

Ruixiang Liu

Ph.D. Student, Department of Geography
 Geoinformation and Big Data Research Laboratory (GIBD)
 The Pennsylvania State University, University Park, USA
 Address: 205 Walker Building, State College, PA, USA 16803
 Email: ruixiangliu@psu.edu

[Google Scholar](#) | [ResearchGate](#) | [LinkedIn](#) | [Website](#)

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Education

- **Ph.D.** 2025 – Present Geography, The Pennsylvania State University, PA, USA.
- **M.Sc.** 2022 – 2025 Cartography and Geographic Information System, Wuhan University, Hubei, China.
- **B.Eng.** 2018 – 2022 Remote Sensing Science and Technology, Wuhan University, Hubei, China.

Research Interests

Autonomous GIS	Spatial Reasoning
Geographic Information Science	Big Data Analytics
High-performance Geo-computing	Geospatial Data Cube
Human Mobility	Knowledge Graph

Peer-reviewed Journal Articles (* denotes the corresponding author)

1. Li, Z. *, Khosravi Kazazi, A., **Liu, R.**, Akinboyewa, T., Ning, H., Huang, X., ... & Simonis, I. (2026). Geospatial Agentic Services: A Framework for Interoperable Geospatial Intelligence in the Era of Autonomous GIS. (Under Revision)
2. **Liu, R.**, Li, Z. *, Lim, S., & Lessani, M. Naser. Exploring tract-level human mobility adaptation to heatwaves in contiguous United States using mobile location data (2018–2022). (Under Revision)
3. **Liu, R.**, Li, Z. *, & Khosravi Kazazi, A. (2026). Towards intelligent geospatial data discovery: a knowledge graph-driven multi-agent framework powered by large language models. *International Journal of Geographical Information Science*, 1-29.
4. Lim, S., Li, Z. *, & **Liu, R.** (2026). A directional latent demand index for city links: from mobility traces to service gaps. *Computational Urban Science*, 6(1), 41.
5. Yue, P. *, Wu, H., **Liu, R.**, Gong, J., Xiang, L., Wang, K., & Teng, B. (2026). Conceptualizing the analysis-readiness for the next-generation SDI through the Open Geospatial Engine (OGE). *International Journal of Remote Sensing*, 1-35.
6. Yue, P., Wang, K. *, Wu, H., & **Liu, R.** (2025). Recent progress and technical practices of GIServices. *Chinese Science Bulletin*, 70 (30), 5163-5179.
7. Gong, J., Yue, P. *, Xiang, L., Wu, H., Wang, K., **Liu, R.**, & Teng, B. (2025). The design and

- implementation of the open geospatial engine (OGE). *Acta Geodaetica et Cartographica Sinica*, 54 (4), 587-602.
8. Yue, P.^{*}, Liu, X., **Liu, R.**, Cai, C., Huang, L., Li, J., Zhang, Q., & Jiang, M. (2024). Modelling and development approaches for spatial-temporal data governance in intelligent connected vehicles. *Geomatics and Information Science of Wuhan University*.
 9. **Liu, R.**, Yue, P.^{*}, Shangguan, B., Gong, J., Xiang, L., & Lu, B. (2024). RTGDC: a real-time ingestion and processing approach in geospatial data cube for digital twin of Earth. *International Journal of Digital Earth*, 17(1), 2365386.
 10. He, L.^{*}, & **Liu, R.** (2024). Discovering links between geospatial data sources in the Web of data: the open geospatial engine approach. *ISPRS International Journal of Geo-Information*, 13(5), 143.
 11. Yue, P.^{*}, **Liu, R.**, Shangguan, B., Cao, Z., Liu, S., & Xu, H. (2023). GeoAI training data: model, quality, and services. *Geomatics and Information Science of Wuhan University*, 48(10), 1616-1631.

