Rui Zhu

Senior Scientist, Systems Science Department

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Statement

My research interest lies in Urban Informatics, including three interconnected fields, i.e., Solar Cities, Urban Environment, and Urban Mobility. During the past few years, I have refined and further enriched the concept of Solar Cities and comprehensively developed models to address scientific challenges in the estimation of spatiotemporal solar photovoltaic (PV) potential on 3D urban surfaces, spatial optimization of PV installation constraint by the expected socio-economic and environmental impacts, and PV penetration for adaptively and efficiently powering various urban sectors to dynamically balance the heterogeneous relationships between supply and demand over time and space.

Associate Editor, *Springer Nature Computer Science*

Editor, *Big Earth Data* (ESCI: 2022 IF 4.0; EI; Scopus: 2022 CiteScore 8.0)

Editor, *Energy 360* (Elsevier New Journal)

Assistant Editor, *Advances in Applied Energy* (ESCI, IF: 13.0)

Young Editor, *The Innovation* (IF: 32.1)

Board of Directors Member (2023-2024), CPGIS

Professional experience

Senior Scientist, 07/2023–

   Institute of High Performance Computing, A*STAR, Singapore

Scientist, 11/2022–06/2023

   Institute of High Performance Computing, A*STAR, Singapore

Research Assistant Professor, 01/2021–10/2022

   Department of Land Surveying and Geo-Informatics

   Faculty of Construction and Environment

   The Hong Kong Polytechnic University, Hong Kong, China

Postdoctoral Associate, 01/2018–12/2020

   MIT Senseable City Laboratory

   Singapore-MIT Alliance for Research and Technology, Singapore

   Massachusetts Institute of Technology, USA

Education

PhD, Geo-Informatics, The Hong Kong Polytechnic University, Hong Kong, China, 2017

PhD Exchange Study, Université Laval, Canada, 2015/08-2016/01

PhD Dissertation Awards for Postgraduate Students (HKIS), 2 winners only in HK every year

MSc, KTH - Geodesy and Geoinformation, Royal Institute of Technology, Sweden, 2013

BSc, Geographical Information System, Nanjing Normal University, China, 2010

Professional membership

- Member, Education Committee of CPGIS
- Member, American Association of Geographers
- Member, International Society for Photogrammetry and Remote Sensing (ISPRS)
- Member, International Society for Urban Informatics
- Member, International Association of Chinese Professionals in Geographic Information Sciences
- Member, Modeling Geographical Systems Commission, International Geographical Union (IGU)
- Member, Applied Energy Academy, Journal of Applied Energy
- Committee Member, Remote Sensing and Environment, Jiangsu-Hong Kong-Macao University Alliance
- Program Committee Member, ICCS 2025 - International Conference on Computational Science, Singapore, 7-9 July 2025.
- Scientific Committee Member, ISPRS Geospatial Week 2023, GeoHB 2023: Geo-Spatial Computing for Understanding Human Behaviours, Cairo, Egypt, 2-7 September 2023.
- Program Committee Member, Space-time AI and Urban Analytics, The 30th International Conference on Geoinformatics 2023, UK, 19-21 July 2023.
- Scientific Committee Member, ISPRS Technical Commission IV Symposium 2018, 3D Spatial Information Science - The Engine of Change, 1-5 October 2018, Delft, The Netherlands.
- Session Chair, Session name: Geography of Heat in Asia: The Interplay of Urbanization, Land Cover Transformations, Urban Heat Island, and Climate Change. The 4th Workshop of Asian Young Geographers, Yuxi, China, November 29–December 2, 2024.
- Session Chair, Session name: Energy networks and urban environment. Global Smart Cities Summit cum The 3rd International Conference on Urban Informatics, Hong Kong, China, August 21–23, 2023.
- Session Chair, Session name: Climate risks and their implications for Asian societies, The 2nd workshop of Asian Young Geographers, Virtual, 17-18 December 2022.
- Session Chair, Session name: Energy and Buildings. Applied Energy Symposium 2022: Low carbon cities and urban energy systems, Virtual, 24-27 November 2022.
- Session Chair, Session name: Climate change and policy option. Applied Energy Symposium 2021: Low carbon cities and urban energy systems, Matsue, Japan, 4-8 September 2021.

Journal publications

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86. Wang, S., **Zhu, R.***, Pu. Y., Wong, M.S., Xu, Y., Qin, Z. (2025). Modelling sunlight and shading distribution on 3D trees and buildings: Deep learning augmented geospatial data construction from street view images. *Building and Environment*, 275, 112816. (IF: 7.1, 24/821, Q1) [Link]

85. Pu. Y., **Zhu, R.***, Wang, S., You, L., Zhong, T., Xu, Y., Qin, Z. (2025). City-scale roadside electric vehicle parking and charging capacity: A deep learning augmented street-view-image data mining and analytic framework. *Applied Energy*. Accepted.

84. Liao, X., Wong, M.S., **Zhu, R.** (2025). Dual-gate temporal fusion transformer for estimating large-scale land surface solar irradiation. *Renewable and Sustainable Energy Reviews*, 214, 115510. (IF: 16.3, 3/91, Q1) [Link]

83. Li, S., Wong, M.S., **Zhu, R.**, Shi, G., Yang, J. (2025). Impacts of land surface temperature and ambient factors on near-surface air temperature estimation: A multisource evaluation using SHAP analysis. *Sustainable Cities and Society*, 122, 106257. (IF: 11.2, 9/142, Q1) [Link]

82. Li, H., Qu, H., **Zhu, R.**, You, L. (2025). UrbanEV: A Benchmark Dataset for Urban Electric Vehicle Charging Demand Prediction. *Scientific Data*. Accepted.

81. Zhang, T., Chen, Y., **Zhu, R.**, Wilson, J.P., Song, J., Chen, R., Liu, L., Bao, L. (2025). An Intelligent Learning Reconfiguration Model Based on Optimized Transformer and Multi-Source Features (TMSF) for High-Precision InSAR DEM Void Filling. *IEEE Transactions on Geoscience and Remote Sensing*, 63, 5203418. (IF: 7.5, 8/63, Q1) [Link]

80. Zhang, Z., Qian, Z., Chen, M., **Zhu, R.**, et al. (2025). Worldwide rooftop photovoltaic electricity generation may mitigate global warming. *Nature Climate Change*. (IF: 30.3, 1/182, Q1) [Link]

79. Zhang, T., Chen, Y., Zhang, L., Wilson, J.P., **Zhu, R.**, Chen, R., Li, Z. (2025). Multibaseline Interferometry Based on Independent Component Analysis and InSAR Combinatorial Modeling for High-Precision DEM Reconstruction. *IEEE Transactions on Geoscience and Remote Sensing*, 63, 5205417. (IF: 7.5, 8/63, Q1) [Link]

- Xu, Z., **Zhu, R.***, Song, J., Feng, L., Qin, Z., You, L., Yan, J. (2025). An advanced GCN-LSTM-SA model for multi-scale forecasting of electric vehicle charging demand: A case study in Singapore. *Applied Energy*. Major revision.

- Dong, R., Xu, Y., **Zhu, R.*** (2025). Heterogeneous effects of artificial light at night on sleep and mental health: 2SLS augmented geospatial data modelling and geo-correlation analysis. *Health & Place*. Major revision.

- Tan, J.K.D., **Zhu, R.***, Song, J., Feng, L., Qin, Z., Xu, Y., Chen, Y. (2025). AdvUNet3+: Segmentation of city-scale heterogeneous building façade materials from street view images. *Sustainable Cities and Society*. Major revision.

- Hu, D., **Zhu, R.***, Yu, J. (2025). Impacts of lake surface environment on floating photovoltaic electricity generation in Southeast Asia: Remote sensing and GIS-integrated modelling. *Journal of Environmental Management*. Under review.

- Wan, Y., **Zhu, R.***, Hu, Q., Wong, M.S., Zhao, W., Qin, Z., Xu, Y. (2025). The effects of anisotropic artificial light at night on land surface temperature: Remote sensing and GeoAI-augmented modelling and analysis. *ISPRS Journal of Photogrammetry and Remote Sensing*. Submitted.

