

Curriculum Vitae

Zihan Kan, PhD

(Last updated in November 2023)

CONTACT INFORMATION

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PROFESSIONAL APPOINTMENTS

Aug 2022 – , **Assistant Professor**, Department of Geography and Resource Management, The Chinese University of Hong Kong.

Jan 2020 – July 2022, **Research Grants Council Postdoctoral Fellow**, Institute of Space and Earth Information Science, The Chinese University of Hong Kong.

Feb 2019 – Aug 2019, **Research Associate**, Department of Land Surveying and Geo-Informatics, The Hong Kong Polytechnic University.

EDUCATION

Sept 2017 – Dec 2018 **Joint Ph.D. Program**

University of Illinois at Urbana-Champaign, USA (Advisor: **Prof. Mei-Po Kwan**)

Sept 2014 – Dec 2019 **Ph.D. in Photogrammetry and Remote Sensing**

Wuhan University, China (Advisor: **Prof. Luliang Tang**)

Sept 2010 – Jun 2014 **B.S. in Cartography and Geographic Information Engineering**

Wuhan University, China

RESEARCH INTERESTS

- Geographic Information Science (GIS)
- Geospatial Data Mining
- Spatial Statistics
- Transportation Geography
- Travel Behavior
- Machine Learning
- Environmental Health
- Spatiotemporal Analysis
- Environment Management
- Geovisualization

AWARDS

2021. Advancing Diversity and Inclusion Award, Energy and Environment Specialty Group of the American Association of Geographers

- 2020. Research Grants Council (RGC) Postdoctoral Fellowship** (HK\$ 1,215,990), Research Grants Council (PDFS2021-4S08) (Hong Kong)
- 2019. University Scientific Research Outstanding Achievement Award (Science and Technology).** Ministry of Education (China)
- 2019. Graduate Academic Innovation Award,** Wuhan University
- 2019. Outstanding Doctoral Candidate Scholarship,** Wuhan University
- 2017. First Prize in Progress in Surveying and Mapping Technology.** Chinese Society for Geodesy Photogrammetry and Cartography.
- 2017. National Scholarship,** Ministry of Education (China)
- 2017. Joint Ph.D. Student Program Scholarship,** China Scholarship Council
- 2017. First Class Scholarship,** Wuhan University
- 2016. Second Class Scholarship,** Wuhan University
- 2015. Grand Prize for Outstanding Paper,** National Remote Sensing and Geographical Information Science Postgraduate Forum (China)
- 2015. Kwang-Hua Scholarship,** Taiwan Kwang-Hua Education Foundation
- 2015. First Class Scholarship,** Wuhan University

PUBLICATIONS

1. Ahmed, N., Lee, J., Liu, D., **Kan, Z.** and Wang, J., 2023. Identifying urban green space deserts by considering different walking distance thresholds for healthy and socially equitable city planning in the Global South. *Urban Forestry & Urban Greening*, 89,128123.
2. **Kan, Z.**, Kwan, M.P., Cai, J., Liu, Y. and Liu, D., 2023. Nonstationary relationships among individuals' concurrent exposures to noise, air pollution and greenspace: A mobility-based study using GPS and mobile sensing data. *Health & Place*, 83, p.103115.
3. Cai, J., Kwan, M.P., **Kan, Z.** and Huang, J., 2023. Perceiving noise in daily life: How real-time sound characteristics affect personal momentary noise annoyance in various activity microenvironments and times of day. *Health & Place*, 83, p.103053.
4. Liu, D., Kwan, M.P., **Kan, Z.**, Song, Y. and Li, X., 2023. Racial/ethnic inequity in transit-based spatial accessibility to COVID-19 vaccination sites. *Journal of Racial and Ethnic Health Disparities*, 10(4), pp.1533-1541.
5. Liu, D., Kwan, M.P., **Kan, Z.** and Liu, Y., 2023. Examining individual-level tri-exposure to greenspace and air/noise pollution using individual-level GPS-based real-time sensing data. *Social Science & Medicine*, p.116040.
6. Liu, D., Kwan, M.P. and **Kan, Z.**, 2023. Assessment of Doubly Disadvantaged Neighborhoods by Healthy Living Environment Exposure. *Applied Spatial Analysis and Policy*, 16(2), pp.689-702.
7. Yang, X., Yu, J., **Kan, Z.**, Zhou, L., Guan, Q. and Tang, L., 2023. Spatial temporal analysis of vehicle routing problem from online car-hailing trajectories. *ISPRS International Journal of Geo-Information*, 2023, forthcoming.
8. Liu, Y., Kwan, M.P. and **Kan, Z.**, 2023. Inconsistent Association between Perceived Air Quality and Self-Reported Respiratory Symptoms: A Pilot Study and Implications for Environmental Health Studies. *International Journal of Environmental Research and Public Health*, 20(2),

