XINGHAN CHEN

+86 180 1859 2284 2230078@tongji.edu.cn

Quantitative researcher in urban studies and data science. Extensive experience with machine learning, spatial analysis, and analysis of multi-sourced urban data, focusing on urban morphology, urban equity, and data-informed urban design.

For more detailed information, please visit my personal website: https://xinghanchen1999.github.io/

Education

Tongji University Shanghai, China

M.S. Candidate in the College of Architecture and Urban Planning [GPA: 4.80/5.00] Graduating Jun. 2025

Thesis: "Decoding Diversity of Global Cityscapes: Measuring unmeasurable cityscapes and the construction of a global genealogy"
Advised by Yu Ye

Tongji University Shanghai, China

B.Eng. in the College of Architecture and Urban Planning [GPA: 4.62/5.00] Jun. 2022

Graduated with Honor: Shanghai Outstanding Graduate Award, 2022 (Top 2)

Publications

Journal Articles

Chen XH, Ding XW, Ye Y. (2024) Mapping sense of place as a measurable urban identity: Using Street View images and machine learning to identify building façade materials. *Environment and Planning B: Urban Analytics and City Science.* (Major Revision)

Chen XH, Yu HT, Xiong RJ, et al. (2024) Construction of an analytical framework for spatial indicator of Chinese classical gardens based on space syntax and machine learning. *Landscape Architecture* 31(3): 123-131. (Chinese, DOI: 10.3724/j.fjyl.202305080216)

Ye Y, Zhang HL, **Chen XH**, et al. (2024) Precise urban regeneration via digital urban design: Using Lujiazui water loop project as the case. *The Architect* 3(2): 31-38. (Chinese, DOI: 10.12285/jzs.20240403003)

Conference Papers

Chen XH, Ye Y. (2024) Intelligent redelineation and feature analysis of urban historical areas. *The 64th Association of Collegiate Schools of Planning (ACSP)*. Seattle, America. (Accepted)

Chen XH, Zhang YP, Ye Y. (2024) Assisting refined urban management: Building an evaluation framework of data mapping rate towards digital twin city platforms. *The 6th International Conference on Computational Design and Robotic Fabrication (CDRF)*. Shanghai, China.

Chen XH, Ding XW, He HY, et al. (2024) Measuring sense of place as an unmeasurable urban environment: Using Street View images and CNN to detect building façade materials. *The 28th International Conference Association People-environment Studies (IAPS)*. Barcelona, Spain.

Chen XH, Yu HT, Zhang HL, et al. (2023) Evaluating and optimizing the functional composition of community centres: A data-informed approach assisting 15-minute community life circle. *The 30th International Seminar on Urban Form (ISUF)*. Belgrade, Serbia.

Chen XH, Kang SZ, Huang CC, et al. (2023) A human-oriented exploration of data-informed urban design: A case study in Shanghai. *The 18th International Conference on Computational Urban Planning and Urban Management (CUPUM)*. Montreal, Canada.

Manuscript

Decoding diversity of global cityscapes: Measuring unmeasurable cityscapes and the construction of a global genealogy.

Research Experience

Tongji University / College of Architecture and Urban Planning Shanghai, China

M.S. program Sep. 2022--Present

Advisor: Yu Ye, Associate Professor of Urban Design

- Decoding diversity of global cityscapes: Measuring unmeasurable cityscapes and the construction of a global genealogy (ongoing).

  Key Aspects: Developed a deep learning-based quantitative approach for measuring cityscapes globally. Constructed a global genealogy of cityscapes, revealing the associations between cityscapes and global cultural-geographical regions worldwide. Created an interactive visualization platform for analyzing and exploring global cityscapes.

  - Utilized knowledge graph method to identify key indicators of cityscapes.
  - Collected a total of 5,750,000 Street View images from over 70 cities worldwide; managed and analyzed this large database using cloud servers.
  - Preprocessed Street View images and used a DeepLab model for semantic segmentation.
  - Calculated HSV color histograms to represent building color distributions.
  - Constructed a series of specialized cross-cultural datasets and trained deep learning models (ResNet, Poly-YOLO, etc.) using different architectures to measure cityscape features (façade materials, architectural styles, urban signs, etc.).
  - Participated in research design, drew diagrams, wrote the manuscript.

Tongji University / Computational Urban Design Lab Shanghai, China

Research Assistant Sep. 2022--Present

PI: Yu Ye, Associate Professor of Urban Design

Urban Morphology:

- Mapping sense of place as a measurable urban identity: Using Street View images and machine learning to identify building façade materials.

  Key Aspects: Developed a method for mapping the large-scale sense of place by measuring building

façade materials. Discovered that New York City, Chicago, and London share similar senses of place compared to Asian cities, while Paris and Tokyo are more distinctive. Our measurements of sense of place can improve urban identity through future urban planning

- Collected Street View images from eight cities globally.
- Preprocessed Street View images and utilized a DeepLab model for semantic segmentation.
- Constructed a cross-cultural dataset by labeling, augmenting, and enhancing the images.
- Calculated and visualized the Shannon index and Local Moran's I to assess the spatial patterns of sense of place.
- Designed research, drew diagrams, wrote the manuscript, revised the manuscript.

- Construction of an analytical framework for spatial indicator of Chinese classical gardens based on space syntax and machine learning.

  Key Aspects: Proposed a systematic spatial indicator framework to better depict the spatial characteristics of Chinese classical gardens. Combined space syntax with machine learning algorithms to develop a technical approach for the measurement of these spatial indicators.

