Yuhan Xu

PhD Student · City and Regional Planning

Georgia Institute of Technology

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Education

Georgia Institute of Technology — *Atlanta, Georgia, United States*
Doctor of Philosophy in City and Regional Planning — *Aug 2025 - Present*
- Advisor: Dr. Yiyi He

Southeast University — *Nanjing, Jiangsu, China*
Master of Engineering in Landscape Architecture — *Sep 2022 - Jun 2025*
- GPA: 3.96/4.0

Southeast University — *Nanjing, Jiangsu, China*
Bachelor of Engineering in Landscape Architecture — *Sep 2017 - Jun 2022*
- GPA: 3.88/4.0

Professional Experience

2025-	**Graduate Teaching Assistant**, School of City and Regional Planning, Georgia Institute of Technology
2025-	**Graduate Student Fellows**, Center for Sustainable Communities Research and Education, Georgia Institute of Technology
2024-2025	**Research Assistant**, Department of Urban Planning and Design, The University of Hong Kong
2022-2025	**Graduate Student Researcher**, Department of Landscape Architecture, Southeast University
2021-2023	**Research Assistant**, Department of Urban Planning, Southeast University
2020-2021	**Undergraduate Researcher**, Department of Landscape Architecture, Southeast University

Publications

Published (* indicates the corresponding author)

Xu, Y., Chen, C.*, Deng, W., Dai, L., & Yang, T*. (2025). Spatial eco-socio-economic trade-offs inform differentiated management strategies in mega-urban agglomerations. *npj Urban Sustainability*, 5(1), 43. [link][code]

Rui, J.*, **Xu, Y.**, Cai, C., & Li, X. (2025). Leveraging large language models for tourism research based on 5D framework: A collaborative analysis of tourist sentiments and spatial features. *Tourism Management*, 108, 105115. [link]

Xu, Y., & Tang, J.* (2024). Examining the rationality of Giant Panda National Park's zoning designations and management measures for habitat conservation: Insights from interpretable machine learning methods. *Science of The Total Environment*, 170955. [link][code]

Xu, Y., & Ma, X.* (2024). Assessing urban street vitality through visual and auditory perception: A case study of historic urban area in Guangzhou, China. *The International Review for Spatial Planning and Sustainable Development*, 12(4), 57-76. [link]

Ma, X., **Xu, Y.***, Pan, M., & Jiang, K. (2024). Rethinking public service facility distribution and management strategies with the consideration of carbon peak - Insights from Suzhou, China. *Journal of Cleaner Production*, 143070. [link][code]

Rui, J.*, & **Xu, Y.** (2024). Beyond built environment: Unveiling the interplay of streetscape perceptions and cycling behavior. *Sustainable Cities and Society*, 109, 105525. [link][code]

Rui, J.*, **Xu, Y.**, & Li, X. (2024). Destigmatizing urban villages by examining their attractiveness: Quantification evidence from Shenzhen. *Habitat International*, 150, 103120. [link]

Xu, Y., Ma, X.*, Pan, M., & Jiang, K. (2022). A two-stage simulation approach of urban transport emission evaluation towards carbon peak: A case study in Suzhou, China. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 10, 285-292. [link]

Yuan, Y.*, Gan, Y., **Xu, Y.**, Xie, Q., Shen, Y., & Yin, Y. (2022). SWMM-based assessment of urban mountain stormwater management effects under different LID scenarios. Water, 14(1), 78. [link]

In Preparation

Xu, Y., He, Y. Navigating compound hazards for resilient cities, a systematic review.

Xu, Y., He, Y. Understanding vulnerability and identifying resilience strategies for the healthcare critical infrastructure nexus under coastal flooding.

Xu, Y., Zhou, X., Deng, W., & Yang, T. Optimizing urban form though social, economic, and environmental performance: A three-dimensional production possibility frontier approach in 36 Chinese cities.

Research Experience

Georgia Institute of Technology - School of City and Regional Planning *Atlanta*

Advisor: Dr. Yiyi He *Aug 2025 - Present*

- **Assessing the Vulnerability of Healthcare Critical Infrastructure Through Multilayer and Temporal Network Models**
- Employing NetworkX to build a geospatial multi-layer network model to quantify coastal flood exposure and cascading failures, using Lee Health hospitals as a case study.
- Constructing a temporal network model informed by Hurricane Ian and other historical flood events to simulate time-evolving failures and recovery dynamics, generating actionable insights to guide Lee County's long-term recovery and strengthen HCI resilience.
- **A Systematic Review of Definitions, Data, and Modeling Approaches for Compound Hazards**
- examines how compound hazards have been defined across different perspectives and identified the conceptual values and knowledge gaps associated with each.
- synthesizes the data sources and methodologies (physics-based, data-driven, and hybrid methods) employed to model compound hazards across spatial scales.
- assesses the major challenges that hinder progress in compound hazard modeling and outlines key opportunities and future directions for advancing this field.

