

# Bin Liu

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18, Shuangqing Road, Haidian District, Beijing, 100085, China

## RESEARCH INTERESTS

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Urban-Human Dynamics & Mapping, Landscape Functional Heterogeneity, Landscape Regulation, Geospatial Big Data, GIS & Remote Sensing, Urban Analytics, Applied Statistics & Spatial Econometrics

## EDUCATION

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Chinese Academy of Sciences, Research Center for Eco-Environmental Sciences, State Key Laboratory of Regional and Urban Ecology (RCEES, CAS) Beijing, China | 09/2023 – 06/2026

- **Degree: Master's Student in Landscape Ecology** (Advisor: Prof. Liding Chen) **GPA: 3.55/4.0**  
(Entrance through the exam-free recommendation program)
- **Essential Coursework:** Landscape and Regional Ecology, Spatial Analysis and Modeling in Landscape, Ecological Remote Sensing Applications, GIS, Human geography Model and Application
- **Graduation Thesis:** *Evolution of Production-Living-Ecological Spaces and Its Relationships with Landscape Patterns in the Beijing-Tianjin-Hebei Urban Agglomeration*

Northeast Forestry University, College of Economics and Management, Harbin, China | 09/2019 - 06/2023

- **Degree: Bachelor of Economics in Economic Statistics** (Advisor: Prof. Jiehua Lv) **GPA: 88.42/100**  
(Outstanding Graduate & Excellent Graduation Thesis)
- **Essential Coursework:** Statistics, Econometrics, Multivariate Statistical Analysis, Micro and macro-economics, Finance, Statistical Software Practice, Time Series Analysis, Data Mining Technology
- **Graduation Thesis:** *Spatial-temporal Evolution and Decoupling Visualization of Energy Carbon Emissions in the Three Northeastern Provinces from the Perspective of Nighttime Light Data*

## PUBLICATIONS

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- **Bin Liu**, Liding Chen\*, Lei Yang (2026). Construction of Production-Living-Ecological Space Information Atlas Based on POI Data and Its Application in the Beijing-Tianjin-Hebei Region. *Acta Ecologica Sinica*. (In Chinese, 《生态学报》, CSCD & Chinese Core, Accepted)
- **Bin Liu**, Jiehua Lv\* (2024). Spatiotemporal evolution and Tapio decoupling analysis of energy-related carbon emissions using nighttime light data: A quantitative case study at the city scale in Northeast China, *Energies*, 17(19), 4795. (SCI & EI, IF=3.2)
- Yaxin Jin, **Bin Liu**, Longjiao Ma, Kai Li, Henghua Zhu\*, Ranhao Sun\* (2026). Effects of different ecological restoration measures on seasonal variability of water quality: A case study of Yimeng Mountain Restoration, *Acta Scientiae Circumstantiae*, 46(4): 335-345. (In Chinese, 《环境科学学报》, CSCD & Chinese Core)
- **Bin Liu**, Rongshen Yan, Ni Pu, Jiehua Lv\* (2022). Visualization Research of Supply and Demand Dimensions of Forest Health Industry Based on Cloud Model: A Case Study of Survey Data of the Elderly Population in the Three Northeastern Provinces, *Forestry Economics*, 2022(04), 19-37. (In Chinese, 《林业经济》, Chinese Core)
- **Bin Liu**, Huaru Li (2022). Risk and Return: An Empirical Analysis of the Optimal Trading Strategies of Gold and Bitcoin from the Perspective of Market Traders with Three Decision Types[C]// *Proceedings of 3rd International Symposium on Frontiers of Economics and Management Science (FEMS 2022)*. (CPCI Conference)

- **Bin Liu**, Rongshen Yan, Ni Pu, Runyu Wang (2022). Comprehensive evaluation of forest health consumption satisfaction based on analytic hierarchy process and fuzzy comprehensive evaluation method[C]//. *Proceedings of the 3rd International Symposium on Frontiers of Economics and Management Science (FEMS 2022)*. (CPCI Conference)