- Hu, Q., **Zhu, R.***, Wan, Y., Lü, G., Wong, M.S., Jiang, H., Jiang, H., Qin, Z., Xu, Y. (2025). From 2D toward 3D: Fine distribution of city-scale artificial light at night by remote sensing and GIS-integrated modelling. *Remote Sensing of Environment*. Submitted.

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78. **Zhu, R.**, Lau, W.S., You, L., Chen, M., Yan, J., Wong, M.S., Ratti, C., Qin, Z. (2024). Multi-sourced data modelling of spatially heterogeneous life-cycle carbon mitigation potential from installed rooftop photovoltaics: A case study in Singapore. *Applied Energy*, 362, 122957. (IF: 11.2, 9/142, Q1) [Link]

77. You, L., **Zhu, R.***, Kwan, M.P., Chen, M., Zhang, F., Yang, B., Wong, M.S., Qin, Z. (2024). Unraveling adaptive changes in electric-vehicle charging behavior towards the post-pandemic era by federated meta-learning. *The Innovation*, 5(2), 100587. (IF: 32.1, 3/134, Q1) [Link]

76. Ji, N., **Zhu, R.***, Huang, Z., You, L. (2024). An urban-scale spatiotemporal optimization of rooftop photovoltaic charging of electric vehicles. *Urban Informatics*, 3, 4. [Link]

75. You, L., Chen, Q., Qu, H., **Zhu, R.***, Yan, J., Santi, P., Ratti, C. (2023). FMGCN: Federated Meta Learning-augmented Graph Convolutional Network for EV Charging Demand Forecasting. *IEEE Internet of Things*, 11(14), 24452–24466. (IF: 10.6, 3/122, Q1) [Link]

74. Zhang, K., Chen, M., **Zhu, R.**, Zhang, F., Zhong, T., Lin, J., You, L., Lü, G., Yan, J. (2024). Integrating photovoltaic noise barriers and electric vehicle charging stations for sustainable city transportation. *Sustainable Cities and Society*, 100, 104996. (IF: 11.7, 1/68, Q1) [Link]

73. Liu, S., You, L., **Zhu, R.**, Liu, B., Liu, R., Yu, H., Yuen, C. (2024). AFM3D: An Asynchronous Federated Meta-learning Framework for Driver Distraction Detection. *IEEE Transactions on Intelligent Transportation Systems*, 1-16. (IF: 8.5, 4/139, Q1) [Link]

72. Chen, Z., Yang, B., **Zhu, R.**, Dong, Z. (2024). City-scale solar PV potential estimation on 3D buildings using multi-source RS data: A case study in Wuhan, China. *Applied Energy*, 359, 122720. (IF: 11.2, 9/142, Q1) [Link]

71. Zhang, K., Wang, D., Chen, M., **Zhu, R.**, Zhang, F., Zhong, T., Qian, Z., Wang, Y., Li, H., Yang, Y., Lü, G., Yan, J. (2023). Power generation assessment of bifacial photovolatic noise barriers across 52 Chinese cities. *Applied Energy*, 361, 122839. (IF: 11.2, 9/142, Q1) [Link]

70. Zhang, L., Li, Z., Song, J., **Zhu, R.** (2024). Understanding the impacts of COVID-19 on bike-sharing travel behaviors: insights from the literature and a case study in New York City, USA. *Sustainable Cities and Society*, 105818. (IF: 11.7, 1/68, Q1) [Link]

69. Qu, H., Li, H., You, L., **Zhu, R.**, Yan, J., Paolo, S., Carlo, R., Yuen, C. (2024). ChatEV: Predicting electric vehicle charging demand as natural language processing. *Transportation Research Part D: Transport and Environment*, 136, 104470. (IF: 7.3, 11/379, Q1) [Link]

68. Adeniran, I.A., Nazeer, M., Wong, M.S., **Zhu, R.**, Yang, J., Chan, P.W. (2024). Improved fusion model for generating hourly fine scale land surface temperature data under all-weather condition. *International Journal of Applied Earth Observation and Geoinformation*, 131, 103981. (IF: 7.5, 5/33, Q1) [Link]

67. Kuang, H., Zhang, X., Qu, H., You, L., **Zhu, R.**, Li, J. (2024). Unravelling the effect of electricity price on electric vehicle charging behavior: A case study in Shenzhen, China. *Sustainable Cities and Society*, 115, 105836. (IF: 11.7, 1/68, Q1) [Link]

66. Zou, K., Yu, X., Wong, M.S., Qin, K., **Zhu, R.**, Li, S. (2024). Exploring the spatiotemporal evolution patterns of Urban Heat Island with a network-based approach. *Sustainable Cities and Society*, 105926. (IF: 11.7, 1/68, Q1) [Link]

65. Jiang, H., Yao, L., Qin, J., **Zhu, R.**, Zhou, C. (2024). Unlocking Multifaceted Benefits of Photovoltaic Recycling via Global Collaborative Efforts. *The Innovation Energy*, 1(3), 100043. [Link]

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64. **Zhu, R.**, Zhang, F., Yan, J., Ratti, C., Chen, M. (2023). A sustainable solar city: From utopia to reality facilitated by GIScience. *The Innovation Geoscience*, 1(1), 100006. [Link]

63. **Zhu, R.***, Kwan, M.P., Perera, A.T.D., Fan, H., Yang, B., Chen, B., Chen, M., Qian, Z., Zhang, H., Zhang, X., Yang, J., Santi, P., Ratti, C., Li, W., Yan, J. (2023). GIScience can facilitate the development of solar cities for energy transition. *Advances in Applied Energy*, 10, 100129. (ESCI, IF: 13, 13/171, Q1) [Link]

62. **Zhu, R.**, Guo, D., Wong, M.S., Qian, Z., Chen, M., Yang, B., Chen, B., Zhang, H., You, L., Heo, J., Yan, J. (2023). Deep Solar PV Refiner: An advanced deep learning network for photovoltaic area segmentation from satellite imagery. *International Journal of Applied Earth Observation and Geoinformation*, 116, 103134. (IF: 7.5, 5/33, Q1) [Link]

61. Huang, Z., **Zhu, R.***, You, L. (2023). Unravelling the effects of dynamic urban thermal environment on utility-scale photovoltaic electricity generation. *Sustainable Cities and Society*, 99, 104964. (IF: 11.7, 1/68, Q1) [Link]

60. Yan, L., **Zhu, R.***, Kwan, M.P., Luo, W., Wang, D., Zhang, S., Wong, M.S., You, L., Yang, B., Chen, B., Feng, L. (2023). Estimation of building-integrated photovoltaic potential: A detail-oriented deep learning network for constructing three-dimensional building models from optical remote sensing imagery. *Sustainable Cities and Society*, 93, 104515. (IF: 11.7, 1/68, Q1) [Link]

59. Ye, Y., **Zhu, R.***, Yan, J., Lu, L., Wong, M.S., Luo, W., Chen, M., Zhang, F., You, L., Wang, Y., Qin, Z. (2023). Planning the installation of building-integrated photovoltaic shading devices: A GIS-based spatiotemporal analysis and optimizaiton approach. *Renewable Energy*, 216, 119084. [Link]. (IF: 8.7, 26/115, Q1)

58. Liao, X., **Zhu, R.**, Wong, M.S., Heo, J., Chan, P.W., Kwok, C.Y.T. (2023). Fast and accurate estimation of solar irradiation on building rooftops in Hong Kong: A machine learning-based parameterization approach. *Renewable Energy*, 119034. (IF: 8.7, 26/115, Q1) [Link]

57. Xu, F., Wong, M.S., **Zhu, R.**, Heo, J. (2023). Semantic Segmentation of Urban Building Surface Materials using Multi-Scale Contextual Attention Network. *ISPRS Journal of Photogrammetry and Remote Sensing*, 202, 158–168. (IF: 12.7, 1/49, Q1) [Link]

56. Zhang, Z., Chen, M., Zhong, T., **Zhu, R.**, Qian, Z., Zhang, F., Yang, Y., Zhang, K., Santi, P., Wang, K., Pu, Y., Tian, L., Lü, G., Yan, J. (2023). Significant carbon mitigation potential of rooftop solar photovoltaics in China. *Nature Communications*, 14, 2347. (IF: 16.6, 6/73, Q1) [Link]

