

# Maosu Li

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## VISION

Apply state-of-art **3D City Information Modeling (CIM)**, **AI**, and **Big Data** to smarter **landscape management and urban planning**;

Particularly focus on **disparity of window-level visual exposure to nature and openness** to create **automatic tools and quantified evidence** for decision-making in **healthy high-rise, high-density urban development**.

## RESEARCH INTERESTS

Urban Informatics, Analytics, and Computing through i) 3D City Information Modeling, ii) Machine Learning, and iii) Data Management and Analysis.

## MAJOR RESEARCH ACHIEVEMENTS

**Systematically create multiple automatic assessment methods of window views to enable urban-scale window-view research and applications in urban planning, housing, and health.**

The quantified window views **open up a new track of landscape analytics, supplementing** two typical ones from street and satellite views.

The thesis (**Outstanding, Top 5% (HKU), IEEE GRSS Excellent PhD Dissertation Award (First Prize)**) systematically constructed a **theoretical framework** of window view characteristics, an **urban computing paradigm**, and three quantification and automatic **computation methods**.

On window views, Maosu's four-year Ph.D. research has:

- **Won 14 honors and awards**, e.g., Gold Medal of the 49th International Exhibition of Inventions of Geneva (2024), HKU Foundation Publication Award for Research Postgraduate Students (1/20) (2023), HKU Research Postgraduate Student Innovation Award (2023), Hong Kong Talent Development Scholarship twice (2024 and 2022), and Esri Young Scholars Award (Hong Kong) (2021);
- **Been published in 10 journal and conference papers, and 1 US/CN/PCT patent;**
- **Been applied in 3 housing and urban planning practices**, supported by HKU Estates Office, Centraline Property, and Hong Kong Urban Renewal Authority;
- **Received several recognitions from researchers and practitioners**, e.g., "groundbreaking contribution", "innovative methods", and "timely, inspiring, and commendable work" with "cutting-edge techniques";

## EDUCATION

Ph.D. Geographic Information Science (Outstanding, Top 5%), the University of Hong Kong, 2020-2024

B.Eng. Geodesy and Geomatics Engineering (First Class Honors), Southwest Jiaotong University, 2014-2018

## **EMPLOYMENT**

- 2025.2-present URC Post-doctoral Fellow, the University of Hong Kong  
2024.6-2024.12 Visiting Post-doctoral Fellow, Massachusetts Institute of Technology  
2024.2-2025.2 Post-doctoral Fellow, the University of Hong Kong  
2021.6-2021.8 Summer Intern, Hong Kong Urban Renewal Authority

## **FEATURED AWARDS**

- 2024 IEEE GRSS Excellent PhD Dissertation Award (First Prize), IEEE GRSS Hong Kong Chapter.  
2024 Talent Development Scholarship, Education Bureau of Hong Kong SAR.  
2024 Gold Medal, 49<sup>th</sup> International Exhibition of Inventions of Geneva.  
2024 Best Poster Presentation Award, Organizing Committee of HKU Research Postgraduate Symposium 2024, the University of Hong Kong.  
2023 Best Conference Paper Award (First Place), Organizing Committee of Global Smart Cities Summit cum The 3<sup>rd</sup> International Conference on Urban Informatics.  
2023 First Prize of Smart City Research and Innovation Scheme, International Society for Urban Informatics.  
2023 HKU Foundation Publication Award for Research Postgraduate Students 2023 (1/20), Graduate School, the University of Hong Kong.  
2023 Research Postgraduate Student Innovation Award 2022/23 (1/10), Graduate School, the University of Hong Kong.  
2022 Second Prize (3D modeling) and Third Prize (2D CAD), Second "Scan-to-BIM" challenge, CVPR. [\[Web\]](#)  
2022 HK-Asia-Pacific Economic Cooperation Scholarship, Education Bureau of Hong Kong SAR.  
2022 Talent Development Scholarship, Education Bureau of Hong Kong SAR.  
2021 Esri Young Scholars Award (Hong Kong), Environmental Systems Research Institute (Esri). [\[Web\]](#)  
2020 Outstanding Paper Award and Merit Paper Award, Organizing Committee of 25<sup>th</sup> International Symposium on Advancement of Construction Management and Real Estate. (Li et al., 2021; Zhang et al. 2021)  
2019 National Scholarship, Ministry of Education of the People's Republic of China. [\[Web\]](#)  
2019 Excellent Students Award, Southwest Jiaotong University.  
2018 Outstanding Paper Award, 2018 National Symposium on Surveying and Mapping Science and Technology.  
2018 Mao Yisheng Gold Medal, Mao Yisheng Honor's College, Southwest Jiaotong University.  
2018 Outstanding Graduates Award, Southwest Jiaotong University.  
2017 SWJTU Press and Mao Yisheng Scholarship (Honorary Student Award), Southwest Jiaotong University.  
2017 Best Paper Award, 9<sup>th</sup> National College Students' Paper Competition on Surveying and Mapping.  
2017 'Hi-Target' Scholarship, Southwest Jiaotong University.  
2017 University Scholarship (Special Prize), Southwest Jiaotong University.  
2017 First Prize, 14<sup>th</sup> May Day Mathematical Modeling Competition.  
2016 Outstanding Student Leader Award, Southwest Jiaotong University.  
2016 University Scholarship (First Prize), Southwest Jiaotong University.