Presentations (* denotes the corresponding author)

1. Wang, Y., & **Liu, R.**^{*} Fine-grained Land Cover Classification from Multispectral LiDAR Using Point Transformer V3. 2026 14th International Conference on Agro-Geoinformatics, Sanya, Hainan, China, July 13-16, 2026.
2. **Liu, R.**, Li, Z., & Kazazi, A. Towards Intelligent Geospatial Data Discovery: a knowledge graph-driven multi-agent framework powered by large language models. 2026 PA GIS Conference, State College, PA, USA, April 16, 2026.
3. **Liu, R.**, & Li, Z. Towards Intelligent Geospatial Data Discovery: a knowledge graph-driven multi-agent framework powered by large language models. 2026 American Association of Geographers (AAG) Annual Meeting, San Francisco, CA, USA. March 19, 2026.
4. **Liu, R.** RTGDC: a real-time ingestion and processing approach in geospatial data cube for digital twin of earth. GIS Day Lightning Talk, Pennsylvania State University, State College, PA, USA, November 17, 2025.
5. Mi, Y., **Liu, R.**^{*}, & Yue, P. A data organization approach in geospatial data cube based on variable spatial grids. 2025 13th International Conference on Agro-Geoinformatics, Boulder, CO, USA, July 7-10, 2025.
6. **Liu, R.** Introduction to OGC TrainingDML-AI Standard with use cases. ISG-ISRS National Symposium 2023, Pune, MH, India, November 28-30, 2023.
7. **Liu, R.**, & Yue, P. The latest progress of TrainingDML-AI Part 2 & Part 3: JSON and XML Encoding. 127th OGC Member Meeting, Singapore, September 25-29, 2023.
8. **Liu, R.**, Yue, P.^{*}, Yu, D., Wang, K., Deng, H., & Li, H. A cube-enabled cloud geoprocessing engine for big Earth data. 2023 11th International Conference on Agro-Geoinformatics, Wuhan, Hubei, China, July 25-28, 2023.

9. **Liu, R.**, Yu, D.^{*}, & Yue, P. A disaster information service for damaged road networks using dynamic segmentation. 2022 10th International Conference on Agro-Geoinformatics, Quebec City, QC, Canada, July 11-14, 2022. **(Best Student Paper Award)**

Standards

1. GB/T XXXXX-XXXX Specification for intelligent vehicle base map markup language. Standardization Administration of China. **(Editor)** (Under Review)
2. GB/T XXXXX.1-XXXX Geographic Information—Training data markup language for artificial intelligence—Part 1: Conceptual model. Standardization Administration of China. **(Editor)** (Under Review)
3. GB/T 44491.2-2026 Geographic information—Preservation of digital data and metadata—Part 2: Content specifications for Earth observation data and derived digital products. Standardization Administration of China. **(Editor)**
4. GB/T 44491.1-2024 Geographic information—Preservation of digital data and metadata—Part 1: Fundamentals. Standardization Administration of China. **(Editor)**
5. OGC Training Data Markup Language for Artificial Intelligence (TrainingDML-AI) Part 3: XML Encoding Standard, OGC 24-007r1. Wayland, MA: Open Geospatial Consortium Inc. **(Editor & Submitter)**
6. OGC Training Data Markup Language for Artificial Intelligence (TrainingDML-AI) Part 2: JSON Encoding Standard, OGC 24-006r1. Wayland, MA: Open Geospatial Consortium Inc. **(Editor & Submitter)**
7. OGC Training Data Markup Language for Artificial Intelligence (TrainingDML-AI) Part 1: Conceptual Model Standard, OGC 23-008r3. Wayland, MA: Open Geospatial Consortium Inc. **(Submitter)**

Teaching

As a teaching assistant:

Spring 2026	GEOG 1N: Global Parks and Sustainability, The Pennsylvania State University
Fall 2025	GEOG 1N: Global Parks and Sustainability, The Pennsylvania State University
Fall 2024	High-performance Geo-computing, Wuhan University
Fall 2023	High-performance Geo-computing, Wuhan University
Spring 2023	Spatiotemporal Big Data Analytics and Data Science, Wuhan University
Fall 2022	High-performance Geo-computing, Wuhan University

Honors and Awards

- 2024 **Zhizhuo Wang Innovative Talent Scholarship**, Wuhan University, China.
- 2024 **National Scholarship (top 0.2%)**, China.
- 2024 **Outstanding Student Scholarship (grade 1, top 10%)**, Wuhan University, China.
- 2023 **Outstanding Student Scholarship (grade 2, top 20%)**, Wuhan University, China.