55. Cao, R., Liao, C., Li, Q., Tu, W., **Zhu, R.**, Luo, N., Qiu, G., Shi, W. (2023). Integrating satellite and street-level images for local climate zone mapping. *International Journal of Applied Earth Observation and Geoinformation*, 119, 103323. (IF: 7.5, 5/33, Q1) [Link]

54. Waqas, M., Wong, M.S., Stocchino, A., Abbas, S., **Zhu, R.** (2023). Marine Plastic Pollution Detection and Identification by Using Remote Sensing-Meta Analysis. *Marine Pollution Bulletin*, 197, 115746. (IF: 5.8, 5/117, Q1) [Link]

53. Mengistie, B.M., Shi, W.Z., Wong, M.S., **Zhu, R.** (2023). Urban street network and data science based spatial connectivity evaluation of African cities: implications for sustainable urban development. *GeoJournal*, 88, 47530–4766. [Link]

52. Yang, J., Wu, Z., Shi, Q., Menenti, M., Xie, Y., **Zhu, R.**, Abbas, S., Xu, Y. (2023). Impacts of urban morphology on sensible heat flux and net radiation exchange. *Urban Climate*, 50, 101588. (IF: 6.4, 14/94, Q1) [Link]

51. Luo, W., Zhou, ,Y., Liu, Z., Kang, W., He, S., **Zhu, R.**, Li, R., Huang, B. (2023). Cross-Regional Analysis of the Association Between Human Mobility and COVID-19 Infection in Southeast Asia During the Transition Period of "Living with COIVD-19". *Health & Place*, 81, 103000. (IF: 4.8, 34/180, Q1) [Link]

50. Mepparambath, R.M., Nguyen Huynh, H., Oon, J., Song, J., **Zhu, R.**, Feng, L. (2023). The impact of COVID-19 pandemic on the fundamental urban mobility theories using transit data from Singapore. *Transportation Research Interdisciplinary Perspectives*, 21, 100883. [Link]

49. Cao, M., Tian, Y., Wu, K., Chen, M., Chen, Y., Hu, X., Sun, Z., Zuo, L., **Zhu, R.**, Xu, Z., Luo, L., Lin, J., Bandrova, T., Konecny, M., Yuan, W., Guo, H., Lin, H., Lü, G. (2023). Future land-use change and its impact on terrestrial ecosystem carbon pool evolution along the Silk Road under SDG scenarios. *Science Bulletin*, 68(7), 740–749. (IF: 18.9, 5/73, Q1) [Link]

48. Chen, M., Qian, Z., Boers, N., Jakeman, A.J., Kettner, A.J., Brandt, M., Kwan, M.P., Batty, M., Li, W., **Zhu, R.**, Luo, W., Ames, D.P., Zhang, F., Cuddy S.M., Reichstein, M., Ratti, C., Barton M.C., Zhong, T., Liu, J., Sun, Z., Zhang, Z., Zhu, Z., Ma, Z., He, Y., Lü, G. (2023). Iterative integration of deep learning in hybrid Earth surface system modelling. *Nature Reviews Earth & Environment* (IF: 42.2, 1/274, Q1) [Link]

47. Cao, M., Chen, M., Zhang, J., Pradhan, P., Guo, H., Fu, B., Li, Y., Bai, Y., Chang, L., Chen, Y., Sun, Z., Xu, Z., **Zhu, R.**, Meadows, M.E., Lü, G. (2023). Spatio-temporal changes in the causal interactions among Sustainable Development Goals in China. *Humanities and Social Sciences Communications*, 10, 450. (IF: 3.5, 19/110, Q1) [Link]

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46. **Zhu, R.**, Anselin, L., Kwan, M.P., Batty, M., Chen, M., Luo, W., Cheng, T., Lim, C.K., Santi, P., Cheng, C., Gu, Q., Wong, M.S., Zhang, K., Guonian Lü, Ratti, C. (2022). The effect of different travel modes and travel destinations on COVID-19 transmission in global cities. *Science Bulletin*, 67, 588–592. (IF: 20.577, 5/73, Q1) [Link]

45. **Zhu, R.**, Kondor, D., Cheng, C., Zhang, X., Santi, P., Wong, M.S., Ratti, C. (2022). Solar photovoltaic generation for charging shared electric scooters. *Applied Energy*, 313, 118728. (IF: 11.446, 9/142, Q1) [Link] [Website]

44. **Zhu, R.**, Cheng, C., Santi, P., Chen, M., Zhang, X., Mazzarello, M., Ratti, C. (2022). Optimization of photovoltaic provision in a three-dimensional city using real-time electric demand. *Applied Energy*, 316, 119042. (IF: 11.446, 9/142, Q1) [Link]

43. **Zhu, R.**, Wong, M.S., Kwan, M.P., Chen, M., Santi, P., Ratti, C. (2022). An economically feasible optimization of photovoltaic provision using real electricity demand: A case study in New York city. *Sustainable Cities and Society*, 103614. (IF: 10.696, 2/68, Q1) [Link]

42. **Zhu, R.**, Dong, X., Wong, M.S. (2022). Estimation of the urban heat island effect in a reformed urban district: A scenario-based study in Hong Kong. *Sustainability*, 14, 4409. (IF: 3.889, 57/127, Q2) [Link]

41. Liao, X., **Zhu, R.***, Wong, M.S. (2022). Simplified estimation modeling of land surface solar irradiation: A comparative study in Australia and China. *Sustainable Energy Technologies and Assessments*, 52, 102323. (IF: 7.632, 32/119, Q2) [Link]

40. Cheng, C., **Zhu, R.***, Costa, A.M., Thompson, R.G., Huang, Y. (2022). Multi-period two-echelon location routing problem for disaster waste clean-up. *Transportmetrica A: Transport Science*, 18(3), 1053–1083. (IF: 3.496, 17/38, Q2) [Link]

39. Adeniran, I.A., **Zhu, R.**, Yang, J., Zhu, X., Wong, M.S. (2022). Cross-comparison between Landsat-8 and Himawari-8 satellite derived land surface temperature for image fusion: A case study in Hong Kong. *Remote Sensing*, 14, 4444. (IF: 5.349, 30/201, Q1) [Link]

38. Cheng, C., Lu, J.-W., **Zhu, R.**, Xiao, Z., Costa, A.M., Thompson, R.G. (2022). An integrated multi-objective model for disaster waste clean-up systems optimization. *Transportation Research Part E*, 165, 102867. (IF: 10.047, 6/379, Q1) [Link]

37. Yu, X., Wong, M.S., Liu, C.H., **Zhu, R.** (2022). Synergistic data fusion of satellite observations and in-situ measurements for hourly PM2.5 estimation based on hierarchical geospatial long short-term memory. *Atmospheric Environment*, 286, 119257. (IF: 5.755, 19/94, Q1) [Link]

36. Qian, Z., Chen, M., Zhong T., Zhang, F., **Zhu, R.**, Zhang, Z., Zhang, K., Sun, Z., Lü, G. (2022). A detail-oriented deep learning network for refined delineation of roof structure lines using satellite imagery. *International Journal of Applied Earth Observation and Geoinformation*, 107, 102680. (IF: 7.672, 5/34, Q1) [Link]

35. Zhang, K., Chen, M., Yang, Y., Zhong, T., **Zhu, R.**, Zhang, F., Qian, Z., Lü, G., Yan, J. (2022). Quantifying the photovoltaic potential of highways in China. *Applied Energy*, 324, 119600. (IF: 11.446, 9/142, Q1) [Link]

34. Qian, Z., Chen, M., Yang, Y., Zhong, T., Zhang, F., **Zhu, R.**, Zhang, K., Zhang, Z., Sun, Z., Ma, P., Lü, G., Yan, J. (2022). Vectorized dataset of roadside noise barriers in China using street view imagery. *Earth System Science Data*, 14, 4057-4076. (IF: 11.333, 4/200, Q1) [Link]

33. Zhang, K., Qian, Z., Chen, M., Yang, Y., Zhong, T., **Zhu, R.**, Lü, G., Yan, J. (2022). Using street view images to identify road noise barriers with ensemble classification model and geospatial analysis. *Sustainable Cities and Society*, 78, 103598. (IF: 10.696, 2/68, Q1) [Link]