p.1491.

9. Liu, D., Kwan, M.P., **Kan, Z.** and Wang, J., 2022. Toward a healthy urban living environment: Assessing 15-minute green-blue space accessibility. *Sustainability*, 14(24), p.16914.
10. Liu, D., Kwan, M.P., **Kan, Z.**, Song, Y. and Li, X., 2022. Inter-and intra-racial/ethnic disparities in walking accessibility to grocery stores. *Area*, 54(4), pp.627-637.
11. Zhao, Z., Fang, M., Tang, L., Yang, X., **Kan, Z.** and Li, Q., 2022. The Impact of Community Shuttle Services on Traffic and Traffic-Related Air Pollution. *International Journal of Environmental Research and Public Health*, 19(22), p.15128.
12. Tang, L., Zhao, Z., Yang, X., **Kan, Z.**, et al., Road crowd-sensing with high spatio-temporal resolution in big data era. *Acta Geodaetica et Cartographica Sinica*, 2022, 51(6): 1070-1090.
13. **Kan, Z.**, Kwan, M.P., Ng, M. K., Tieben, H., 2022. The Impacts of Housing Characteristics and Built-Environment Features on Mental Health. *International Journal of Environmental Research and Public Health*, 19(9): 5143. <https://doi.org/10.3390/ijerph19095143>
14. **Kan, Z.**, Kwan, M.P., Liu, D., Tang, L., Chen, Y. and Fang M., 2022. Assessing individual activity-related exposures to traffic congestion using GPS trajectory data. *Journal of Transport Geography*, 98, 103240. <https://doi.org/10.1016/j.jtrangeo.2021.103240>
15. Liu, D., Kwan, M.P., **Kan, Z.**, Song, Y. and Li, X., 2022. Racial/Ethnic Inequity in Transit-Based Spatial Accessibility to COVID-19 Vaccination Sites. *Journal of Racial and Ethnic Health Disparities*, 1-9.
16. Liu, D., Kwan, M.P., Huang, J., **Kan, Z.**, Song Y. and Li, X., 2022. Analyzing income-based inequality in transit nodal accessibility. *Travel Behaviour and Society*. 27, 57-64. <https://doi.org/10.1016/j.tbs.2021.11.005>
17. Huang, J., Kwan, M.P., Cai, J., Song, W., Yu, C., **Kan, Z.** and Yim, S.H.L., 2022. Field Evaluation and Calibration of Low-Cost Air Pollution Sensors for Environmental Exposure Research. *Sensors*, 22(6), 2381. <https://doi.org/10.3390/s22062381>
18. **Kan, Z.**, Kwan, M.P., Huang, J., Wong, M.S. and Liu, D., 2021. Comparing the space-time patterns of high-risk areas in different waves of COVID-19 in Hong Kong. *Transaction in GIS*. 00, 1– 20. <https://doi.org/10.1111/tgis.12800>
19. **Kan, Z.**, Kwan, M.P. and Tang, L., 2021. Ripley's K-function for network-constrained flow data. *Geographical Analysis*. 0, 1–20. <https://doi.org/10.1111/gean.12300>
20. **Kan, Z.**, Kwan, M.P., Wong, M.S., Huang, J. and Liu, D., 2021. Identifying the space-time patterns of COVID-19 risk and their associations with different built environment features in Hong Kong. *Science of the Total Environment*, 772, 145379. <https://doi.org/10.1016/j.scitotenv.2021.145379>
21. Huang, J., Kwan, M.P. and **Kan, Z.**, 2021. The superspreading places of COVID-19 and the associated built-environment and socio-demographic features: A study using a spatial network framework and individual-level activity data. *Health & Place*, 102694. <https://doi.org/10.1016/j.healthplace.2021.102694>
22. Ren, C., Tang, L., Long, J., **Kan, Z.** and Yang, X., 2021. Modelling place visit probability sequences during trajectory data gaps based on movement history. *ISPRS International Journal of Geo-Information*, 10(7), 456. <https://doi.org/10.3390/ijgi10070456>
23. Kwok, C.Y.T., Wong, M.S., Chan, K.L., Kwan, M.P., Nichol, J.E., Liu, C.H., Wong, J.Y.H., Wai, A.K.C., Chan, L.W.C., Xu, Y., Li, H., Huang, J. and **Kan, Z.**, 2021. Spatial analysis of the impact of urban geometry and socio-demographic characteristics on COVID-19, a study in Hong

