Huan Ning

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Google Scholar (Citation: 750) | ResearchGate

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Research Interest

Geographic Information Science	Autonomous Agent
Autonomous Modeling	Meta-Modeling
Artificial Intelligence	Sustainability
Human-environment	Transportation
Urban Informatics	Health Geography
Big data analytics	Human Mobility
Network Science	Complex Systems

Education

- Ph.D. student and candidate, 2023.08 – present, Geography, The Pennsylvania State University, PA, US.

- Ph.D. student and candidate, 2021 – 2023.07, Geography, University of South Carolina, SC, US.

- Ph.D. student, 2019 -2020, Information Systems, New Jersey Institute of Technology, NJ, US.

- M.S., 2019, Geography, University of South Carolina, SC, US.

- B.S., 2006, Remote Sensing Science and Technology, Wuhan University, Hubei, China.

Professional Experience

1. 2023.08 – present, Research Assistant, Department of Geography, Pennsylvania State University, Columbia, SC, USA

2. 2021.01 – 2023.07, Instructor/Research Assistant/Teaching Assistant, Department of Geography, University of South Carolina, Columbia, SC, USA

3. 2019 – 2020, Teaching/Research Assistant, Department of Informatics, New Jersey Institute of Technology, Columbia, SC, USA

4. 2017 – 2019, Teaching/Research Assistant, Department of Geography, University of South Carolina, Columbia, SC, USA

5. 2011- 2017, Chief of Technology Officer, Manager of Research and Development Department, Manager of Quality Control, Wuhan SunMap RS Technology Co., Ltd, Wuhan, Hubei, China.

6. 2016 – present, Registered Surveyor, China

7. 2006 – 2010, Project Manager, China TopRS Technology Co., Ltd, Beijing, China.

Selected Honors and Awards

1. 2023, Breakthrough Graduate Scholar Award, University of South Carolina, US

2. 2023, SPARC Graduate Research Grant Program, University of South Carolina, US

3. 2022, The Grace and Allan Davis Scholarship, Department of Geography, University of South Carolina, US

4. 2017, Winner of NVIDIA GPU Essay Challenge, United States Geospatial Intelligence Foundation, US

5. 2010, Outstanding Employee, China TopRS Technology Co., Ltd, China

6. 2005, Outstanding Student Scholarship, Wuhan University, China

Research Grants

External Funding

1. *Research center of earth monitoring technology by unmanned aerial vehicle*, Wuhan East Lake New Technology Development Zone in the Earth Space Information and Application of the Special Service Industry Development. ($15,000, 2014)

2. *Unmanned aerial vehicle data processing in a cloud-computing environment*, Key Technology Research Project in Wuhan City. ($30,000, 2014)

3. *Remote sensing image change detecting based intelligent interaction,* Innovation Fund for Small Technology-based Firms, Ministry of Science and Technology of China. ($110,000, 2012)

4. *Remote sensing image change detecting,* 3551 Schema for Talents in Optics Valley, Wuhan. ($95,000, 2012, devised and wrote the proposal)

Internal Funding

5. Neighborhood Mobility Assessment for Wheelchair Users Based on Street View Imagery *, Support to Promote Advancement of Research and Creativity (SPARC Graduate Research Grant Program)*, University of South Carolina. ($5,000, 2023)

6. The spreading of COVID-19 in South Carolina based on human mobility data*, Heal GIS Scholars Program, Big Data Health Science Center*, University of South Carolina. ($3,000, 2023)

Peer-reviewed Journal Articles

*: contributed equally with the listed first author

1. Akinboyewa, T., **Ning, H**., Lessani, M. N., & Li, Z. (2024). Automated floodwater depth estimation using large multimodal model for rapid flood mapping. *Computational Urban Science*, *4*(1), 12.

2. Yu, M., Zhang, S., **Ning, H**., Li, Z., & Zhang, K. (2024). Assessing the 2023 Canadian wildfire smoke impact in Northeastern US: Air quality, exposure and environmental justice. Science of The Total Environment, 926, 171853.