  - Utilized DepthMap to calculate metrics of space syntax. Clustered and visualized results using the DBSCAN algorithm.
  - Organized volunteer experiments to validate research conclusions against human perception.
  - Designed research, drew diagrams, wrote the manuscript, revised the manuscript.

- Quantitative analysis and quality assessment of historic districts in Shanghai.

  Key Aspects: Conducted large-scale, high-precision analysis of Shanghai's historic districts from a top-down perspective. Performed quantitative modeling and evaluation of the integrity and quality of these areas.

  - Utilized ArcGIS to calculate quantitative indicators of historic district morphology. Classified and visualized the morphological types of various street blocks. Calculated the consistency, mutation degree, and continuity of historical areas.

Urban Equity:

- Evaluating and optimizing the functional composition of community centres: A data-informed approach assisting 15-minute community life circle.

  Key Aspects: Integrated multi-sourced urban data and the Urban Network Analysis (UNA) tool to establish a data-driven, systematic analytical framework. Conducted detailed effectiveness assessments of both public service and commercial facilities within 15-minute community life circles.

  - Mapped 15-minute community life circles. Created user portraits (including age composition, consumption levels, etc.) using Location Based Services (LBS) data.
  - Calculated the coverage rates of public facilities. Calculated the effectiveness of various public and commercial facilities using the UNA tool.
  - Designed research, drew diagrams, wrote the manuscript, revised the manuscript.

- Monitoring and evaluating basic public services equalization in Chinese megacities.

  Key Aspects: Identified key factors influencing the level of public services equalization in urban areas. Developed a precise analysis model leveraging multi-sourced data and urban computing. Established a monitoring platform for assessing the current status of public services equalization.

  - Applied Gaussian functions to model the service efficiency decay of public facilities.
  - Conducted linear regression analysis to investigate the correlation between basic public services equalization levels, economic income, and total building area.

Urban Design and Management:

- A human-oriented exploration of data-informed urban design: A case study in Shanghai.
  Key Aspects: Established a human-oriented urban design analytical framework based on classic urban theories. Integrated multi-sourced urban data and various spatial analysis methods to provide comprehensive support for urban design, from preliminary analysis to plan optimization.
  - Mapped walking and driving accessibility in Shanghai using the Spatial Design Network Analysis (sDNA) tool.
  - Analyzed spatiotemporal vitality distribution with LBS data. Identified shop distributions and popular attractions using crowdsourced and social media data. Analyzed characteristic streets using Point of Interest (POI) data.
  - Drew diagrams, wrote the manuscript, revised the manuscript.
- Assisting refined urban management: Building an evaluation framework of data mapping rate towards digital twin city platforms.
  Key Aspects: Explored the conceptual framework of data mapping rate in digital twin city platforms, proposing three indicators: data resolution, data freshness and data relevance. Proposed an approach for the measurement of data mapping rate and built a real-time evaluation platform.
  - Organized and visualized urban management data from digital twin city platforms.
  - Utilized Analytic Hierarchy Process (AHP) to determine the weights of various data types.
  - Participated in research design, drew diagrams, wrote the manuscript, revised the manuscript.

Professional Experience

Shanghai Tongji Urban Planning Design Research Institute Shanghai, China
Urban Design Intern Sep. 2023--Present
Participated in urban design projects for Beihu and Pidu in Chengdu, Dongtou in Zhejiang, and Yichang in Hubei. Responsibilities included data analysis, visual presentations, report writing, and compiling urban design guidelines.

Other Activities

Staff, 2024 Computational Design Symposium of Chinese Architectural Society Feb. 2024--Present
Responsibilities included conference coordination and copywriting.

Editor-in-Chief, Student Magazine "Future Architecture" Sep. 2020-- Jul. 2022
Responsibilities included planning, organizing, designing, and publicizing.

Volunteer, the 10th China Flower Expo May. 2021--Jun. 2021
Responsibilities included guiding tours, photography, and copywriting.

Student representative, The 4th Global Grand Challenges Summit Sep. 2019
Participated in an indoor navigation project and was received by Princess Anne in London.

Peer Mentor, Tongji University Sep. 2018--Jul. 2022
Responsibilities included sharing learning experiences and guiding undergraduates.

Part-time Counselor, College of Architecture and Urban Planning Sep. 2018--Jul. 2022
Responsibilities included class management, guiding undergraduates, and psychological support.

Awards

2022-2023	Merit Master's Student Scholarship, Tongji University
2022	Shanghai Outstanding Graduate Award (Top 2)
2022	Outstanding Graduation Design Award, Tongji University
2022	Second Prize, ByteDance Game-Dev University Challenge (Top 2)
2020-2021	Tianxiang Scholarship (Top 2)
2020-2021	Social Activity Scholarship, Tongji University
2020-2021	Merit Student, Tongji University
2020	Merit Award, Exhibition of Architectural Design in Developing Countries
2019-2020	National Scholarship (Top 1)
2019-2020	Merit Student, Tongji University
2019	Jia Zhaoye International Exchange Scholarship, Tongji University
2019	Merit Student, The 4th Global Grand Challenges Summit
2019	Third Prize, Tongji University International Construction Festival
2018-2019	Second Prize Scholarship, Tongji University
2018-2019	Outstanding Student Leader, Tongji University

Skill

Research: Research Design, Literature Review, Data Collection and Management, Statistical Analysis, Experimental Design, Visualization, Academic Writing.

Languages & Tools: Python, Git, ArcGIS, Depthmap, sDNA, UNA, Rhino, CAD, SPSS, CiteSpace, Gephi

Interpersonal: Presentation, Communication, Team Collaboration, Team Management, Mentoring