## PUBLICATIONS

### First-author Articles in Peer-Reviewed Journals

- 2025 Li, M., Yeh, A. G., & Xue, F. "Efficient and accurate assessment of window view distance using city information models and 3D computer vision." *Landscape and Urban Planning* (R1 revision). (*First Prize in Smart Cities Innovation Competition; Talent Development Scholarship*)
- 2024 Li, M., Yeh, A. G., & Xue, F. "CIM-WV: A 2D semantic segmentation dataset of rich window view contents in high-rise, high-density areas based on photorealistic City Information Models." *Urban Informatics*, 3, 1-24. (*Best Paper Award at Global Smart Cities Summit cum The 3<sup>rd</sup> International Conference on Urban Informatics*)
- 2023 Li, M., Xue, F., & Yeh, A. G. "Bi-objective analytics of 3D visual-physical nature exposures in high-rise high-density cities for landscape and urban planning." *Landscape and Urban Planning*, 233, 104714. (*Esri Young Scholars Award; Talent Development Scholarship; HK-Asia-Pacific Economic Cooperation Scholarship*)
- 2022 Li, M., Xue, F., Wu, Y., & Yeh, A. G. "A room with a view: Automatic assessment of window views for high-rise high-density areas using City Information Models and deep transfer learning." *Landscape and Urban Planning*, 226, 104505. (*Gold Medal of Geneva Exhibition; HKU Foundation Publication Award; Best Poster Presenter Award; Research Postgraduate Student Innovation Award*)
- 2022 Li, M., Peng, Y., Wu, Y., Xu, J., Tan, T., Guo, H., ... & Xue, F. "Role of the built environment in the recovery from COVID-19: Evidence from a GIS-based natural experiment on the city blocks in Wuhan, China." *Frontiers in Built Environment*, 7, 813399.

### Co-author Articles in Peer-Reviewed Journals

- 2025 Meng, S., Su, X., Sun, G., Li, M., & Xue, F. "From 3D pedestrian networks to wheelable networks: An automatic wheelability assessment method for high-density urban areas using contrastive deep learning of smartphone point clouds." *Computers, Environment and Urban Systems*, 117, 102255.
- 2024 Wang, B., Li, M., Peng, Z., & Lu, W. "FaçadeGraph: A hierarchical attributed graph-based generative façade parsing approach for high-rise residential buildings." *Automation in Construction*, 164, 105471.
- 2024 Wu, Y., Xue, F., Li, M., & Chen, S. "A novel building section skeleton for compact 3D reconstruction from point clouds: A study of high-density urban scenes." *ISPRS Journal of Photogrammetry and Remote Sensing*, 209, 85-100.
- 2023 Yuan, L., Lu, W., Xue, F., & Li, M. "Building feature-based machine learning regression to quantify urban material stocks: A Hong Kong study." *Journal of Industrial Ecology*, 27, 336-349.
- 2020 Zhu, Q., Chen, M., Feng, B., Zhou, Y., Li, M., Xu, Z., ... & Xie, X. "Optimized spatiotemporal data scheduling based on maximum flow for multilevel visualization tasks." *ISPRS International Journal of Geo-Information*, 9 (9), 518.
- 2020 Zhu, Q., Feng, B., Li, M., Chen, M., Xu, Z., Xie, X., ... & Feng, Y. "An efficient sparse graph index method for dynamic and associated data." *Acta Geodaetica et Cartographica Sinica*, 49 (6), 681-691 (in Chinese).
- 2020 Zhu, Q., Li, M., Ding, Y., Feng, B., Zhang, J., Cao, Z., Qiu, L., & Yin, H. "Multi-level semantic retrieval method for landslide disaster data." *Journal of Southwest Jiaotong University*, 55 (3), 467-475 (in Chinese).

