

Wenbo Lv

B.Sc. Graduate

Curriculum Vitae

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Some stuff about me

- My research interests lie in **advancing methodologies in spatial causal inference** and **developing high-performance computational tools**, with a primary focus on *R packages*.
- Currently, my work centers on **Empirical Dynamic Modeling (EDM)** framework for modeling *dynamic system* and **Difference-in-Differences (DID)** methods for *event studies*. I am particularly interested in leveraging these approaches to address critical challenges in *urban sustainability*, *climate change mitigation*, and broader global issues.
- I specialize in *data analysis*, *statistical modeling*, and developing open-source analytical tools, including *R packages*, using **R**, **C++**, and **Python**, with a strong focus on *spatial analysis*. I actively contribute to the R geospatial community and am dedicated to advancing open-source geospatial software.

Education

2021.8-2025.6 **B.Sc. In Geographic Information Science** Shaanxi Normal University
Xi'an, Shaanxi

Research Experience

2025.9-2026.9 **Research Assistant** EITech
Ningbo, Zhejiang

2025.2-2025.8 **Research Assistant** PolyU-SZRI
Shenzhen, Guangdong

2024.8-2025.6 **Visiting Student** HKUST(GZ)
Guangzhou, Guangdong

Publications

1. Lv, W., Lei, Y., Liu, F., Yan, J., Song, Y., & Zhao, W. (2025). gdverse: An R package for spatial stratified heterogeneity family. *Transactions in GIS*, 29(2), 29:e70032. <https://doi.org/10.1111/tgis.70032>
2. Lv, W., Liu, F., Cai, K., Cao, Y., Deng, M., Liang, W., Yan, J., & Wang, G. (2024). Distinguishing the impacts and gradient effects of climate change and human activities on vegetation cover in the weihe river basin, china. *Journal of Geophysical Research: Biogeosciences*, 129(10). <https://doi.org/10.1029/2024jg008297>
3. Chen, C., Song, Y., Lv, W., Shemery, A., Hampson, K., Yi, W., Zhong, Y., & Wu, P. (2025). Predicting pavement cracking performance using laser scanning and geocomplexity-enhanced machine learning. *Computer-Aided Civil and Infrastructure Engineering*. <https://doi.org/10.1111/mice.13489>
4. Song, Z., Liu, F., Lv, W., & Yan, J. (2023). Classification of urban agricultural functional regions and their carbon effects at the county level in the pearl river delta, china. *Agriculture*, 13(9). <https://doi.org/10.3390/agriculture13091734>
5. Song, Z., Liu, F., & Lv, W. (2023). *Spatiotemporal characteristics and optimization strategies of urban-rural development disparities in china's urban agglomerations(in chinese)* (pp. 1418–1429). People's Cities, Empowered by Planning - Proceedings of the 2023 China Urban Planning Annual Conference (14 Regional Planning; Urban Economy). <https://link.cnki.net/doi/10.26914/c.cnkihy.2023.061565>

Honor

2024.12 **Longi Non-Education Major Scholarship**

2024.11 **First Prize in the 13th National University Student GIS Application Skills Competition**

2024.06 **National University Student Innovation and Entrepreneurship Training Program Qualified Completion**

2023.12 **Grand Prize in the 12th National University Student GIS Application Skills Competition**

2023.11 **First Prize in the Second National University Student Ecological Environment Management Research Innovation Competition**

- 2023.12 **Second Prize of the 5th 'Guodi Cup' National College Student Natural Resource Science and Technology Competition, China Society of Natural Resources**
- 2021.10 **Outstanding Individual in Military Training Publicity for College Students, Shaanxi Normal University**

Unpublished

- First Author **Measuring causal strengths by geographical cross mapping cardinality** Submitted to IJGIS, currently under review
- First Author **Causal discovery in urban data with temporal empirical dynamic modeling: The R package tEDM** Submitted to CEUS, currently under review
- First Author **Quantifying Information Flows in Spatial Processes** Plan
- First Author **gobi: General ODE-Based Causal Inference in R** Plan

Developed Spatial Analysis Toolkit

| Package | Description | Source Code | Language |
|---------------|--|---|----------------|
| spEDM | Spatial Empirical Dynamic Modeling | https://github.com/stscl/spEDM | C++, R |
| tEDM | Temporal Empirical Dynamic Modeling | https://github.com/stscl/tEDM | C++, R |
| gobi | General ODE-Based Causal Inference | https://github.com/stscl/gobi | C++, R |
| infocausality | Information-Theoretic Measure of Causality | https://github.com/stscl/infocausality | C++, Python, R |
| gdverse | Analysis of Spatial Stratified Heterogeneity | https://github.com/stscl/gdverse | R, C++, Python |
| itmsa | Information-Theoretic Measures for Spatial Association | https://github.com/stscl/itmsa | C++, R |
| sdsfun | Spatial Data Science Complementary Features | https://github.com/stscl/sdsfun | R, C++ |
| geocomplexity | Mitigate Spatial Bias Through Geographical Complexity | https://github.com/ausgis/geocomplexity | C++, R, C |
| HSAR | Hierarchical Spatial Autoregressive Model | https://github.com/spatlyu/hsar | C++, R |
| GD | Geographical Detectors for Assessing Spatial Factors | https://github.com/ausgis/GD | R |
| sesp | Spatially Explicit Stratified Power | https://github.com/stscl/sesp | R, C++ |
| cisp | A Correlation Indicator Based On Spatial Patterns | https://github.com/stscl/cisp | R |
| geosimilarity | Geographically Optimal Similarity | https://github.com/ausgis/geosimilarity | R |
| geocn | Loads Spatial Data Sets of China | https://github.com/stscl/geocn | R |
| figpatch | Easily Arrange External Figures with Patchwork Alongside 'ggplot2' Figures | https://github.com/spatlyu/figpatch | R |
| qgisprocess | R package to use QGIS processing algorithms | https://github.com/r-spatial/qgisprocess | R |
| spEcula | Spatial Prediction Methods In R | https://github.com/SpatLyu/spEcula | R |

| Package | Description | Source Code | Language |
|------------|-----------------------------|---|----------|
| tidyrgeoda | A tidy interface for rgeoda | https://github.com/SpatLyu/tidyrgeoda | R |