- Kong. *Science of the Total Environment*, 764, 144455.
<https://doi.org/10.1016/j.scitotenv.2020.144455>
24. Liu, D., Kwan, M.P., **Kan, Z.**, 2021. Analyzing disparities in transit-based healthcare accessibility in the Chicago Metropolitan Area. *Canadian Geographer/Le Géographe canadien*. 1-15.
<https://doi.org/10.1111/cag.12708>
 25. Liu, D., Kwan, M.P., **Kan, Z.** and Song, Y., 2021. An integrated analysis of housing and transit affordability in the Chicago Metropolitan Area. *The Geographical Journal*, 187, 110–126.
<https://doi.org/10.1111/geoj.12377>
 26. Liu, D., Kwan, M.P. and **Kan, Z.**, 2021. Analysis of urban green space accessibility and distribution inequity in the City of Chicago. *Urban Forestry & Urban Greening*, 59,127029.
<https://doi.org/10.1016/j.ufug.2021.127029>
 27. Liu, D., Kwan, M.P. and **Kan, Z.**, 2021. Assessing job-access inequity for transit-based workers across space and race with the Palma ratio. *Urban Research & Practice*, 1-27
<https://doi.org/10.1080/17535069.2021.1923795>
 28. Yu, X., Wong, M.S., Kwan, M.P., Nichol, J.E., Zhu, R., Heo, J., Chan, P.W., Chin, D.C., Kwok, C.Y.T. and **Kan, Z.**, 2021. Covid-19 infection and mortality: Association with PM2.5 concentration and population density—An exploratory study. *ISPRS International Journal of Geo-Information*, 10(3),123. <https://doi.org/10.3390/ijgi10030123>
 29. Fang, M., Tang, L., **Kan, Z.**, Yang, X., Pei, T., Li, Q. and Li, C., 2021. An adaptive Origin-Destination flows cluster-detecting method to identify urban mobility trends. *arXiv preprint arXiv:2106.05436*. <https://arxiv.org/abs/2106.05436>
 30. **Kan, Z.**, Wong, M. 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. <https://doi.org/10.1016/j.compenvurbsys.2019.101399>
 31. Chen, Y., Tang, L., **Kan, Z.**, Bilal, M. and Li, Q., 2020. A novel water body extraction neural network (WBE-NN) for optical high-resolution multispectral imagery. *Journal of Hydrology*, 588, 125092. <https://doi.org/10.1016/j.jhydrol.2020.125092>
 32. Cheng, L., Yang, X., Tang, L., Duan, Q., **Kan, Z.**, Zhang, X. and Ye, X., 2020. Spatiotemporal analysis of taxi-driver shifts using big trace data. *ISPRS International Journal of Geo-Information*, 9(4), 281. <https://doi.org/10.3390/ijgi9040281>
 33. Chen, Y., Tang, L., **Kan, Z.**, Latif, A., Yang, X., Bilal, M. and Li, Q., 2020. Cloud and cloud shadow detection based on multiscale 3D-CNN for high resolution multispectral imagery. *IEEE Access*, 8, 16505-16516. <https://doi.org/10.1109/ACCESS.2020.2967590>
 34. Huang, J., Kwan, M. P., **Kan, Z.** et al. 2020. Investigating the relationship between the built environment and relative risk of COVID-19 in Hong Kong. *ISPRS International Journal of Geo-Information*, 9(11): 624. <https://doi.org/10.3390/ijgi9110624>
 35. Kwok, C.Y.T., Wong, M.S., Li, H., Hui, K.K.W., Ko, F.W.Y., Shiu, H.Y.K. and **Kan, Z.**, 2020. Detection of structural tree defects using thermal infrared imaging. In *40th Asian Conference on Remote Sensing: Progress of Remote Sensing Technology for Smart Future*, ACRS 2019.
<http://www.scopus.com/inward/record.url?scp=85085665273&partnerID=8YFLogxK>
 36. **Kan, Z.**, Tang, L., Kwan, M.P., Ren, C., Liu, D. and Li, Q., 2019. Traffic congestion analysis at the turn level using taxis' GPS trajectory data. *Computers, Environment and Urban Systems*, 74, 229-243. <https://doi.org/10.1016/j.compenvurbsys.2018.11.007>
 37. Tang, L., Gao, J., Ren, C., Zhang, X., Yang, X. and **Kan, Z.**, 2019. Detecting and evaluating urban

