

Wenbo Lv

B.Sc. Graduate

Curriculum Vitae

Friday 31st October, 2025

📍 Ningbo
🏠 spatlyu.github.io
✉ lyu.geosocial@gmail.com
🔗 SpatLyu
🆔 0009-0002-6003-3800

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*.
- 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.
- Currently, my work centers on **Empirical Dynamic Modeling (EDM)** framework for modeling *dynamic system*, **information theory** for quantifying *information flow* and *causal interdependence*, **ordinary differential equations (ODEs)** for characterizing *spatiotemporal processes* and *system evolution*, as well as **counterfactual** and **potential outcomes** framework for estimating *causal effects*. I am particularly interested in leveraging these approaches to address critical challenges in *urban sustainability*, *climate change mitigation*, and broader global issues.

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

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