## MANUSCRIPTS

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- Xiangyu Ji, Chun Li, Yiting Wang, **Bin Liu**, Lei Yang, Qingyu Feng, Liding Chen\*. (2026) How Built-up Land Encroachment Shapes Cropland Fragmentation: Evidence from China, 1980–2020. **(Manuscript submitted to *Landscape and Urban Planning*)** (SCI & SSCI, IF=9.2)
- **Bin Liu**, Lei Yang, Liding Chen\*, Sike Ma. (2026) Rapid statistical identification of urban job-housing space patterns via spatiotemporal feature extraction from population stock dynamics: a case study in Haidian District, Beijing, China. **(Manuscript completed)**
- **Bin Liu**, Liding Chen\*. (2026) Using dynamic production-living-ecological space information to extract the spatiotemporal evolution characteristics of functional structure and their scale effects in the Beijing-Tianjin-Hebei urban agglomeration. **(Manuscript completed)**
- **Bin Liu**, Liding Chen\*. (2026) Multiscale Regulatory Relationships Between 2D/3D Landscape Pattern and Functional Structure of Production-Living-Ecological Space: A Case Study of the Beijing-Tianjin-Hebei Urban Agglomeration. **(under preparation)**

## RESEARCH EXPERIENCE

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### Landscape Spatial Process Evolution and Soil Environmental Benefits in Rapidly Urbanizing Regions

**Key Project Funded by National Natural Science Foundation of China 09/2023 - Present | Research Assistant**

**Advisor:** Prof. CHEN Liding (Research Center for Eco-Environment Sciences, CAS & Yunnan University)

- Investigated the impacts of rapid urbanization on landscape patterns and soil ecological security by integrating socioeconomic dynamics and geospatial big data
- Combined geographic information science with POI, mobile signaling, and land use change data to quantitatively calculate and map urban functional space dynamics and their landscape pattern driving forces (e.g., form, shape, size)
- Constructed a grid-scale Production-Living-Ecological Spaces (PLES) information atlas framework including density and type atlas using POI and land use data to highlight landscape functional heterogeneity and the social sensing capability of POI data
- Applied the PLES information atlas to the Beijing-Tianjin-Hebei (BTH) urban agglomeration at a 5km grid scale, and extracted the spatiotemporal evolution and spatial inequality characteristics using transition matrices and the standard deviational ellipse across 2016, 2020, and 2024 in the 13 cities of BTH
- Analyzed the spatial response relationship between PLES and landscape patterns by comparing Spatial Durbin, Error, and Lag models, and plans to explore PLES spatial optimization based on 3D landscape patterns regulation using XGBoost-SHAP and NAIL (Interpretable Machine Learning and Multi-Objective Optimization Algorithms)
- Identified urban job-housing space patterns by extracting spatiotemporal features from dynamic population stock dynamics using population dynamic data (a type of mobile signaling data) in Beijing's Haidian District
- Published one and completed two first-author manuscripts, finished the master's graduation thesis, and provided research support for the integrated development of BTH while promoting geospatial big data applications in urban landscape sustainability from a social sensing perspective and exploring experience in quantitative spatial optimization planning schemes via Landscape Regulation

### Policy Implications on Matching and Equilibrium of Greenhouse Gas Emissions and Forest Carbon Sink

**Funded by National Social Science Foundation of China**

**09/2021 - 06/2023 | Research Assistant**

**Advisor:** Prof. LV Jiehua (College of Economics and Management, Northeast Forestry University)

- Investigated the driving factors of greenhouse gas emission reduction and inter-provincial spillover effects, and evaluated the sequestration potential of forest carbon sinks
- Conducted provincial-level statistical accounting and fitted city-level carbon emissions from eight energy sources in Northeast China (2005–2019), extracted their spatiotemporal evolution characteristics and visualized conflicts between emissions and economic growth with RStudio 4.3.2 and ArcGIS 10.8
- Developed a carbon emission fitting method by combining provincial statistical accounting, nighttime light data, and a scaling approach to model city-level energy-related carbon emissions
- Applied the standard deviational ellipse, LISA analysis, and Moran's I index to analyze and extract spatiotemporal evolution characteristics of city-level energy carbon emissions in Northeast China
- Calculated the Tapio decoupling index to visualize spatiotemporal dynamics and decoupling trends between carbon emissions and economic growth
- Published one first-author paper, completed an excellent undergraduate thesis, provided targeted policy recommendations for local governments, and supported China's dual-carbon goals and sustainable urbanization