3. Shi, F., Mi, T., Li, X., **Ning, H**., Li, Z., & Yang, X. (2024). Structural Racism and HIV Pre-exposure Prophylaxis Use in the Nationwide US: A County-Level Analysis. *Journal of Raciautol and Ethnic Health Disparities*, 1-7.

4. Wang, S., Hu, T., Xiao, H., Li, Y., Zhang, C., **Ning, H**., ... & Ye, X. (2024). GPT, large language models (LLMs) and generative artificial intelligence (GAI) models in geospatial science: a systematic review. *International Journal of Digital Earth*, *17*(1), 2353122.

5. Jing, F., Li, Z., Qiao, S., **Ning, H**., Lessani, M. N., & Li, X. (2024). From neighborhood contexts to human behaviors: Cellphone-based place visitation data contribute to estimating neighborhood-level depression prevalence in the United States. *Cities*, *148*, 104905.

6. Li, Z., **Ning, H**., Jing, F., & Lessani, M. N. (2024). Understanding the bias of mobile location data across spatial scales and over time: a comprehensive analysis of SafeGraph data in the United States. Plos one, 19(1), e0294430.

7. Gao, G., Ye, X., Li, S., Huang, X., **Ning, H**., Retchless, D., & Li, Z. (2024). Exploring flood mitigation governance by estimating first-floor elevation via deep learning and google street view in coastal Texas. *Environment and Planning B: Urban Analytics and City Science*, *51*(2), 296-313.

8. Li, Z., & **Ning*, H**. (2023). Autonomous GIS: the next-generation AI-powered GIS. *International Journal of Digital Earth*, 16(2), 4668-4686.

9. Wang, S., **Ning*, H**., Huang, X., Xiao, Y., Zhang, M., Yang, E. F., ... & Zeng, Y. (2023). Public surveillance of social media for suicide using advanced deep learning models in Japan: time series study from 2012 to 2022. *Journal of medical internet research*, *25*, e47225.

10. Li, Z., Qiao, S., **Ning, H**., Sun, X., Zhang, J., Olatosi, B., & Li, X. (2023). Place Visitation Data Reveals the Geographic and Racial Disparities of COVID-19 Impact on HIV Service Utilization in the Deep South. *AIDS and Behavior*. https://doi.org/10.1007/s10461-023-04163-4

11. Zeng, C., Zhang, J., Li, Z., Sun, X., **Ning, H**., Yang, X., ... & Li, X. (2023). Residential Segregation and County-Level COVID-19 Booster Coverage in the Deep auth: Surveillance Report and Ecological Study. *JMIR Public Health and Surveillance*, *9*(1), e44257.

12. Jing, F., Li, Z., Qiao, S., **Ning, H**., Zhou, S., & Li, X. (2023). Association between immigrant concentration and mental health service utilization in the United States over time: A geospatial big data analysis. *Health & Place*, *83*, 103055. https://doi.org/10.1016/j.healthplace.2023.103055

13. Shi, F., Zhang, J., Yang, X., Sun, X., Li, Z., Zeng, C., **Ning, H.**, Weissman, S., Olatosi, B., & Li, X. (2023). Moderation effect of community health on the relationship between racial/ethnic residential segregation and HIV viral suppression in South Carolina: A county-level longitudinal study from 2013 to 2018. *Frontiers in Public Health*, *10*, 1013967.

14. **Ning, H.**, Li, Z., Qiao, S., Zeng, C., Zhang, J., Olatosi, B., & Li, X. (2023). Revealing geographic transmission pattern of COVID-19 using neighborhood-level simulation with human mobility data and SEIR model: A Case Study of South Carolina. *International Journal of Applied Earth Observation and Geoinformation*, *118*, 103246.

15. **Ning, H.**, Li, Z., Ye, X., Wang, S., Wang, W., & Huang, X. (2022). Exploring the vertical dimension of street view image based on deep learning: A case study on lowest floor elevation estimation. *International Journal of Geographical Information Science*, *36*(7), 1317-1342.

16. **Ning, H.**, Li, Z., Wang, C., Hodgson, M. E., Huang, X., & Li, X. (2022). Converting street view images to land cover maps for metric mapping: a case study on sidewalk network extraction for the wheelchair users. *Computers, Environment and Urban Systems*, *95*, 101808.