32. Meng, Y., Wong, M.S., Xing, H., Kwan, M.P., **Zhu, R.** (2022). Association between Global Air Pollution and COVID-19 Mortality: A Study of Forty-Six Cities in the World. *Annals of the American Association of Geographers*, 112(6), 1777-1793. (IF: 3.982, 19/85, Q1) [Link]

31. Zhang, Z., Qian, Z., Zhong, T., Chen, M., Zhang, K., Yang, Y., **Zhu, R.**, Zhang, F., Zhang, H., Zhou, F., Yu, J., Zhang, B., Lü, G., Yan, J. (2022). Vectorized rooftop area data for 90 cities in China. *Scientific Data*, 9, 66. (IF: 8.501, 12/73, Q1) [Link]

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30. Wong, M.S., **Zhu, R.***, Kwok, Y.T., Kwan, M.P., Santi, P., Lee, K.H., Heo, J., Li, H., Ratti, C. (2021). Association between NO2 concentrations and spatial configuration: A study of the impacts of COVID-19 lockdowns in 54 US cities. *Environmental Research Letters*, 16, 054064. (IF: 6.793, 8/94, Q1) [Link]

29. Cheng, C., **Zhu, R.***, Thompson, R.G., Zhang, L. (2021). Reliability analysis for multiple-stage solid waste management systems. *Waste Management*, 120, 650–658. (IF: 7.145, 29/274, Q1) [Link]

28. Cheng, C., **Zhu, R.***, Costa, A.M., Thompson, R.G. (2021). Optimisation of waste clean-up after large-scale disasters. Waste Management, 119, 1-10. (IF: 7.145, 29/274, Q1) [Link]

27. Chen, X., Yang, J., **Zhu, R.**, Wong, M.S., Ren, C. (2021). Spatiotemporal impact of vehicle heat on urban thermal environment: a case study of Hong Kong. *Building and Environment*, 205, 108224. (IF: 6.456, 6/136, Q1) [Link]

26. Zhong, T., Zhang, Z., Chen, M., Zhang, K., Zhou, Z., **Zhu, R.**, Wang, Y., Qian, Z., Lu, G., Yan, J. (2021). A city-scale estimation of rooftop solar photovoltaic potential based on deep learning. *Applied Energy*, 298, 117132. (IF: 9.746, 6/143, Q1) [Link]

25. Zhong, T., Zhang, K., Chen, M., Wang, Y., **Zhu, R.**, Zhang, Z., Zhou, Z., Qian, Z., Lv, G., Yan, J. (2021). Assessment of solar photovoltaic potentials on urban noise barriers using street-view imagery. *Renewable Energy*, 168, 181–194. (IF: 8.001, 16/114, Q1) [Link]

24. Meng, Y., Wong, M.S., Xing, H., **Zhu, R.**, Qin, K., Kwan, M.P., Lee, K.H., Kwok, C.Y.T., Li, H. (2021). Effects of urban functional fragmentation on nitrogen dioxide (NO$_2$) variation with anthropogenic-emission restriction in China. *Scientific Reports*, 11, 11908. (IF: 4.379, 17/73, Q1) [Link]

23. Meng, Y., Wong, M.S., Xing, H., Kwan, M.P., **Zhu, R.** (2021). Yearly and Daily Relationship Assessment between Air Pollution and COVID-19 Incidence: Evidence from 254 Countries and Regions. *ISPRS International Journal of Geo-Information*, 10, 401. (IF: 2.899, 76/162, Q2) [Link]

22. Meng, Y., Wong, M.S., Xing, H., Kwan, M.P., **Zhu, R.** (2021). Assessing the country-level excess all-cause mortality and the air pollution-human activity impacts during COVID-19 epidemic. *International Journal of Environmental Research and Public Health*, 18(13), 6883. (IF: 3.390, 41/176, Q1) [Link]

21. Yang, Z., Hui, K.W., Abbas, S., **Zhu, R.**, Kwok, C.Y.T., Heo, J., Ju, S., Wong, W.S. (2021). A Review of Dynamic Tree Behaviors: Measurement Methods on Tree Sway, Tilt and Root-plate Movement. *Forests*, 12, 379. (IF: 2.633, 13/67, Q1) [Link]

20. Yu, X., Wong, M.S., Kwan, M.P., Nichol, J., **Zhu, R.**, Heo, J., Chan, P.W., Chin, D.C.W., Kwok, C.Y.T., Kan, Z. (2021). COVID-19 infection and mortality: association with PM2.5 concentration and population distribution – an exploratory study. *ISPRS International Journal of Geo-Information*, 10, 123. (IF: 2.899, 76/162, Q2) [Link]

19. Yu, Z., Zhu, X., Liu, X., Chen, X., Wei, T., Yuan, H.Y., Xu, Y., **Zhu, R.**, He, H., Wang, H., Wong, M.S., Jia, P., Shi, W.Z., Chen, W. (2021). Reopening International Borders without Quarantine: Contact Tracing Integrated Policy against COVID-19. *International Journal of Environmental Research and Public Health*, 18(14), 7494. (IF: 3.390, 41/176, Q1) [Link]

2020 (5)

18. **Zhu, R.**, Wong, W.S., You, L., Santi, P., Nichol, J., Ho, H.C., Lu, L., Ratti, C. (2020). The effect of urban morphology on the solar capacity of three-dimensional cities. *Renewable Energy*, 153, 1111–1126. (IF: 6.274, 19/112, Q1) [Link] [Website at MIT SCL]

17. **Zhu, R.**, Zhang, X., Kondor, D., Santi, P., Ratti, C. (2020). Understanding spatio-temporal heterogeneity of bike-share and scooter-share mobility. *Computers, Environment and Urban Systems*, 81, 101483. (IF: 4.655, 6/84, Q1; ESI high citation) [Link]

16. **Zhu, R.**, Guilbert, E., Wong, W. S. (2020). Object-oriented tracking of spatial and thematic dynamic behaviors of urban heat islands. *Transactions in GIS*, 24, 85–103. (IF: 2.119, 40/84, Q2) [Link]

15. Yan, L., Luo, X., **Zhu, R.**, Santi, P., Wang, D., Ratti, C. (2020). Quantifying and analyzing traffic emission reduction by ridesharing: a case study of Shanghai. *Transportation Research Part D: Transport and Environment*, 89, 102629. (IF: 4.577, 5/37, Q1) [Link]

14. Kan, Z., Wong, W. S., **Zhu, R.** (2020). Understanding space-time patterns of vehicular emission flows in urban areas using geospatial technique. *Computers, Environment and Urban Systems*, 79, 101399. (IF: 4.655, 6/84, Q1) [Link]

2019 (5)

13. **Zhu, R.**, You, L., Santi, P., Wong, W.S., Ratti, C. (2019). Solar accessibility in developing cities: A case study in Kowloon East, Hong Kong. *Sustainable Cities and Society*, 51, 101738. (IF: 5.268, 5/63, Q1) [Link]

12. You, L., Tuncer, B., **Zhu, R.**, Xing, H., Yuen, C. (2019). A Synergetic Orchestration of Objects, Data and Services to Enable Smart Cities. *IEEE Internet of Things Journal*, 6(6), 10496–10507. (IF: 9.936, 3/156, Q1) [Link]

11. Ho, H. C., Wong, W.S., Abbas, S., **Zhu, R.** (2019). Development of the Adjusted Wind Chill Equivalent Temperature (AWCET) for cold mortality assessment across a subtropical city: validation and comparison with a spatially-controlled time-stratified approach. *BMC Public Health*, 19, 1290. (IF: 2.521, 70/193, Q2) [Link]

10. Lu, M., An, K., Hsu, S.C., **Zhu, R.** (2019). Considering user behavior in free-floating bike sharing system design: A data-informed spatial agent-based model. *Sustainable Cities and Society*, 49, 101567. (IF: 5.268, 5/63, Q1) [Link]

9. Ho, H.C., Abbs, S., Yang, J., **Zhu, R.**, Wong, W.S. (2019). Spatiotemporal prediction of increasing winter perceived temperature for climate change mitigation: A sustainable planning guideline for a sub-tropical city. *International Journal of Environment Research and Public Health*, 16, 497. (IF: 2.849, 32/171, Q1) [Link]

