in data discovery. In *2015 23rd International Conference on Geoinformatics*, pp. 1-6. IEEE.

Working papers:

1. **Sun, K.**, Hu, Y., & Joseph, K. How do people describe locations during a natural disaster: a location description dataset from ten disasters. (Submitted to *Scientific Data*)
2. **Sun, K.** & Lam, N. S. N. Understanding human mobility patterns disrupted by the January 2025 Los Angeles County wildfires using mobile phone location data. (In progress)
3. Dai, X., **Sun, K.***, Li, W., Zhu, Y., Ding, F., Pan, P., Yang, Y., & Wang, S. Explainable GeoAI

reveals spatial varying and nonlinear effects of PM2.5 driving factors in Chinese cities in the context of air quality improvement from 2015 to 2022. (*International Journal of Digital Earth*, under major revision)

Research Grants

1. PI. Advancing the spatially explicit geographical random forests model and its interpretability. *Young Scientists Fund, National Natural Science Foundation of China*. CNY 300,000. 2026-2028 (Awarded)
2. PI. Natural Disasters and Urban Workforce: Labor Market Disruptions from the 2021 Zhengzhou Flood. *Interdisciplinary Research Seed Funding, The Chinese University of Hong Kong*. HK\$ 15,000. 10/2025 – 02/2026

Teaching and Mentoring Experience

Guest Lecturer:

- *GEO 514 GIS and Machine Learning* (Spring 2024, University at Buffalo)
A graduate-level course that teaches students how to integrate GIS and machine learning to address geospatial problems. My role as the Guest Lecturer is to teach Python fundamentals as well as decision tree and random forest models for geospatial applications (e.g., land use classification).

Graduate Student Mentor:

- *Weirong Li*, PhD student
Guided Weirong in data collection and labeling, deep learning model building for geographical information extraction from text, and manuscript revision to achieve publications
- *Xiaoliang Dai*, PhD student
Guided Xiaoliang in addressing limitations of existing spatially explicit models and applying AI models to real-world applications related to environments and natural disasters

Technical Skills

Programming languages: Python, Java, R, JavaScript

Geospatial software: ArcGIS Pro, QGIS

Conference Presentations

1. **Oral presentation** (2025): GALLOC: A GeoAnnotator for Labeling LOCation descriptions from disaster-related text messages, *the 3rd Seminar on Data-Driven and Geoscience Development*, October 13-15, 2025, Zhuhai, China
2. **Oral presentation** (2025): PyGRF: An improved Python Geographical Random Forest model and case studies in public health and natural disasters, *the 2nd Conference on Information Geography*, August 18-20, 2025, Chengdu, China
3. **Oral presentation** (2025): PyGRF: An improved Python Geographical Random Forest model and

case studies in public health and natural disasters, *the 4th Intelligent Surveying and Mapping Symposium*, June 13-15, 2025, Guangzhou, China

4. **Oral presentation** (2024): PyGRF: An improved Python Geographical Random Forest model and case studies in public health and natural disasters, *2024 Esri User Conference: Innovations in GI Science*, July 15-19, 2024, San Diego, California, USA
5. **Poster presentation** (2024): GALLOC: A GeoAnnotator for Labeling LOCation descriptions from disaster-related text messages, *2024 CaGIS + UCGIS Symposium*, June 3-6, 2024, Columbus, Ohio, USA
6. **Oral presentation** (2023): GALLOC: A GeoAnnotator for Labeling LOCation descriptions from disaster-related text messages, *the 4th Spatial Data Science Symposium*, September 5-6, 2023, Online
7. **Oral presentation** (2023): GALLOC: A GeoAnnotator for Labeling LOCation descriptions from disaster-related text messages, *International Symposium on Location-Based Big Data and GeoAI*, August 12, 2023, Online
8. **Oral presentation** (2022): Geospatial data ontology: the semantic foundation of geospatial data integration and sharing, *International Training Workshop on Resource & Environment Scientific Data Sharing and Disaster Risk Reduction Knowledge Service along the Belt and Road*, November 20-24, 2022, Online
9. **Oral presentation** (2022): Aligning geographic entities from historical maps based on spatial mapping transformation, *the 5th International Conference on Big Earth Data*, November 12-13, 2022, Online
10. **Oral presentation** (2021): Geospatial data ontology: the semantic foundation of geospatial data integration and sharing, *the 19th International Conference on Spatial Data Handling and Geographic Intelligence*, August 13-14, 2021, Online
11. **Oral presentation** (2015): Morphology-ontology of geospatial data and its application in data discovery, *the 23rd International Conference on Geoinformatics*, June 19-21, 2015, Wuhan, China

Peer Reviewer for Academic Journals

- International Journal of Geographical Information Science
- Transactions in GIS
- Reliability Engineering & System Safety
- Information Processing and Management
- International Journal of Digital Earth
- GIScience & Remote Sensing
- Computers & Geosciences
- Geo-spatial Information Science
- Journal of Earth Science
- Journal of Geographical Systems

- ISPRS International Journal of Geo-Information
- PLOS ONE
- Frontiers in Environmental Science
- Remote Sensing
- Sustainability
- Buildings

Awards and Honors

- ICA Scholarship, By the *International Cartographic Association (ICA)*, 2024
- Excellent PhD Graduate Award, by the *Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences*, 2021
- Doctoral Fellowship, by the *Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences*, 2018, 2019
- Joint PhD Student Scholarship, by *China Scholarship Council*, 2018
- Undergraduate Fellowship, by *Wuhan University*, 2011, 2012