17. Li, X., **Ning, H.**, Huang, X., Dadashova, B., Kang, Y., & Ma, A. (2022). Urban infrastructure audit: an effective protocol to digitize signalized intersections by mining street view images. *Cartography and Geographic Information Science*, *49*(1), 32-49.

18. Song, Y., **Ning, H.**, Ye, X., Chandana, D., & Wang, S. (2022). Analyze the usage of urban greenways through social media images and computer vision. *Environment and Planning B: Urban Analytics and City Science*, 23998083211064624.

19. Wang, S., Huang, X., Hu, T., Zhang, M., Li, Z., **Ning, H.**, ... & Li, X. (2022). The times, they are a-changin': tracking shifts in mental health signals from early phase to later phase of the COVID-19 pandemic in Australia. *BMJ global health*, *7*(1), e007081.

20. **Ning, H.**, Ye, X., Chen, Z., Liu, T., & Cao, T. (2022). Sidewalk extraction using aerial and street view images. *Environment and Planning B: Urban Analytics and City Science*, *49*(1), 7-22.

21. Kupfer, J. A., Li, Z., **Ning, H.**, & Huang, X. (2021). Using mobile device data to track the effects of the COVID-19 Pandemic on spatiotemporal patterns of national park visitation. *Sustainability*, *13*(16), 9366.

22. Li, Z., Huang, X., Hu, T., **Ning, H.**, Ye, X., Huang, B., & Li, X. (2021). ODT FLOW: Extracting, analyzing, and sharing multi-source multi-scale human mobility. *Plos one*, *16*(8), e0255259.

23. Li, Z., Huang, X., Ye, X., Jiang, Y., Martin, Y., **Ning, H.**, ... & Li, X. (2021). Measuring global multi-scale place connectivity using geotagged social media data. *Scientific Reports*, *11*(1), 1-19.

24. Huang, X., Wang, C., Li, Z., & **Ning, H**. (2021). A 100 m population grid in the CONUS by disaggregating census data with open-source Microsoft building footprints. *Big earth data*, *5*(1), 112-133.

25. **Ning, H.**, Li, Z., Hodgson, M. E., & Wang, C. (2020). Prototyping a social media flooding

photo screening system based on deep learning. *ISPRS International Journal of Geo-Information*, *9*(2), 104.

26. **Ning, H**., Huang, X., Li, Z., Wang, C., & Xiang, D. (2020). Detecting new building construction in urban areas based on images of small unmanned aerial system. *Papers in Applied Geography*, *6*(1), 56-71.

27. **Ning, H**., Li, Z., Wang, C., & Yang, L. (2020). Choosing an appropriate training set size when using existing data to train neural networks for land cover segmentation. *Annals of GIS*, *26*(4), 329-342.

28. Huang, X., Li, Z., Wang, C., & Ning, H. (2020). Identifying disaster related social media for rapid response: A visual-textual fused CNN architecture. *International Journal of Digital Earth*, *13*(9), 1017–1039. https://doi.org/10.1080/17538947.2019.1633425

29. Huang, X., Wang, C., Li, Z., & **Ning, H**. (2019). A visual–textual fused approach to automated tagging of flood-related tweets during a flood event. *International Journal of Digital Earth*, *12*(11), 1248-1264..

30. Bi, K., Li Y., Xue, Y., Ding, X., and **Ning. H**. "Study on Rapidly Processing Images Acquired from the Altitude Ultra-light Aircraft at Low to Make DOM Based on ERDAS LPS and TerraSolid [J]." *Remote Sensing Information* 5 (2008).

Manuscripts Under Review

31. Tam, C. C., **Ning*, H**., Cai, R., Zhang, J., Li, Z., & Li, X.. Evaluation of Artificial Neural Networks in Natural Language Processing to Identify Suicide-Risk Messages on Twitter.

32. **Ning, H**., Li, Z., Akinboyewa, T., & Lessani, M. N. (2024). LLM-Find: An Autonomous GIS Agent Framework for Geospatial Data Retrieval. *arXiv preprint arXiv:2407.21024*.