2018 (2)

8. Na, J., Yang, X., Dai, W., Li, M., Xiong, L., **Zhu, R.**, Tang, G. (2018). Bidirectional DEM relief shading method for extraction of gully shoulder-line in loess tableland area. *Physical Geography*, 39(4), 368-386. (IF: 1.435, 149/200, Q3) [Link]

7. **Zhu, R.**, Guilbert, E., Wong, W. S. (2018). Object-core oriented data modelling for tracking of behaviors of urban heat islands. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 42(4), 763–770. [Link]

2017 and before (6)

6. **Zhu, R.**, Wong, W. S., Guilbert, E., Chan, P. W. (2017). Understanding heat patterns produced by vehicular flows in urban areas. *Scientific Reports*, 7, 16309. (IF: 4.543, 17/71, Q1) [Link] [Video]

5. **Zhu, R.***, Guilbert, E., Wong, W. S. (2017). Object-oriented tracking of the dynamic behavior of urban heat islands. *International Journal of Geographical Information Science*, 31(2), 405–424. (IF: 3.733, 10/84, Q1) [Link]

4. Wong, W. S., **Zhu, R.**, Liu, Z., Lu, L., Peng, J., Tang, Z., Lo, C. H., Chan, W. K. (2016). Estimation of Hong Kong's solar energy potential using GIS and remote sensing technologies. *Renewable Energy*, 99, 325–335. (IF: 6.274, 19/112, Q1) [Link]

3. **Zhu, R.***, Guilbert, E., Wong, W. S. (2016). Tracking the spatial evolution of urban heat islands. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 3(2), 3–8. [Link]

2. Li, F., Tang, G., Wang, C., Cui, L., **Zhu, R.** (2016). Slope Spectrum Variation in a Simulated Loess Watershed. *Frontiers of Earth Science*, 10(2), 328–339. (IF: 1.62, 134/200, Q3) [Link]

1. Yang, Y., Tang, G., Cao, M., **Zhu, R.** (2013). An intelligent method to discover transition rules for cellular automata using bee colony optimization. *International Journal of Geographical Information Science*, 27 (10), 1849–1864. (IF: 3.733, 10/84, Q1) [Link]

Working paper

- Yu, X., Wong, M.S., Qin, K., **Zhu, R.**, You, L., Wei, J. (2025). Electric vehicle attributed air pollution alleviation: A case study in Guangdong province, China. *Sustainable Cities and Society*. Submitted.

- Liao, X., Wong, M.S., **Zhu, R.** (2025). A Temporal Fusion Transformer (TFT) augmented GeoAI framework for estimating hourly land surface solar irradiation: A case study in Australia. *Energy and AI*. Submitted.

- Cheng, B., Zao, L., **Zhu, R.**, Jiang, H., Shen, T. (2025). Refined semantic segmentation of multi-resolution photo-voltaics from remote sensing imagery: A novel deep learning model augmented by aggregated dilated feature attention. *Applied Energy*. Submitted.

- Qu, H., Kuang, H., You, L., Fan, W., **Zhu, R.**, Li, J, (2025). Impacts of electricity price on electric vehicle charging behavior: A case study in Shenzhen, China. *Transportation Research Part D: Transport and Environment*. Submitted.

- You, L., Chen, Q., Liu, S., **Zhu, R.**, Qu, H., Yuen, C. (2025). AF2L: An Asynchronous Federated Learning to Learn Mechanism for the Occupancy Prediction of Charging Stations with Small Samples. *IEEE Internet of Things Journal*. Submitted.

- You, L., Chen, Q., **Zhu, R.**, Liu, S., Yuen, C. (2025). AFML: An Asynchronous Federated Meta-Learning Mechanism for Charging Station Occupancy Prediction with Biased and Isolated Data. *IEEE Transactions on Network Science and Engineering*. Submitted.

- Chen, Q., Liu, S., **Zhu, R.**, You, L. (2025). FMGCN: A Federated Meta-Learning based Graph Convolution Network for Regional Charging Demand Forecasting. *IEEE Transactions on Neural Networks and Learning Systems*. Submitted.

- Xu, F., Wong, M.S., **Zhu, R.**, Dang, Y. (2025). Solar Cities: multiple-reflection within urban canyons. *NPJ Urban Sustainability*. Submitted.

- Luo, Y., Yu, X., Wong, M.S., Yang, J., **Zhu, R.** (2025). Estimating Multi-scale Ventilation Corridors in Complex 3D Urban Space: A Graph-based Least-Cost Path Model. *Sustainable Cities and Society*. Submitted.

- xx, Chen, Y., **Zhu, R.**, et al. (2025). Estimating urban flooding depth from social media data: A segment-level direct preference optimization-based multimodal large language model. *xxx*.

- Yan, L., Chen, J., Luo, Z., Cao, Z., Hu, Y., **Zhu, R.**, Cheng, Y. (2025). Modeling and assessing the effects of built environment on ride-shareability: a case study of Shanghai, China. *Transportation Research Part D: Transport and Environment*. Submitted.

- Yan, M., Fu, C., Huang, X., Wang, S., Li, Y., **Zhu, R.**, Tatah, L., Xu, Y. (2025). Unpacking Asthma Risks: A Multi-level Spatio-temporal Analysis of Social Determinants of Health in the U.S. *Environmental Health Perspectives*. Submitted.

- Yan, M., Huang, X., Wang, S., Fu, C., Li, Y., **Zhu, R.**, de Melo, S.N., Li, X., Xu, Y. (2025). Climate matters in the spatiotemporal prediction of global terrorism. *PNAS*. Submitted.

- Zhang, S., Chen, R., Fu, C., Li, Y., Jiang, S., de Melo, S.N., **Zhu, R.**, Yang, B., Xu, Y. (2025). Be alert for violent crime in hot weather and property crime in cold weather. *PNAS*. Submitted.

Conference publications

9. **Zhu, R.**, Lau, V.W.S., Yan, J., Ratti, C. (2023). Significant carbon mitigation potential from installed rooftop photovoltaics in Singapore: A GIS-integrated life cycle assessment. *Proceeding of Urban Solutions and Sustainability R&D Congress 2023 – Science of Cities Symposium*, 16, Singapore, 4–5 October 2023.

8. Chen, Q., Liu, S., Qu, H., **Zhu, R.**, You, L. (2022). TWAFR-GRU: An Integrated Model for Charging Station Occupancy Prediction. *The 19th IEEE International Conference on Ubiquitous Intelligence and Computing*. Haikou, China, 15-18 December 2022. [Link]

7. Yang, J., Chen, X., **Zhu, R.**, Wong, M.S., Ren, C. (2022). Potential Benefit of Electric Vehicles on Urban Heat Mitigation Under Future Climate (Invited). AGU Fall Meeting. Chicago, IL, 12-16 December 2022.

6. Chen, X., Yang, J., **Zhu, R.**, Wong, M.S., Ren, C. (2022). Spatiotemporal impact of vehicle heat on urban thermal environment: a case study of Hong Kong. *Urban Climate News*, 84, 12-16. [Link]

5. **Zhu, R.**, Guilbert, E., Wong, W. S. (2016). Tracking the spatial evolution of urban heat islands, Commission II, WG II/1. In Proceeding of the XXIII ISPRS Congress. Prague, Czech Public, 12-19 July 2016.

4. **Zhu, R.**, Guilbert, E., Wong, W. S. (2015). Event-based tracking of the dynamic behavior of urban heat islands. In Proceeding of the 2nd International Conference on Sustainable Urbanization, 239. Hong Kong, China, 7-9 January 2015.

3. **Zhu, R.**, Gidófalvi, G. (2013). GPS-based crowd sourced intelligent traffic information hub. In Proceeding of the 26th International Cartographic Conference, 669–670. Dresden, Germany, 25-30 August 2013.

2. **Zhu, R.**, Alizadeh, A., Wu, W. (2011). A GIS based potential risk assessment for water body, In Proceeding of the 1st Higher Technical Institution in Russia, 168–171. St. Petersburg, Russia, 20-23 April 2011.