- clusters with spatiotemporal big data. *Sensors*, 19(3), p.461. <https://doi.org/10.3390/s19030461>
38. Tang L., **Kan Z.**, Ren C. et al., 2019. Fine-grained analysis of traffic congestions at the turning level using GPS traces. *Acta Geodaetica et Cartographica Sinica*, 48(1), 75-85. <https://doi.org/10.11947/j.AGCS.2019.20170448>
 39. **Kan, Z.**, Tang, L., Kwan, M. P. and Zhang, X., 2018. Estimating vehicle fuel consumption and emissions using GPS big data. *International Journal of Environmental Research and Public Health*, 15(4), 566. <https://doi.org/10.3390/ijerph15040566>
 40. **Kan, Z.**, Tang, L., Kwan, M.P., Ren, C., Liu, D., Pei, T., Liu, Y., Deng, M. and Li, Q., 2018. Fine-grained analysis on fuel-consumption and emission from vehicles trace. *Journal of cleaner production*, 203, 340-352. <https://doi.org/10.1016/j.jclepro.2018.08.222>
 41. Tang, L., Sun, F., **Kan, Z.**, Ren, C. and Cheng, L., 2017. Uncovering distribution patterns of high performance taxis from big trace data. *ISPRS International Journal of Geo-Information*, 6(5), 134. <https://doi.org/10.3390/ijgi6050134>
 42. Tang, L., **Kan, Z.***, Duan, Q. et al., 2017. A space-time path supported estimation approach for vehicles' fuel-consumption and emissions. *Acta Geodaetica et Cartographica Sinica*, 46(12), 2024-2031. (Corresponding author). <https://doi.org/10.11947/j.AGCS.2017.20160439>
 43. Tang, L., **Kan, Z.***, Liu, H., et al., 2017. A kernel density estimation method for linear features in network space. *Acta Geodaetica et Cartographica Sinica*, 46(1), 107-113. (Corresponding author). <https://doi.org/10.11947/j.AGCS.2017.20150158>
 44. Tang L., Duan Q., **Kan, Z.** et al., 2017. Study on identification and space-time distribution analysis of taxi shift behavior. *ISPRS Journal of Geo-Information Science*, 19(2), 167-175. <https://doi.org/10.3724/SP.J.1047.2017.00167>
 45. Tang L., Jin C., Yang X., **Kan. Z.** et al., 2017. Road network topology automatic change detection based on GPS spatio-temporal trajectories. *Geomatics and Information Science of Wuhan University*, 42(10), 1381-1386. <https://doi.org/10.13203/j.whugis20150662>
 46. Tang, L., **Kan, Z.***, Zhang, X., et al., 2016. A network kernel density estimation for linear features in space-time analysis of big trace data. *International Journal of Geographical Information Science*, 30(9), 1717-1737. (Corresponding author). <https://doi.org/10.1080/13658816.2015.1119279>
 47. Tang, L., **Kan, Z.***, Huang, F., et al., 2016. Travel time detection at intersection from taxis' trace data. *Geomatics and Information Science of Wuhan University*, 41(1), 136-142. (Corresponding author). <https://doi.org/10.13203/j.whugis20130822>
 48. Liu, H., **Kan, Z.***, Sun, F., et al., 2016. Taxis' short-term out-of-service behaviors detection using big trace data. *Geomatics and Information Science of Wuhan University*, 41(9), 1192-1198. (Corresponding author). <https://doi.org/10.13203/j.whugis20150569>
 49. Liu, H., **Kan, Z.**, Wu, H. et al., 2016. Vehicles' refueling activity modeling and space-time distribution analysis. *Bulletin of Surveying and Mapping*, 9, 29-34. <https://doi.org/10.13474/j.cnki.11-2246.2016.0286>
 50. Tang, L., Yang, X., **Kan, Z.** et al., 2016. Traffic lane numbers detection based on the naive Bayesian classification. *China Journal of Highway and Transport*, 29(3), 116-123. <https://doi.org/10.3969/j.issn.1001-7372.2016.03.015>
 51. Tang L., Liu Z., Yang X., **Kan Z.** et al., 2016. A method of spatio-temporal trajectory fusion and road network generation based on cognitive law. *Acta Geodaetica et Cartographica Sinica*, 44(11), p.1271. <https://doi.org/10.11947/j.AGCS.2015.20140591>