33. **Ning, H**., Li, Z., Yu, M.. (2024). Estimating Hourly Neighborhood Population Using Mobile Phone Data in the United States

34. Akinboyewa, T., Li, Z., **Ning, H**., & Lessani, M. N. (2024). GIS Copilot: Towards an Autonomous GIS Agent for Spatial Analysis. *arxiv.org/abs/2411.03205*.

35. Chukwu, M., Huang, X., Li Z., **Ning, H**., & Audu, K. (2024). Understanding Urban Park Visitors' Pattern in New York City and the Long-Standing Inequity Issues: A Longitudinal Study with Fine-grained Human Mobility Data.

36. Temitope Akinboyewa, Zhenlong Li, Huan Ning, M. Naser Lessani, Louisa M. Holmes, Shan Qiao.**Smartphone-based place visitation data better explain neighborhood-level coronary heart disease in the United States.**

Presentations
(presented by the first author unless otherwise noted)

1. Estimating Hourly Neighborhood Population Using Mobile Phone Data. Pennsylvania State University, GIS Day Lightning Talk, November 18, 2024, State College, PA, US (**Ning Huan,** Zhenlong LI, Manzhu Yu, Shiyan Zhang, Shan Qiao)

2. Estimating Hourly Neighborhood Population Using Mobile Phone Data. Pennsylvania State University, Department of Geography, Postdoc and Graduate Student Coffee Hour, November 15, 2024, State College, PA, US (**Ning Huan,** Zhenlong LI, Manzhu Yu, Shiyan Zhang, Shan Qiao)

3. Developing a Novel Wheelchair Mobility Index for Wheelchair Users using Street View Imagery and Artificial Intelligence, National Neighborhood Data Archive (NaNDA) Summer Workshop 2024, August 14, 2024, Ann Arbor, MI, US (**Ning H.,** Li Z., Qiao S., Li X.)

4. Estimating Hourly Neighborhood Population Using Mobile Phone Data , 2024 AAG Annual Meeting, April 16-20, 2024, Honolulu, HI, US (**Ning H.,** Li Z., Yu M., Zhang S., Qiao S., Li X.)

5. Estimating Hourly Neighborhood Population Using Mobile Phone Data, 5th National Big Data Health Science Conference, February 2-3, 2024, Collumbia, SC, US (**Ning H.,** Li Z., Yu M., Zhang S., Qiao S., Li X.)

6. Autonomous GIS: the next-generation AI-powered GIS, International Association of Geo-informatics (IAG'i), October 28, 2023. (**Ning H.** Li Z) (**invited**)

7. Autonomous GIS, Pennsylvania State University, October 28, 2023. (**Ning H.** Li Z)

8. Estimating first floor elevation for building flooding risk assessment using street view image, AAG Annual Meeting, March 23-27, 2023, Denver. (**Ning H.** Li Z., Ye X.)

9. Using smartphone-based place visitation big data to improve health measure estimation, 4th National Big Data Health Science Conference, February 11-12, 2023, Collumbia, SC, US (**Ning H**., Li Z., Jing F., Qiao S., Li X.)

10. Sidewalk extraction based on street view image, *The 29th International Conference on Geoinformatics*, Aug. 15-18, 2022. Beijing. (**Ning H.,** Li Z., Wang C., Hodgson M., Huang X., Li X.)

11. Place visitation data reveals the geographic and racial disparity of COVID-19 impact on HIV facility utilization in Deep South, The 150th APHA Annual Meeting, Boston, MA, Nov 6-9, 2022. (Li Z., Qiao S., **Ning H**., Zhang J., Olatosi B., Li X)

12. Integrating human mobility data with SEIR model to analyze COVID-19 spreading in South Carolina, The 150th APHA Annual Meeting, Boston, MA, Nov 6-9, 2022. (**Ning H.,** Li Z., Qiao S., Zhang J., Olatosi B., Li X)

13. Converting street view images to land cover maps for metric mapping using AI: a case study on sidewalk network extraction for the wheelchair users, 2022 AAG Annual Meeting, Feb. 25-Mar. 1, 2022, New York City

14. Poster: Where people got COVID-19 in South Carolina? Neighborhoods or Restaurants? 3rd National Big Data Health Science Conference, February 11-12, 2022, Collumbia, SC, US (**Ning H.,** Li Z., Li X., Zhang J., Olatosi, B.)