1. Yang Tao, Guoan Tang, Shanshan Ge, Shijie Zhu, Xiangxi Dai, **Zhu, R.** (2009). Assessment of urban building layout based on spatial pattern analysis methods, IEEE 2009 17th International Conference on Geoinformatics, 1-5. Fairfax, VA, USA, 12-14 August 2009.

Grants

[08/2022–07/2024] Brownfield Recognition

PI for the project entitled with "*Brownfield recognition and planning analysis in the Northern Metropolis of Hong Kong by integrating remote sensing, deep learning, and augmented reality technologies*", Funded by Research Institute of Land and Space, HK PolyU, HKD 400,000, 24 months.

[12/2021–11/2023] Water Quality Prediction

Co-I for the project entitled with "*Study of Water Quality Parameters in Hong Kong: From Present to Future Prediction under the Government Development Schemes*", Funded by Research Institute of Land and Space, HK PolyU, HKD 1,200,000, 24 months.

[04/2021–06/2022] Solar techno-economic assessment

PI for the project entitled with "*Economic assessment of solar photovoltaic projects: Modelling solar photovoltaic potential in a dynamic geographical environment*", Funded by HK PolyU, HKD 250,000, 14 months

[06/2021-06/2022] Large Equipment Fund

Co-I for the project entitled with "*GNSS-embedded Backpack-LiDAR and UAV-LiDAR (LSGI-2)*", PolyU (UGC) (LEF2021-028), HKD 842,806.00, 12 months.

[04/2021–06/2022] Marine Environmental Management

Project Manager for the project entitled with "*Provision of Services for Pilot Application of Satellite Imagery Technology for Marine Environmental Management*", Funded by Environmental Protection Department, The Government of the Hong Kong Special Administrative Region, HKD 1,380,000, 18 months.

[09/2020–08/2023] Urban thermal environment

Co-I for the project entitled with "*An integrated knowledge-based Remote Sensing and GIS dynamic model for the urban thermal environment*", Funded by Hong Kong GRF, HKD 1,581,600 (the 5th highest fund in the current year in HK), 36 months.

[09/2019–08/2022] Solar energy potential on 3D urban envelops

Co-I for the project entitled with "*Development of an integrated model for estimating 3D solar energy potential using GIS, Remote Sensing and Deep learning techniques*", Funded by Hong Kong GRF, HKD 1,210,980, 36 months.

[09/2015–08/2017] Augmented Reality based vehicular navigation

PI for the project entitled with "*Augmented Reality based vehicular navigation based on smart glasses*", Funded by HK PolyU, CNY 200,000, 48 months.

[06/2018–06/2019] Smart City Tree Management

Major Participate for the project entitled with "*Jockey Club Smart City Tree Management Project*" for monitoring and detection of tree rotation and tilt angles using Smart Sensing Technologies, Funded by the Hong Kong Jockey Club Charities Trust, HKD $32.28 million, 36 months.

Presentations

60. AdvUNet3+: Segmentation of city-scale heterogeneous building façade materials from street view images. The 2025 International Symposium on Spatiotemporal Data Science, Harvard University, Cambridge, USA, May 22-24, 2025.

59. Carbon mitigation capacity of installed rooftop PVs. Themed session of "Building Greener, Smarter Cities", Science Brew. Hosted by Prof Andy Hor (DCER) and co-organised by Research Office and the ASTAR Postdoc and Early Career Scientist Society (APECSS). Singapore, March 10, 2025.

58. Light field modelling and applications in complex urban scenarios. Lee Kuan Yew Centre for Innovative Cities, Singapore University of Technology and Design, Singapore, February 25, 2025.

57. Solar energy modelling, application, and policy implication. Lee Kuan Yew School of Public Policy, National University of Singapore, Singapore, February 17, 2025.

56. Solar photovoltaic potential modelling and applications in complex urban scenarios. The workshop on *Singapore and the Energy Transition: Local and Regional Potentials and Challenges for a Sustainable and Just Transition*. Asia Research Institute, National University of Singapore, Singapore, November 25, 2024.

55. Light field modelling and applications in complex urban scenarios. Urban governance and design series workshop. HKUST (Guangzhou), China, November 18, 2024.

54. Unravelling Spatiotemporally Heterogenous Life-cycle Carbon Mitigation of Existing Rooftop Photovoltaics: GIS and Remote Sensing Data Modelling. The 31st International Conference on Geoinformatics, Toronto, Canada. August 14-16, 2024.

53. Unravelling the effects of urban thermal environment on utility-scale floating photovoltaic electricity generation by using GeoAI. World Cities Summit 2024. Singapore, June 2-4, 2024.

52. Light field modelling and applications in complex urban scenarios. The 1st National Conference of Young Geographers. Xi'an, China, May 17-19, 2024.

51. Light field modelling and applications in complex urban scenarios. 2024 Spring CPGIS Education Webinar Series. Online, March 29, 2024.

50. Multi-sourced data modelling of spatially heterogenous life-cycle carbon mitigation potential from installed rooftop photovoltaics: A case study in Singapore. The 3rd Workshop of Asian Young Geographers. Online, December 16-17, 2023.

49. Modelling of light field adaptive to complex urban environment and its applications. 2023 The First National Information Geography Conference, Suzhou, China, November 17-20, 2023.

48. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. 2023 Singapore-ETH Centre, Singapore, October 31, 2023.

47. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Center for Remote Imaging, Sensing and Processing, National University of Singapore, Singapore, October 20, 2023.

46. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. 2023 International Conference on Geospatial Information Science: Eductation, Innovatin and Applications, Wuhan, China, October 15-16, 2023.

45. Significant carbon mitigation potential from installed rooftop photovoltaics in Singapore: A GIS-integrated life cycle assessment. R&D Congress' Science of Cities Symposium. Marina Bay Sands Convention Centre, Singapore, October 5, 2023. Invited Keynote Speaker and Panel Discussion (invited by the Ministry of National Development Singapore).

44. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Seminar for Hong Kong Institute of Surveyors (HKIS), Virtual/Online, Singapore, August 31, 2023. (Invited)

43. An urban scale optimization of rooftop photovoltaic charging of electric vehicles. Global Smart Cities Summit cum The 3rd International Conference on Urban Informatics, Hong Kong, China, August 21–23, 2023.

42. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Chinese Academy of Sciences Geography Science and Resource Institute, China, August 2, 2023.

41. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Beijing Normal University, August 2, 2023.

40. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Nanjing Normal University, China, July 31, 2023.

39. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. *International Conference on Urban Renewal and Future Urban Development under Carbon Peaking and Carbon Neutrality Goals*. Anji, Zhe Jiang, China, July 28-30, 2023. (Invited Keynote Speaker)

38. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Energy Visions, Virtual/Online, Singapore, July 27, 2023.

37. Spatial optimization of solar photovoltaic installation for charging shared electric scooters. The 30th International Conference on Geoinformatics, University College London, UK, July 19-21, 2023.

36. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. The 18th Academic Annual Conference in Chinese Geographic Information Science Theory and Method, Guilin, China, May 19-21, 2023.

35. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Guest Lecture for LSGI547 Advanced GIS, HK PolyU, Hong Kong, China, March 20, 2023.

34. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Research Seminar, Department of Geography and Resource Management, Chinese University of Hong Kong, Hong Kong, China, February 16, 2023. (Invited)

33. Solar cities for energy transition facilitated by GIScience with multi-sourced spatiotemporal big data. Department of Geography, National University of Singapore, Singapore, February 10, 2023.

32. A detail-oriented deep learning network for refined segmentation of distributed photovoltaic areas from satellite imagery. Applied Energy Symposium 2022: Low carbon cities and urban energy systems, Virtual/Matsue, Japan, November 24-27, 2022.

31. CRDIG webinar: Creating a sustainable solar city: The spatiotemporal data modeling for the energy transition. Department of Geomatics, Université Laval, Québec City, Canada, October 6, 2022.

30. Solar cities for energy transition facilitated by Geographical Information Science with multi-sourced spatiotemporal big data. Guest lecture for LSGI 524 Urban Big Data, LSGI, HK PolyU, Hong Kong, China, September 28, 2022.

29. The effect of different travel modes and travel destinations on COVID-19 transmission in global cities. Singapore Genera Hospital Research Labs Presentation 2022, Singapore, April 29, 2022.