**Coupling and Coordination Analysis Between Forest Wellness Service Supply and the Aging Population's Elderly Care Needs**

**05/2021 - 05/2022 | Project Leader**

**Funded by National College Students Innovation and Entrepreneurship Training Program**

**Advisor:** Prof. LV Jiehua (College of Economics and Management, Northeast Forestry University)

- Led a 5-member team to investigate forest wellness-elderly care misalignment in Northeast China, integrating ecological economics and data science to address aging challenges and ecological economic industry optimization.
- Designed and executed a survey (500+ valid samples, 3 northeastern provinces capital city) with multi-dimensional indicators (service quality, recreational facilities, transportation accessibility, medical support) to assess elderly satisfaction and needs.
- Independently conducted quantitative analysis using RStudio, SPSS and MATLAB for statistical processing; applied AHP-FCE & Cloud Model to evaluate supply-demand coupling coordination.
- Authored the final report and published 2 first-author papers, providing data-driven insights for silver economy age-friendly services and sustainable urban ecological industrial upgrading

**Chinese Forestry and Grassland Spirit and Its Connotation and Contemporary Value**

**Funded by China Forestry Policy and Research Association**

**07/2021 - 03/2022 | Member**

**Advisor:** Prof. CHEN Wenbin (Northeast Forestry University)

- Investigated the spiritual connotation of China's forestry-grassland sector from practitioners' perspective under the Ecological Civilization framework
- Led a nationwide perceptual evaluation study by surveying 3,000+ forestry/grassland practitioners across seven state-owned forest regions
- Employed classical statistical methods (PCA, contingency analysis, and factor analysis) to quantify core dimensions of the forestry-grassland spirit
- Awarded First Prize by the China Forestry Policy and Research Association for outstanding research

**PLANNING AND DESIGN EXPERIENCE**

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**Green Development Planning, Design and Research Center, China Urban Construction Design & Research Institute Co., Ltd.** Beijing, China | 09/2025 – 12/2025 | *Urban landscape planner Internship*

- 1) **Special Plan for Green Space System in Duoba Area, Xining City, Qinghai Province, China (2025-2035)**  
09/2025 – 12/2025 | Advisor: Senior Engineer **WANG Guoyu**
  - Designed the waterfront greenway system, with full consideration of the river courses, road networks and functional zones along the routes
  - Planned and designed landscape roads based on the accessibility and connectivity of road networks within and between urban areas
- 2) **Regulatory Detailed Planning for Duoba New Town, Xining City, Qinghai Province, China**  
10/2025 – 12/2025 | Advisor: Senior Engineer **WANG Guoyu**
  - Planned and mapped of 15-minute, and 5-10-minute living circles
  - Formulated the infrastructure allocation list for living circles in line with planning codes for relevant communities and living circles

## ACTIVITIES

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**The 4th Heilongjiang Provincial Survey on Ecological Civilization Progress, Heilongjiang Provincial Think Tank for Ecological Civilization and Green Development**

Harbin & Yichun, China | 07/2021 - 08/2021 | **Team Leader**

- Led team to conduct comprehensive field surveys in Yichun, Heilongjiang province, a national key forest region, with a focus on eco-economic industries (e.g., forest health) and forestry workers' livelihoods
- Awarded the *First Prize for Outstanding Survey Report* and the *Second Prize for Outstanding Survey Team*

**China Foundation for Poverty Alleviation Program (CFPA): "Kindness 100" Charity Fundraising Campaign**  
Harbin, China | 10/2019 - 12/2019 & 11/2020 - 12/2020 | **Member**

- Participated in local communities via street fundraising and social media on poverty-related challenges
- Awarded the *Pioneer Challenger* and *Tier 1 Volunteer* of Kindness 100 by CFPA