15. A Street View Research Framework for Urban Environments. Columbia University. Nov. 2019. New York, US (**Ning H.,** Ye X.)

16. A Research Framework for Street View. New Jersey Institute of Technology. Oct., 2019. New York, US (**Ning H**., Ye X.)

17. Build customized deep learning training dataset for remote sensing image classification, *2018 AAG Annual Meeting, April 10-14, 2018*, New Orleans (**Ning H.,** Li Z.)

18. *The story of Unmanned Aerial Vehicle mapping in China – from an engineer's perspective.* University of South Carolina November 2017 (**Ning H.)**

Teaching

Courses Taught

1. GEOG 105 Digital Earth, University of South Carolina (Fall 2022; Instructor of Record)

2. Lab of of GEOG 363 Introduction to GIS, University of South Carolina (Fall 2018)

As a teaching assistant

1. GEOG 363 Introduction to GIS, University of South Carolina, (Fall 2018, Spring 2019)

2. IS 107 Introduction to Website Development, New Jersey Institute of Technology (Fall 2020)

Geospatial Web Application

1. Digital-twin Building Wind Vulnerability 3D visualization: https://gladcolor.github.io/TGI_Rolla/

2. South Carolina Mariculture Siting Tool: https://www.scseagrant.org/gis-based-mariculture-siting-tool/

Academic Services

Manuscript Reviews for Peer-reviewed Journals

1. International Journal of Geographical Information Science

2. Computers, Environment and Urban Systems

3. International Journal of Digital Earth

4. International Journal of Applied Earth Observation and Geoinformation

5. PLOS ONE

6. Scientific Reports

7. Transportation Research Interdisciplinary Perspectives

8. Applied Geography

9. Papers in Applied Geography

10. Cities

11. Environment and Planning B: Urban Analytics and City Science

12. Jounral of Asian Architecture and Building Engineering

13. Transportation Planning and Technology

14. Geo-spatial Information Science

15. The Lancet Regional Health – Southeast Asia

16. BMC Health Services Research

17. Transportation Research Interdisciplinary Perspectives

Manuscript Reviews for Peer-reviewed Conferences

1. Transportation Research Board

2. AI4Research

3. International Conference on Applied Intelligence

Conference Sessions Organized/Chaired

1. Harnessing the Power of Generative AI in GIScience through Autonomous GIS Agents (1 session), AAG Annual Meeting, March 24-28, 2025, Detroit (co-organized with Zhenlong Li, Song Gao, Wenwen Li, Krzysztof Janowicz)

2. Urban Sensing and Understanding via Geospatial Big Data and AI, AAG Annual Meeting, March 24-28, 2025, Detroit (co-organized with Zhenlong Li, Temitope Ezekiel Akinboyewa, M. Naser Lessani, Manzhu Yu)

3. Leveraging Generative Artificial Intelligence for Enhanced Disaster Management, AAG Annual Meeting, March 24-28, 2025, Detroit (co-organized with Temitope Ezekiel Akinboyewa, Zhenlong Li, M. Naser Lessani, Manzhu Yu)

4. Geospatial Big Data for Analyzing and Understanding Human Mobility Patterns, AAG Annual Meeting, March 24-28, 2025, Detroit (co-organized with M. Naser Lessani, Zhenlong Li, Temitope Ezekiel Akinboyewa, Manzhu Yu)

5. Social Sensing and Big Data Computing for Disaster Management(1 session), AAG Annual Meeting, March 24-28, 2025, Detroit (co-organized with Zhenlong Li, M. Naser Lessani, Qunying Huang, Bandana Kar)

6. Integrative Approaches to Understanding Human Mobility and Health Outcomes, AAG Annual Meeting, March 24-28, 2025, Detroit (co-organized with Temitope Ezekiel Akinboyewa, Zhenlong Li, M. Naser Lessani, Manzhu Yu)

7. *Big Data Computing for Geospatial Applications (1 session), AAG Annual Meeting, March 24-28, 2025, Detroit (co-organized with Zhenlong Li, Qunqing Huang, Eric Shook, Wenwu Tang)*

8. Big Data Computing for Geospatial Applications (4 sessions), AAG Annual Meeting, April 16-20, 2024, Honolulu (co-organized with Li Z., Huang Q., Shook E., Tang W.)