52. Tang, L., **Kan, Z.***, Zhang, X., et al., 2016. Travel time estimation at intersections based on low-frequency spatial-temporal GPS trajectory big data. *Cartography and Geographic Information Science*, 43(5), 417-426. (Corresponding author). <https://doi.org/10.1080/15230406.2015.1130649>
53. Tang, L., Yang, X., **Kan, Z.** et al., 2015. Lane-level road information mining from vehicle GPS trajectories based on naïve Bayesian classification. *ISPRS International Journal of Geo-Information*, 4(4), 2660-2680. <https://doi.org/10.3390/ijgi4042660>
54. Huang L., **Kan, Z.** and Li D., 2015. Design and realization of 3d electronic map based on time and space base state correction. *Geospatial Information*, 34(1), 311-315. <https://doi.org/10.3969/j.issn.1672-4623.2015.01.055>
55. Tang, L., Zhang, X., **Kan, Z.**, Yang, B. and Li, Q., 2014. Spatial data Internet progressive transmission control based on the geometric shapes similarity. *International Journal of Control, Automation and Systems*, 12(5), 1110-1117. (Corresponding author). <https://doi.org/10.1007/s12555-012-0484-4>
56. Wang, Z., **Kan, Z.***, Hong, J., et al., 2014. Path optimization based on city intersection turning analysis from floating car data. *Applied Mechanics and Materials*, 577, 1055-1060. Trans Tech Publications. (Corresponding author). <https://doi.org/10.4028/www.scientific.net/AMM.577.1055>

PROJECTS

2024-2026. Sensing “flow patterns of activities” in urban road networks. Young Scientists Fund. National Natural Science Foundation of China. **PI.**

2023-2024. Investigating the impacts of the living environment of aged buildings on older residents’ out-of-home activities. Direct Grant. The Chinese University of Hong Kong. **PI.**

2022-2025. Start-up fund of The Chinese University of Hong Kong. **PI.**

2020-2022. The Exposome and Gene-environment Interactions, RGC Postdoctoral Fellowship Scheme. **PI.**

2023-2024. Vehicle detection and vehicle-kilometrage estimation based on remote sensing technologies." Smart Traffic Fund, Hong Kong Productivity Council and Transport Department. **Co-I.**

2023-2026. Intelligent portrait of urban pedestrian road network based on multi-modal spatio-temporal big data. National Natural Science Foundation of China. **Co-I.**

2020-2023. Multi-scale crowdsourcing perception method for urban space based on spatio-temporal big data. National Natural Science Foundation of China. **Co-I.**