## CONFERENCES & PRESENTATIONS

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- **The 12th National Academic Symposium on Landscape Ecology, Opportunities and Challenges of Landscape Ecology in China: Big Data, New Methods and Research Paradigms** 08/2025, Kunming, China  
**Oral Presentation:** *Construction and Application of an Optimization Method for Identifying Urban Job-Housing Spaces Based on Location-Based Service Data: A Case Study of Haidian District, Beijing*
- **The 27th Annual Meeting of the China Association for Science and Technology, Simulation of Urban Social-Ecological Systems and Construction of Resilient Cities Supported by AI** 07/2025, Beijing, China

## MEMBERSHIP

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- Cartography and Geographic Information Society (**CAGIS**) | The Geographical Society of China (**GSC**)
- ICA Commission on Geospatial Analysis and Modeling (**ICGAM**) | The Ecological Society of China (**ESC**)
- International Association for China Planning (**IACP**) | Chinese Society of Landscape Architecture (**CHSLA**)
- American Society of Landscape Architects (**ASLA**) |

## PEER REVIEW EXPERIENCE

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- *Frontiers in Sustainable Cities* | *Energy Efficiency*

## TEACHING ASSISTANT EXPERIENCE

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- **Forecasting and Decision of Statistics** Northeast Forestry University | 09/2021 - 12/2021
- **Statistical modeling training** Northeast Forestry University | 02/2022 - 05/2022

## AWARDS & COMPETITIONS & SCHOLARSHIPS

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National level:

- **National Third Prize**, National University Student Competition on Energy Conservation, Emission Reduction, and Social Practice (**Team Leader**) **08/2022**
- **National Third Prize**, National University Student Market Research and Analysis Competition (**Member; Team Leader**) **Twice** **2021 & 2022**
- **First Prize for Outstanding Research Achievement**, China Forestry Workers' Ideological and Political Research Association (**Member**) **03/2022**
- **Honorable Mention**, Mathematical Contest in Modeling (**Team Leader**) **2022**

#### Provincial level:

- **Bronze**, "Internet+" National College Student Innovation and Entrepreneurship Competition (Provincial Level) (**Member; Leader; Member**) **Thrice** **2021 & 2022 & 2023**
- **Silver Award**, Challenge Cup National College Student Innovation Plan Competition (Provincial Level) (**Member**) **08/2022**
- **First Prize**, National University Student E-Commerce Challenge (Provincial Level) (**Member**) **08/2022**
- **Second Prize for Excellent Research Report & First Prize for Team**, the 4th Provincial Ecological Civilization Survey of Heilongjiang Province, China (**Team Leader**) **08/2022**

#### University level:

- **Merit Student**, University of Chinese Academy of Sciences (UCAS) **05/2026**
- **Distinguished Graduate**, Northeast Forestry University **06/2023**
- **Outstanding Undergraduate Thesis designation (1/96)**, Northeast Forestry University **06/2023**
- **Merit Student**, Northeast Forestry University **12/2022**
- **Social Practice Activist** (Awarded for Community Engagement and Fieldwork Leadership) **11/2021**

#### Scholarships:

- **National Encouragement Scholarship**, Ministry of Education of China, **Thrice, 2020 & 2021 & 2022**
- **University First-Class Scholarship**, Northeast Forestry University **Twice, 2021 & 2022**
- **University Second-Class Scholarship**, Northeast Forestry University **2023**
- **Academic Performance Scholarship**, Chinese Academy of Sciences (CAS) **Thrice, 2023 & 2024 & 2025**
- **Second-Class Scholarship**, Research Center for Eco-Environmental Sciences, CAS **Twice, 2026 & 2025**

#### SKILLS

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- **Language:** Chinese (Native), English (Fluent, IELTS 6.0, in preparation for higher score)
- **Programming & GIScience:** RStudio, Python (*Familiar*), ArcGIS, Google Earth Engine, ENVI (*Familiar*)
- **Statistical & Data analysis:** SPSS, Eviews, Fragstats, Invest (*Familiar*), yaahp
- **Design & Mapping & Office Work:** Adobe Illustrator, Photoshop, Microsoft, Origin