9. Geospatial Big Data for Analyzing and Understanding Human Mobility Patterns, AAG Annual Meeting, April 16-20, 2024, Honolulu (co-organized with Lessani M., Li Z., Akinoyewa T., Yu M.)

10. Social Sensing and Big Data Computing for Disaster Management, AAG Annual Meeting, April 16-20, 2024, Honolulu (co-organized with Li Z., Lessani M., Huang Q., Kar B.)

11. Integrative Approaches to Understanding Human Mobility and Health Outcomes, AAG Annual Meeting, April 16-20, 2024, Honolulu (co-organized with Akinoyewa T., Lessani M., Li Z., Yu M.)

12. AAG CISG Robert Raskin Student Competition, AAG Annual Meeting, April 16-20, 2024, Honolulu (co-organized with Park J., Zhang Z. Kang J., Michels A., Lyu F. Wu M. Zhang G.)

13. Urban Sensing and Understanding via Geospatial Big Data and AI, AAG Annual Meeting, April 16-20, 2024, Honolulu (co-organized with Li Z., Akinoyewa T., Lessani M., Yu M.)

14. Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions: Big Data Computing for Geospatial Applications (2 sessions), AAG Annual Meeting, March 23-27, 2023, Denver (co-organized with Li Z., Huang Q., Shook E., Tang W.)

15. Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions: Urban Sensing and Understanding via Big Data and GeoAI, AAG Annual Meeting, March 23-27, 2023, Denver (co-organized with Li Z., Jing, F.)

16. Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions: Harnessing Geospatial Information for Mental Health and Emotion Issues, AAG Annual Meeting, March 23-27, 2023, Denver (co-organized with Jing F., Li. Z, Qiao S.)

17. Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions: Human Mobility Analytics in Big Data Era, AAG Annual Meeting, March 23-27, 2023, Denver (co-organized with Lessani N., Li Z.)

18. Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions: Social Sensing and Big Data Computing for Disaster Management, AAG Annual Meeting, March 23-27, 2023, Denver (co-organized with Li, Z., Lessani N., Huang Q., Emrich C.)

19. Symposium on Human Dynamics Research: Uncovering the Bias in Big Data: Who is under-represented and how can we help (2 sessions), AAG Annual Meeting, March 23-27, 2023, Denver (co-organized with Du J., Cui Y., Li D., Yu X.)

Organization Service

1. 2023 – 2024, Student director, Cyberinfrastructure Specialty Group (CISG) of American Association of Geographers (AAG)

Professional Memberships

1. 2017- present: Association of the American Geographers (AAG)

Media Interviews/Mentions

1. 2023, Catholic University of America, Digital Scholar Bytes: Celebrating World GIS Day: Unveiling the Power of Spatial Intelligence, https://www.lib.cua.edu/wordpress/newsevents/21913/

2. 2023, About Geospatial Technology, The Future Shaped by AI and Robotics in Geospatial and BIM Industries, https://www.linkedin.com/pulse/future-shaped-ai-robotics-geospatial-bim-industries-bhoda-uygic

3. 2023, Baobab Tech, GIS Meets Large Language Models: A New Era of Spatial Analysis, https://baobabtech.ai/posts/gis-meets-large-language-models-a-new-era-of-spatial-analysis

4. 2023, University of South Carolina, Geography graduate scholar aims to improve urban planning using emergent tech. https://sc.edu/study/colleges_schools/artsandsciences/about/news/2023/geography_grad_ermgent_tech.php

5. 2020, New Jersey Institute of Technology, AI Software Will Help Regional Planners Build Sidewalks Database. https://news.njit.edu/ai-software-will-help-regional-planners-build-sidewalks-database