TEACHING

Fundamental Statistics for Geographers (GRMD 2102)

Statistical Applications in Geography (GRMD 5110)

Big Data Analysis and Application (GRMD 4502)

Smart City and Governance (GRMD 4503)

Research Seminar (GRMD 5001- 5002. 2022-2023)

PRESENTATIONS

2023. **Guest Speaker.** Geospatial data analysis methods for estimating urban traffic emissions. CUHK-Exeter ENSURE Mini-Symposium on global food, water, and environmental sustainability. The Chinese University of Hong Kong.
2023. **Panelist.** How individual mobility affects COVID-19 risk exposure: A study using a spatial network framework. Center of Geographic Analysis (CGA) Conference, Harvard University.
2023. **Guest Speaker.** Sensing urban flows based on geospatial analytical techniques. *State key laboratory of information engineering in surveying mapping and remote sensing*, Wuhan University.
2023. **Guest Speaker.** Exploring Human-Environment Interactions for Sustainable City Development: A Geospatial Data Analytical Approach. *Department of Geography*, National University of Singapore.
2021. **Guest Speaker.** Research on the space-time pattern of COVID-19 transmission and associated built environment characteristics in Hong Kong. *Institute of Space and Earth Information Science (ISEIS) Seminar*. The Chinese University of Hong Kong
2021. Exploring the Space-Time Patterns of COVID-19 Transmission Risk and Their Associations with Different Built Environment Factors in Hong Kong. *Annual Meeting of American Association of Geographers (Online)*, Seattle, WA. 2021
2019. Traffic Congestion Analysis at the Turn Level Using Taxis' GPS Trajectory Data. *International Conference on Urban Informatics*, Hong Kong Polytechnic University, Hong Kong. 2019
2018. Estimating and Visualizing Vehicles' Fuel Consumption/ Emissions from GPS Trace Big Data Based on Activity Analysis. *Annual Meeting of American Association of Geographers*, New Orleans, LA. 2018
2017. Identify Refueling/Fuel Consumption and Estimating Emissions by Spatial-Temporal GIS. *Conference of Asia GIS*, Hong Kong University, Hong Kong. 2017
2016. A Space-Time Path Supported Approaches for Fuel Consumption/Emissions Estimation. *Annual Meeting of Theories and Methods of Geographic Information Science*. Shenzhen, China. 2016

PROFESSIONAL SERVICES

Guest Editor:

Special Issue "Geospatial Data and Methods for Sustainable Mobility and Urban Accessibility" in *Sustainability*.

Manuscript Reviewer:

Geographical Analysis, Travel Behavior and Society, International Journal of

Geographical Information Science, Cartography and Geographic Information Science, Transportation Research Part C: Emerging Technologies, PLOS One, Transactions in GIS, Applied Geography, Journal of Transport Geography, Future Generation Computer Systems, IEEE Access, IEEE Transactions on Intelligent Transportation Systems, IEEE Transactions on Computational Social Systems, Journal of Intelligent Transportation Systems: Technology, Planning, and Operations, Physica A: Statistical Mechanics and its Applications, Science of the Total Environment, Atmosphere

Conference Session:

1. **Chair.** Symposium on Geospatial Approaches to Pressing Grand Challenges: Global Pandemics, Climate Change, and Food Security: Characterizing the Impact from the COVID-19 Global Pandemic. *Annual Meeting of American Association of Geographers*, March 2023, Denver.
2. **Organizer**, Mobile Sensing and Spatiotemporal Analysis of Human Behavior and Environmental Health, *Annual Meeting of American Association of Geographers (Online)*, February 2022, New York.
3. **Chair**, Spatial Context, Human Activities and Space-Time Transmission of COVID-19, *Annual Meeting of American Association of Geographers (Online)*, April 2021, Seattle, WA.
4. **Organizer**, Spatializing Social Injustice, *Annual Meeting of American Association of Geographers (Online)*, April 2021, Seattle, WA.
5. **Session Convener**, Spatiotemporal Behavior and Environmental Health Perception, *16th Space Behavior and Planning Research Conference (Online)*, December 2020, Xiamen, China.