- 2022 **Second Prize Award of Best Student Paper Competition**, In the 10th International Conference on Agro-Geoinformatics, Quebec City, Canada.
- 2022 **Zhizhuo Scholarship (top 10%)**, Wuhan University, China.
- 2022 **Outstanding Freshman Scholarship (grade 2, top 10%)**, Wuhan University, China.
- 2022 **Excellent Bachelor Dissertation Award (top 5%)**, Wuhan University, China.
- 2022 **Top Ten Remote Sensing Constellations Award of Wuhan University**, School of Remote Sensing Information Engineering, Wuhan University, China.
- 2022 **First Prize**, Competition on Discovering Historical Cultural Heritage with Eye in Space, Asia-Pacific Space Cooperation Organization (APSCO).
- 2021 **Second Prize (top 15%)**, MathorCup University Mathematical Modeling Challenge, China.
- 2021 **Honorable Mention (top 15.35%)**, The Interdisciplinary Contest in Modeling (ICM), The Consortium for Mathematics and its Applications (COMAP), U.S.A.
- 2020 **Winner**, PIESAT Cup—PIE Remote Sensing & GIS Integrated Software Secondary Development Competition, Chinese Society for Geodesy, Photogrammetry and Cartography, China.
- 2020 **Finalist (top 0.17%)**, The Mathematical Contest in Modeling (MCM), The Consortium for Mathematics and its Applications (COMAP), U.S.A.
- 2019 **Second Prize**, The Chinese Mathematics Competitions (CMC), Chinese Mathematical Society, China.
- 2019 **Excellent Student Cadre**, School of Remote Sensing Information Engineering, Wuhan University, China.

Conference Sessions Organized/Chaired

1. Panel: The Convergence of Generative AI and GIScience - Research Agenda Towards Autonomous GIS. AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
2. Panel: The Convergence of Generative AI and GIScience - Challenges and Opportunities. AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
3. The Convergence of Generative AI and GIScience: Autonomous AI Agents Development for Geospatial Tasks (1). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
4. The Convergence of Generative AI and GIScience: Autonomous AI Agents Development for Geospatial Tasks (2). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
5. The Convergence of Generative AI and GIScience: Framework, Foundation Models, Standards, and Infrastructure. AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Chair)**

6. The Convergence of Generative AI and GIScience: Benchmarking, Fine-Tuning, and Evaluation. AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
7. The Convergence of Generative AI and GIScience: Society Impacts, Education and Ethical Considerations (1). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
8. The Convergence of Generative AI and GIScience: Society Impacts, Education and Ethical Considerations (2). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
9. The Convergence of Generative AI and GIScience: Domain Applications and Use Cases (1). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
10. The Convergence of Generative AI and GIScience: Domain Applications and Use Cases (2). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
11. The Convergence of Generative AI and GIScience: Domain Applications and Use Cases (3). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**
12. Symposium on Spatial AI and Data Science: Frontiers and Applications: Big Data Computing for Geospatial Applications (1). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Chair)**
13. Symposium on Spatial AI and Data Science: Frontiers and Applications: Big Data Computing for Geospatial Applications (2). AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Chair)**
14. Symposium on Spatial AI and Data Science: Frontiers and Applications: Integrative Approaches to Understanding Human Mobility and Health Outcomes. AAG Annual Meeting, San Francisco, CA, USA, March 17-21, 2026. **(Organizer)**

Manuscript Reviews for Peer-reviewed Journals

1. International Journal of Applied Earth Observation and Geoinformation (2026[1])
2. Cities (2026[1])
3. International Journal of Digital Earth (2026[1])
4. Geo-spatial Information Science (2026[1])
5. Annals of GIS (2026[1])
6. Progress in Disaster Science (2026[1])
7. SoftwareX (2026[1])
8. Natural Hazards Research (2026[1])
9. Carbonates and Evaporites (2026[1])

Professional Memberships

- 2026 – present: Student Member, Keystone GIS
- 2026 – present: Student Affiliate, Center for Socially Responsible Artificial Intelligence

(CSRAI), The Pennsylvania State University

- 2025 – present: Student Member, Association of the American Geographers (AAG)
- 2025 – 2026: Student Member, The International Association of Chinese Professionals in Geographic Information Sciences (CPGIS)
- 2022 – present: Student Member, International Society of Agromatics (ISAM)

Professional Skills

- **Programming Languages:** Proficient in Scala, Java, Python; Good at C++, MATLAB; Familiar with R.
- **Programming Frameworks:** Good at Vue3 for Web design, Spring Boot for Web service, Spark for high-performance computing, PostgreSQL for data storage.
- **Professional Software:** Good at Google Earth Engine (GEE), ArcGIS, QGIS.
- **Language Skills:** Fluent in Chinese (native) and English (TOEFL score: 103 <R: 30, L: 24, S: 22, W: 27>)