### Conference Proceedings

- 2025 Li, M.\*, Xue, F., & Yeh, A. G. "Accurate assessment of human-perceived window view openness using city information models and visual AI." *2025 Proceedings of the 19<sup>th</sup> International Conference on Computational Urban Planning and Urban Management (Accepted)*, 1-4.

- 2023 **Li, M.\***, Yeh, A. G., & Xue, F. “HRHD-HK: A benchmark dataset of high-rise and high-density urban scenes for 3D semantic segmentation of photogrammetric point clouds.” *2023 Proceedings of the 29<sup>th</sup> IEEE International Conference on Image Processing*, 3714-8. IEEE.
- 2023 **Li, M.\***, Xue, F., & Yeh, A. G. “Efficient assessment of window views in high-rise, high-density urban areas using 3D color city information models.” *2023 Proceedings of the 18<sup>th</sup> International Conference on Computational Urban Planning and Urban Management*, 1-II. OSF.
- 2023 Wu, Y., **Li, M.**, & Xue, F. “Towards fully automatic Scan-to-BIM: A prototype method integrating deep neural networks and architectonic grammar.” *Proceedings of the 2023 European Conference on Computing in Construction and the 40<sup>th</sup> International CIB W78 Conference*, 1-8. European Council on Computing in Construction.
- 2021 Laovisutthichai, V., **Li, M.\***, Xue, F., Lu, W., Tam, K. L., & Yeh, A. G. “CIM-enabled quantitative view assessment in architectural design and space planning.” *2021 Proceedings of the 38<sup>th</sup> International Symposium on Automation and Robotics in Construction*, 65-72. International Association for Automation and Robotics in Construction.
- 2021 **Li, M.\***, Xue, F., Yeh, A. G., & Lu, W. “Classification of photo-realistic 3D window views in a high-density city: The case of Hong Kong.” *Proceedings of the 25<sup>th</sup> International Symposium on Advancement of Construction Management and Real Estate*, 1339-1350. Springer.
- 2021 Zhang, J., **Li, M.**, Zhang, W., Wu, Y., & Xue, F. “Prospect of architectonic grammar reconstruction from dense 3D point clouds: Historical building information modeling (HBIM) of Guangdong cultural heritages.” *Proceedings of the 25<sup>th</sup> International Symposium on Advancement of Construction Management and Real Estate*, 1421-1431. Springer.

## Patents

- 2021 Yeh, A. G., **Li, M.**, & Xue, F. *System and methods for quantifying and calculating window view openness indexes*. PCT/United States patent PCT/CN2023/077947, US 63/269,891, WO 2023/179296 A1.
- 2019 Zhu, Q., Feng, B., Chen, M., **Li, M.**, Ding, Y., & Zhu, J. *A scheduling method, device, and storage medium for scene data of natural resources*. Chinese patent CN110516119A.

## RESEARCH PROJECTS

- 2023-24 Assessing Human-perceived Window View Openness in High-rise High-density Cities: An Automatic Machine Learning-based City Information Modeling Approach, HKU Leung Kau Kui and Run Run Shaw Research and Teaching Endowment Funds, HKD 50,000, Primary Investigator.
- 2023-25 From 3D Real Scene to 3D Semantics: Reconstruction of Semantic Volumetric Building Models using 3D Skeletons in Urban Point Clouds, Natural Science Fund of Guangdong Province, RMB 100,000, Co-Investigator.
- 2023-25 Scan-to-BIM Automation System for Built Assets Digitization in Hong Kong, Hong Kong Innovation and Technology Fund, HKD 7,510,000, Co-Investigator.

## TEACHING EXPERIENCE

- 2022 Course tutor, URBP7003 Research Methods in Spatial Planning, the University of Hong Kong.
- 2021 Course tutor, URBP7003 Research Methods in Spatial Planning, the University of Hong Kong.

## ACADEMIC TALKS

- 2024 Invited talk, “Quantification and Automatic Computation of 3D Window Views in High-rise, High-density Cities Based on City Information Models and Machine Learning.” *Annual Workshop of the*

*IEEE GRSS Hong Kong Chapter cum the 2nd Young Innovation Forum on Digital Earth.* Hong Kong SAR, China. December 6.