The University of Hong Kong - Department of Urban Planning and Design *Hong Kong*

Advisor: Dr. Tianren Yang *Apr 2024 - Aug 2025*

- **Analyzing the Relationship Between Urban Form and Multi-dimensional Performance Using Machine Learning**
- Developed a three-dimensional production possibility frontier (PPF) framework to quantify neighborhood-level trade-offs and efficiency across social, economic, and environmental performance dimensions.
- Integrated and processed large-scale geospatial, mobility, and remote sensing datasets for 194,000+ urban blocks across 36 Chinese cities at 500 m resolution, and derived frontier-based performance gap metrics using distance-to-surface methods.
- Identified Pareto-optimal configurations and constructed a smooth empirical frontier using clustering-based noise reduction and radial basis function interpolation.
- Modeled nonlinear urban form–performance relationships using XGBoost and Shapley Additive exPlanations (SHAP), and applied SHAP-based clustering to reveal heterogeneous urban form mechanisms underlying near-frontier performance.
- **Exploring Spatial Eco-socio-economic Trade-offs to Inform Differentiated Management Strategies**
- Developed a framework using PPF to evaluate eco-socio-economic efficiency and ecosystem service value improvement potential in mega-urban agglomerations.
- Employed the InVEST model to map ecosystem service supply and integrated high-resolution location-based data to measure ecosystem service demand in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA).
- Conducted k-means clustering and fitted production possibility frontiers to assess trade-offs between ecosystem service value and socio-economic well-being across distinct zones within the GBA.
- Provided tailored recommendations for eco-economic coordination, ecological restoration, and payment for ecosystem services policies, supporting balanced growth and environmental sustainability.

Southeast University - Department of Landscape Architecture *Nanjing*

Advisor: Dr. Jun Tang *Sep 2022- Apr 2025*

- **Optimizing National Park's Zoning and Management with Interpretable Machine Learning**
- Built a species distribution model using the Random Forest algorithm and multi-source geospatial data.
- Applied interpretable methods, including partial dependence plots (PDPs) and SHAP, to reveal non-linear correlations between environmental and anthropogenic factors and giant panda habitat (GPH) distribution, highlighting threshold effects of key human-related factors such as national roads
- Used GIS overlay analysis to evaluate the effectiveness of zoning designations and management measures within Giant Panda National Park, identifying conflict areas between human settlements and GPHs.

Collaborative Research *Mar 2023 - Jun 2024*

- **Analyzing the Interplay Between Cycling Behavior and Streetscape Perception to Guide Street Innovation**
- Collected and processed over 1.4M origin-destination (OD) records for bike-share ridership from Shenzhen's Open Data Platform, employing NetworkX to model and map shortest-path cycling routes with precision.
- Applied k-means clustering for representative sampling of more than 110,000 street view images and leveraged XGBoost to predict subjective streetscape perceptions, enhancing the accuracy of models.
- Integrated different regression models to unveil the non-linear spatial interdependencies between streetscape perception, built environment characteristics, and bicycle-sharing volume, revealing key influencing factors.
- mployed a classification method to analyze the relationship between streetscape perceptual quality and bike-sharing volumes, identifying priority streets for cycling-focused renovations.
- **Measuring Urban Villages' Attractiveness to Support Destigmatization**
- Designed a behavior-space interaction framework to provide quantitative insights for mitigating stigma associated with urban villages, typical informal settlements in China.
- Analyzed residents' mobility patterns through mobile signaling data, highlighting urban villages' contributions to job-housing balance and diverse service offerings.
- Investigated non-linear relationships between attractiveness indices and built environment features, revealing key factors that enhance the appeal of urban villages and proposing targeted interventions.

Southeast University - Department of Urban Planning *Nanjing*

Advisor: Dr. Xiaosu Ma *Nov 2021- Dec 2023*

- **Assessing Street Vitality and Quality Through Pedestrian-level Visual and Auditory Perceptions**
- Designed a framework to assess street vitality from pedestrians' visual and auditory perceptions utilizing data from 242 sampling points and methods including semantic segmentation and stated preference questionnaires.
- Identified significant correlations between street vitality and elements such as greenery, infrastructure, and noise, offering actionable insights for enhancing street design and improving the pedestrians' experience.
- **Investigating Transport-related Carbon Emissions (CEs) for Informed Planning and Policy Decisions**
- Conducted a two-stage simulation incorporating multi-scenario sensitivity analysis and link-based CE estimation to evaluate uncertainties in achieving transport-related carbon peaking goals.
- Built an interpretable XGBoost model using PDPs to explore the relationship between built environment characteristics and CE intensity, identifying high-impact factors such as density and facility distribution.
- Examined individual medical care travel patterns using two OD surveys, uncovering that elevated transportation-related carbon emissions near hospitals are influenced by residents' activity preferences.
- Discussed trade-offs and synergies between existing planning practices and low-carbon-oriented policy decisions, offering strategic insights to optimize the spatial distribution of public service facilities.

