

# Wenbo Lv

B.Sc. Graduate

## Curriculum Vitae

Sunday 28<sup>th</sup> September, 2025

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

## Unpublished

First Author	<b>Measuring causal strengths by geographical cross mapping cardinality</b>	Submitted to IJGIS, currently under review
First Author	<b>Causal discovery in urban data with temporal empirical dynamic modeling: The R package tEDM</b>	Submitted to CEUS, currently under review
First Author	<b>gobi: General ODE-Based Causal Inference in R</b>	Plan
First Author	<b>Decomposing spatial causality through mutual information</b>	Plan

## Developed Spatial Analysis Toolkit

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