- 2024 Invited talk, “Does any nature exposure in a city matter equally? A multi-dimensional nature exposure study on well-being: the case of Tokyo, Japan.” *2024 Senseable Forum on Future Cities*. Boston, United States. November 21.
- 2024 Invited talk, “Automatic assessment of window view distance for high-rise, high-density areas using city information models and 3D computer vision and graphics.” *3<sup>rd</sup> International Conference on Geoinformatics*. Toronto, Canada. August 14.
- 2023 Invited talk, “HRHD-HK: A benchmark dataset of high-rise and high-density urban scenes for 3D semantic segmentation of photogrammetric point clouds.” *2023 IEEE International Conference on Image Processing*. Kuala Lumpur, Malaysia. October 8.
- 2023 Invited talk, “CIM-WV: A 2D semantic segmentation dataset of rich window view contents in high-rise, high-density areas based on photorealistic City Information Models.” *3<sup>rd</sup> Global Smart Cities Summit cum The 3<sup>rd</sup> International Conference on Urban Informatics*. Hong Kong SAR, China. August 23.
- 2023 Invited talk, “Efficient assessment of window views in high-rise, high-density urban areas using 3D color city information models.” *1<sup>st</sup> International Conference on Computational Urban Planning and Urban Management*. Montreal, Canada. June 21.
- 2023 Winner’s talk, “Automatic Assessment of Window View Distance for High-rise, High-density Areas using 3D Color CIMS.” *Smart Cities Innovation Competition, International Society for Urban Informatics*. Hong Kong SAR, China. January 13. [\[Web\]](#)
- 2022 Winner’s talk, “Floor layer-based kernels and pillars of points (FLKPP): 3D building model reconstruction.” *2<sup>nd</sup> Workshop and Challenge on Computer Vision in the Built Environment for the Design, Construction, and Operation of Buildings, CVPR 2022*. New Orleans, USA. June 19. [\[Web\]](#)
- 2021 Invited talk, “Exposure to nature in high-rise high-density cities: bi-objective analytics of 3D visual-physical nature accessibility for landscape and urban planning.” *HKU/PKU-SZ Joint Doctoral Colloquium on Smart Cities Analytics*. Shenzhen, China. November 27. [\[Web\]](#)
- 2021 Plenary talk, “CIM-enabled quantitative view assessment in architectural design and space planning.” *38<sup>th</sup> International Symposium on Automation and Robotics in Construction*. Dubai, UAE. November 3. [\[Web\]](#)
- 2021 Winner’s talk, “Save people from the concrete barriers: Integrated assessment of visual and physical accessibility to nature in 3D cities.” *Webinar on “GIS Applications”*. City Gallery and Planning Department. Hong Kong SAR, China. August 26. [\[Web\]](#)
- 2021 Winner’s talk, “Save people from the concrete barriers: Integrated assessment of visual and physical accessibility to nature in 3D cities.” *Seminar on Spatial Analytics*. Urban Renewal Authority. Hong Kong SAR, China. June 29.

## COMMUNITY SERVICE

- 2020-23 Research Advisor, Residential Academic Advising System (RAAS), Lap-Chee College, the University of Hong Kong.
- 2020-21 Committee Member, New Urban Researchers’ Seminar Series (NURSS) Organizing Committee, Department of Urban Planning and Design, the University of Hong Kong.
- 2017 Vice President, Mao Yisheng Honor’s College Students’ Union, Southwest Jiaotong University.

## MEDIA COVERAGE

- 2025 IEEE GRSS Excellent PhD Dissertation Award (First Prize), *MIT Senseable City Lab Newsletter*. Massachusetts Institute of Technology. [\[Web\]](#)

- 2024 Gold Medal, 49<sup>th</sup> International Exhibition of Inventions of Geneva *HKU Press Releases*. The University of Hong Kong. [\[Web\]](#)
- 2023 HKU Research Postgraduate Student Research Innovation Award, *HKU Annual Report 2023*. The University of Hong Kong. [\[Web\]](#)
- 2023 First Prize in ICUI Smart Cities Innovation Competition, *the Graduate School Newsletter*. The University of Hong Kong. [\[Web\]](#)
- 2023 Scan-to-BIM Prizes, 26<sup>th</sup> *Recognition Ceremony*. CEDARS, the University of Hong Kong. [\[Web\]](#)
- 2022 Esri Young Scholars Award, 25<sup>th</sup> *Recognition Ceremony*. CEDARS, the University of Hong Kong. [\[Web\]](#)
- 2021 PhD student wins young scholars award in geospatial sciences, *the Graduate School Newsletter* (Cover). The University of Hong Kong. [\[Web\]](#)
- 2021 A new angle on views, *The University of Hong Kong Bulletin*. [\[Web\]](#)
- 2021 How 3D spatial information brings people closer to nature, *Hong Kong Economic Journal*. [\[Web\]](#)