28. Creating a sustainable solar city. International Forum for Interdisciplinary Sciences and Engineering, Wuhan University, China, April 2, 2022.

27. Creating a sustainable solar city (90 mins). Institute of Space and Earth Information Science, The Chinese University of Hong Kong, Hong Kong, November 26, 2021.

26. Creating a sustainable solar city (60 mins). Digital Futures, KTH - Royal Institute of Technology, Stockholm, Sweden, November 11, 2021.

25. GeoHealth Hub Seminar talk on The effect of different travel modes and travel destinations on COVID-19 transmission in global cities. Department of Geography, National University of Singapore, Singapore, November 10, 2021.

24. Creating a sustainable solar city. Guest Lecturer for Urban Big Data, LSGI, HK PolyU, Hong Kong, China, November 4, 2021.

23. Optimization of scooter-sharing services using a solar-charging based real-time shareability network. Applied Energy Symposium 2021: Low carbon cities and urban energy systems, Matsue, Japan, September 4-8, 2021.

22. An economically feasible optimization of photovoltaic provision using real electricity demand: A case study in New York City. Applied Energy Symposium 2021: Low carbon cities and urban energy systems, Matsue, Japan, September 4-8, 2021.

21. Solar charging improves operational efficiency of shared electric scooters. Webminer on Space Intelligence and Digital Energy Development. Hosted by Nanjing Normal University and the Journal of Applied Energy, Nanjing, China, August 7, 2021. (Invited)

20. Creating a sustainable solar city. RISE Smart Energy Research Seminar III. Research Institute of Smart Energy, HK PolyU, Hong Kong, China, August 4, 2021.

19. Creating a sustainable solar city. Webminer on the development of smart and sensing cities, Nanjing Normal University, Nanjing, China, January 16, 2021.

18. Creating a sustainable solar city. Guest Lecturer for the subject of Smart City and Urban Informatics (LSGI653), HK PolyU, Hong Kong, November 15, 2020.

17. Creating a sustainable solar city. Guest lecturer for the subject of Urban Big Data (LSGI524), HK PolyU, Hong Kong, September 22, 2020.

16. The effect of urban morphology on the solar capacity of three-dimensional solar cities. CREATE Symposium 2019. SMART, Singapore, December 6, 2019. (Invited)

15. The effect of urban morphology on the solar capacity of three-dimensional solar cities. The Second International Conference on Urban Informatics. HK PolyU, Hong Kong SAR, June 24-26, 2019.

14. The effect of urban morphology on the solar capacity of three-dimensional solar cities. Applied Energy "A+B" Symposium. MIT, USA, May 22-24, 2019.

13. Strong effect of urban geomorphology to solar capacity of three-dimensional cities (poster presentation). Future Urban Mobility Symposium 2019. Singapore, January 28-29, 2019.

12. The development of senseable cities. Urban Planning, Land & Resources Commission of Shenzhen Municipality. Shenzhen, China, November 9, 2018. (Invited)

11. Mapping of three-dimensional solar cities. SMART FM Seminar. Singapore, October 23, 2018.

10. Challenges of Drive-By IoT Sensing for Smart Cities: City Scanner Case Study. PURBA 2018, The 7th International Workshop on Pervasive Urban Applications. Singapore, October 12, 2018.

9. A prototype of Vibour AR smart glasses. SMART-REMix Event. Singapore, July 25, 2018.

8. Modelling of urban mobility for sustainable cities. Workshops of Future Urban Mobility Summer Research. Singapore, July 6 & 9, 2018.

7. Modelling of urban mobility to solve environmental and transportation problems. Location: SMART at CREATE Tower. Singapore, May 15, 2018.

6. My studying experience during the past ten years. Location: Nanjing Normal University. Nanjing, China, November 24, 2017.

5. Understanding heat patterns produced by vehicular flows in urban areas. The 38th Research Salon of HK PolyU. Hong Kong, China, February 17, 2017.

4. Understanding spatiotemporal heat patterns of vehicular flows in urban areas. Conference of the 2016 Cartographic Visualization of Big Data for Early Warning and Disaster/Crisis Management (EW&CM)-Methodology, Techniques and Applications. Nanjing, China, November 27-29, 2016.

3. Going abroad to see the world. Location: Nanjing Normal University. Nanjing, China, October 26, 2016.

2. Object-oriented tracking of dynamic behaviors of urban heat islands. The 7th Nationwide PhD-students Forum in Geo-Information, China. Nanjing, China, November 26-28, 2016.

1. Tracking thematic and spatiotemporal dynamic behaviors of urban heat islands. Location: Laval University. Quebec City, Canada, November 30, 2015. (Invited)

Collaboration and Supervision

Collaborators

- Yumin Chen, Visiting Professor at IHPC (12/2024-12/2025), Professor at Wuhan University

- Binjie Chen, Visiting Professor at IHPC (2/2025-2/2026), Assistant Professor at Ningbo University

Interns

- Ng Kai Ee Emmanuelle (ARIA Project: Estimation of floating solar photovoltaic electricity generation - A deep learning-embedded remote sensing and GIS integration model; National University of Singapore, 2025)

- Daniel Tan Jin Kai (FYP: Semantic Segmentation of Urban Surface Materials by Advancing Deep Learning Networks; Temasek Polytechnic, Singapore, 2024)

- Zhaocheng Xu (The University of Hong Kong, Hong Kong, China, 2024)

- Emmanuel D Jiang (University of Sheffield, UK, 2024)

- Ahmad Koya (Stanford University, USA, 2024)

PhD students (as co-supervisor)

- Ibrahim Adeniran (Urban heat islands; registered at HK PolyU in 2021)

- Songyang Li (Urban heat islands; registered at HK PolyU in 2021)

- Xuan Liao (registered at HK PolyU in 2021; PhD Dissertation: Estimation of solar irradiation on building rooftop based on machine learning models)

- Fan Xu (registered at HK PolyU in 2021; PhD Dissertation: Estimation of solar potential on three-dimensional urban envelopes using artificial intelligence)

Master students

- Yantong Wang (Dissertation: Detection of electric vehicle charging hotspots; National University of Singapore, 2025)

- Dong Hu (Project: Estimation of floating PV electricity generation; National University of Singapore; 2024)

- Yifan Pu (Project: Estimating solar PV charging capability for roadside electric vehicles; National University of Singapore; 2024)

- Shu Wang (Project: Estimating shadow effects of trees on solar distribution on 3D building surfaces; National University of Singapore; 2024)

- Tianyi Yang (Dissertation: The effects of COVID-19 on urban mobility demands using electric vehicles; grade B; Singapore Management University; 2023)

- Ziyi Huang (Dissertation: Unraveling the effects of urban thermal environment on solar photovoltaic conversion efficiency: A case study in Singapore; grade B+; 2023)

- Nanfan Ji (Dissertation: Dynamic dispatching of rooftop photovoltaic electricity for charging electric vehicles; grade B; 2023)

- Vincy WS Lau (Dissertation: Estimation of Rooftop Photovoltaic Carbon Reduction Potential: A Deep Learning-based Semantic Segmentation Approach; grade A; 2023)

- Yuk Man Chung (Dissertation: Comparison between deep learning and machine learning-based models for estimation of land surface temperatures in Kowloon, Hong Kong SAR; grade B+; 2022)

- Dongxue Guo (Dissertation: Segmentation of rooftop photovoltaic areas from satellite images by advancing a deep learning-based semantic segmentation model; grade A; 2022)

- Sui Peng Hui (Dissertation: Solar photovoltaic extraction by using deep-learning and image segmentation; grade B+; 2022)

- Ho Mam Ng (Dissertation: Evaluation of payback periods of distributed photovoltaic systems using remote sensing image processing; grade B+; 2021)

- Yidian Liu (Dissertation: Assess the life cycle gas emissions of electric vehicles; grade A-; 2021)

- Xijia Dong (Dissertation: Estimation of the urban heat island effect in a planned urban area: A case study in Kowloon East, Hong Kong; grade A; 2021)

- Yiya Wang (Dissertation: Life cycle assessment of electricity generation and carbon reduction of utility-scale photovoltaic systems using Google and PlanetScope imagery; grade A-; 2021)

Undergraduate students

- Li Mei Suet (HK PolyU; FYP: Study of Urban Heat Island effect in Northern Hong Kong Island; registered in 2021)

- Yeung Chun Yin (HK PolyU; FYP: Investigating the relationship between Urban Heat Island Intensity and Local Climate Zone – A case study of Hong Kong; registered in 2021)

Teaching

[2023-2024] MSc Spatial Big Data and Analytics (Course code: GE5228, National University of Singapore)

Subject leader. The objective of this course is to introduce concepts, technology, and applications on spatial big data and analytics. This course is taught with lectures, laboratories, tutorials, and final project. Students are required to initiate, present, and submit the final project to complete the course requirement. The course also places an emphasis on class presentation of recent and relevant journal articles by the students followed by critical discussion of article content.