Southeast University - Department of Landscape Architecture *Nanjing*

Advisor: Dr. Yangyang Yuan *Jan 2020 - Dec 2021*

- **Comparing Runoff Control Effects of Low Impact Development (LID) Systems**
- Designed two LID systems for managing stormwater runoff in mountainous urban areas.
- Compared the effectiveness of segmental versus terminal LID schemes, using comparative analysis and data visualization to inform optimal scenario selection.

Project-based Internship

Southeast University Urban Planning & Design Institute Co., Ltd. *Nanjing*

Assistant Planner *Dec 2022 - Aug 2024*

- **General Plan for Mount Tianmu Scenic Area (Chinese National-level Scenic Area)**
- Developed a GIS database and drafted planning schemes, with a focus on conservation and land use plans.
- Investigated conflicts between environmental conservation and economic development within urban scenic area boundaries, leading to a report on buffer zone planning challenges.

Southeast University Architecture Design Institute Co., Ltd. *Nanjing*

Assistant Designer *Apr 2023 - Jul 2023*

- **Development Planning and Urban Design for the Mount Tanshi Cultural Park and its Surroundings)**
- Proposed ecological strategies for wetland conservation by reviewing blue-green infrastructure approaches.
- Conducted elevation and sightline analysis in ArcGIS to design an optimized viewing system.

Southeast University Urban Planning & Design Institute Co., Ltd. *Nanjing*

Analytical Assistant *Oct 2022 - Nov 2022*

- **Urban Design for the Historical Urban Area of Guangzhou Based on Heritage Conservation**
- Analyzed population distribution, temporal patterns, and work-residence relationships, visualizing spatial demographics in ArcGIS Pro and Kepler.

Presentations

2026 (accepted). *Understanding vulnerability and identifying resilience strategies for the healthcare critical infrastructure nexus under coastal flooding*. **Oral presentation**: 2026 AAG Annual Meeting, San Francisco, United States.

2025. *When hazards combine and interact: Understanding compound hazards*. **Guest lecture**: CP-4190/6190 Intro to Climate Change Planning, Georgia Institute of Technology.

2024. *Deciphering anthropogenic influences on habitats: Implications from interpretable machine learning*. **Oral presentation**: 60th World Congress of the International Federation of Landscape Architecture, Istanbul, Türkiye.

2024. *Spatial eco-socio-economic trade-offs inform differentiated management strategies in mega-urban regions*. **Invited talk**: Beijing-Hong Kong Conference on Agricultural Microbial Resources, Beijing, China.

2023. *Assessing urban street vitality through visual and auditory perception*. **Oral presentation**: International Conference on Spatial Planning and Sustainable Development, Kanazawa, Japan.

Teaching Experience

Fall 2025 **CP-4190/6190 Intro to Climate Change Planning**, Graduate Teaching Assistant

Awards & Fellowships

2024	**Kang Qi Fellowship**, Southeast University	*Top 10%*
2022	**Second prize, Chinese University Data-driven Innovation Competition**, China National Information Center	*¥ 10,000*
2022	**Outstanding Undergraduate Student**, Southeast University	*Top 5%*
2019	**Southeast University President Fellowship**, Southeast University	*Top 5%*

Professional Development & Services

Professional Development

2025. **Community-Engaged Sustainability Research Faculty Fellows Program**: Center for Sustainable Communities Research and Education (SCoRE), Georgia Institute of Technology

2025. **International Student Workshop**: The Association of Collegiate Schools of Planning (ACSP) Annual Conference, Minneapolis, United States

2024. **DigitalFUTURES2024**: Tongji University, Shanghai, China

2023. **ArchitecturalDigitalFUTURES + HFUT 2023 · Computational Art & Tech Workshop**: Online

Peer Review

Humanities and Social Sciences Communications (3), Computational Urban Science (2), Health & Place (1), Data in Brief (1), Journal of Asian Architecture and Building Engineering (2)

Skills

Programming: Python (Libraries: Pandas, Numpy, Matplotlib, Geopandas, Scikit-learn, DoubleML, NetworkX), R, Latex

Spatial analysis: ArcGIS Pro, Arcpy, FME, GeoDa