[2021-2022] MSc Dissertation (Course code: LSGI551, 9 credits, HK PolyU)

Subject leader. Manage all MSc dissertations, including: 2 hours lecture per weeks (5 teaching weeks in each semester); subject registration; proposal, mid-term report, and final report management; finalizing oral presentation schedules; grade finalization, etc.

[2021-2022] MSc Project (Course code: LSGI552, 6 credits, HK PolyU)

Subject leader. Manage all MSc projects, including: 2 hours lecture per weeks (5 teaching weeks in each semester); subject registration; proposal, mid-term report, and final report management; finalizing oral presentation schedules; grade finalization, etc.

[2021-2022] Remote Sensing Image Processing (Course code: LSGI536, MSc, HK PolyU)

Lecturer. 25 registered students, 3 hours lecture per weeks (13 teaching weeks in semester 2, academic year 20-21). Teach the principles and technology of remote sensing, and theories and techniques for processing remote sensing images.

[2013] Spatial Database (Course code: AG2425, MSc, KTH)

Teaching Assistant. Created the tutorial, gave lectures, and marked homework. It contained spatial database development, geometry definition, spatial queries and spatial indices with PostgreSQL and PostGIS. (Link; Tutorial)

[2012] Web and Mobile GIS (Course code: AG2417, MSc, KTH)

Teaching Assistant. Created the tutorial, gave lectures, and marked homework. It contained GIS computer solutions, such as web maps based on GeoServer, ArcGIS Server, and ArcGIS API for JavaScript, mobile maps based on OpenStreetMap, Google Map, and ArcGIS SDK for Android. (Link; Tutorial)

Selected awards

12/2024   ISDE Young Scientist Award. The 2nd Youth Innovation Forum on Digital Earth. Awarded by *International Society for Digital Earth*.

08/2024   Top 10 Science Advancement (ranking in the group member: 3/14). The awarded project name: The distributed photovoltaic potential estimation and spatial configuration optimization (ID: ZGGTJJXH-2023-R0403). Awarded by *China Society of Territorial Economics*.

03/2024   Highly Cited Paper. Awarded by *The editor-in-chief of Advances in Applied Energy*.

01/2024   Geospatial World 50 Rising Stars 2024. Awarded by *Geospatial World*.

12/2023   Excellent Paper Award (EPA 2023). Paper title: *Multi-sourced data modelling of spatially heterogenous life-cycle carbon mitigation potential from installed rooftop photovoltaics: A case study in Singapore.* The 3rd Workshop of Asian Young Geographers, December 16-17, 2023. Awarded by: *Young Geographer Working Group of Asian Geographical Association (AGA-YGWG), The IGU Task Force for Young and Early Career Geographers (IGU-YECG), Working Committee for Young Geographers of the Geographical Society of China (GSC-WCYG)*, and *The Young Scientist Innovation Network for the International Society for Digital Earth (ISDE-YSIN)*. Signed by Prof. Dahe Qin (Academic Chair), Prof. Mike Medow (EPA Committee Chair), and Prof. Min Chen (Organizing Chair).

08/2023   Best Conference Paper Award (3rd Place). Paper title: *An urban-scale spatiotemporal optimization of rooftop photovoltaic charging of electric vehicles.* Global Smart Cities Summit cum The 3rd International Conference on Urban Informatics, Hong Kong, China. Awarded by *International Society for Urban Informatics*. Signed by Prof. Wen-zhong John Shi (President of ISUI).

08/2023   Top 10 most valuable remote sensing datasets. Launched by the National Earth Observation Scientific Data Center and supported by the Institute of Aerospace Information Innovation, Chinese Academy of Sciences. Project title: *Vectorized rooftop area data for 90 cities in China (2022)*. Recipients: Min Chen, ..., Rui Zhu, et al. (7th out of the 12 recipients, 2nd affiliation: IHPC, A*STAR).

06/2021   Dean's Award for Outstanding Achievement in Technology Transfer – Remote Sensing on Urban Trees. Recipients: Man Sing Wong, Rui Zhu, etc.

06/2021   2021 Smart 50 Awards – "First-Ever Smart Tree Monitoring Project Using Low-Power Wireless Network For Urban Forestry and Tree Management, Hong Kong". Recipients: Man Sing Wong, Rui Zhu, etc. (Link)

04/2019   The Hong Kong Institute of Surveyors – Dissertation Awards for Postgraduate Students (2 winners in 2019 in Hong Kong)

10/2016   The best oral representation and conference paper for the 7th Nationwide PhD-students Forum in Geo-Information, China (5% Selection)

05/2015   Innovation and Seed Fund for Augmented Reality-based Vehicle's Navigation Development, HK PolyU

04/2014   PhD Scholarship of General Research Fund provided by University Grants Committee of Hong Kong

04/2011   Diploma for participating in the International Forum-Competition of Young Researchers, Russia

05/2010   Outstanding Graduate in School of Geographic Science, Nanjing Normal University

Services

Serve as guest editors

- Special Issue of Energy Geography (Energy 360)

- Special Issue of Energy networks and sustainability (Urban Informatics)

- Special Issue of Current Trends Using Cutting Edge Geospatial Remote Sensing (Remote Sensing, Impact factor: 5.347)

- Special Issue of Urban Heat Island and Building Energy Sustainability (Sustainability, Impact factor: 3.251)

- Special Issue of Autonomous Transportation Systems Enabled by Emerging Technologies (Journal of Advanced Transportation, Impact factor: 2.419)

- Special Issue of The 2nd Edition of Urban Environmental Quality (International Journal of Environmental Research and Public Health, Impact factor: 2.849)

- Special Issue of Understanding and Mitigating Urban Heat Island-Remote Sensing and GIS Technologies (Climate)

- Special Issue of The Interaction of Climate Change with Landscape and Environment (Climate)

- Special Issue of Holistic Evaluation and Management of Urban Systems Before, During and After Major Emergencies (International Journal of Chinese Culture and Management)

Serve as reviewers

- Advances in Applied Energy | Applied Energy |Atmosphere

- Building and Environment

- Climate | Complexity

- Environmental Modelling and Software | Energy 360 | Energy Engineering

- Geography and Sustainability

- International Journal of Geographical Information Science | International Journal of Digital Earth | International Journal of Sustainable Transportation | International Journal of Strategic Property Management | International Journal of Disaster Risk Reduction | ISPRS International Journal of Geo-Information | IEEE Transactions on Network Science and Engineering | IEEE Transactions on Cognitive and Developmental Systems

- Nature Communications | Nexus (Cell)

- Scientific Data | Scientific Reports | Sustainable Energy Technologies and Assessments | Social Science & Medicine

- Transactions in GIS | Transactions in Urban Data, Science, and Technology | Transportmetrica A: Transport Science

- Renewable and Sustainable Energy Reviews | Remote Sensing Applications: Society and Environment | Remote Sensing

- Urban Informatics (Springer) | Urban Climate | The 19th COTA ICTP 6-8 July 2019, Nanjing, China

Media reports

Solar Cities

Reported by Lianhe Zaobao1
Reported by Lianhe Zaobao2
Interviewed by Singapore TV
Interviewed by Portfolio Magazine
Interview video
MIT SCL Website
MIT Newsletter
SMART Newsletter
Invited Article in Topos Magazine

Urban Mobility

Singapore Lianhe Zaobao
MIT News
SMART Newsletter
Topic News
USA News Hub

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TechXplore

Transport News

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