HUANFA CHEN

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EDUCATION

Doctor of Philosophy | *Geographic Information Science* Sep 2014 – Feb 2019
University College London London, UK

Master of Science | *Geographic Information Systems and Cartography* Sep 2011 – July 2014
Peking University Beijing, China

Bachelor of Science | *Chemistry* Sep 2007 – July 2011
Peking University Beijing, China

WORK EXPERIENCE

Associate Professor in Spatial Data Science Oct 2023 –
Centre for Advanced Spatial Analysis, UCL London, UK
- Lecture in postgraduate modules and supervise MSc and PhD projects
- Deputy Department Tutor (since 2020)

Lecturer in Spatial Data Science Oct 2020 – Oct 2023
Centre for Advanced Spatial Analysis, UCL London, UK
- Lecture in postgraduate modules and supervise MSc and PhD projects

Teaching Fellow in Spatial Data Science Feb 2019 – Oct 2020
Centre for Advanced Spatial Analysis, UCL London, UK

Guest Lecturer Jan 2019 –
School of Architecture and Cities, University of Westminster London, UK
- Lecture in GIS and spatial analysis

Teaching assistant Oct 2014 – Jan 2019
Department of Civil, Environmental and Geomatic Engineering London, UK
- Lectured in "Agent-Based Simulation" as part of the Msc Course Spatio-Temporal Data Mining
- Led tutorials in R/Python/NetLogo

Research assistant Oct 2015 – Jan 2019
Department of Civil, Environmental and Geomatic Engineering London, UK
- Member of the EPSRC-funded project 'Crime, Policing and Citizenship'
- Developed algorithms for predicting spatio-temporal crime hot-spots and dashboards

RESEARCH INTERESTS

Spatial optimisation
- Developing new models and algorithms for location selection, location-allocation analysis, routing, regionalization problems

GeoAI
- Developing data-driven GeoAI models
- with applications in crime prediction and transport flow prediction

Urban mobility
- Applying econometrics and machine learning models to understand travel mode and purpose in urban contexts

Health GIS
- Using GIS methods to understand the spatio-temporal patterns of infectious disease (e.g. Covid-19)
- Evaluating the performance of control measures (e.g. the varination of vaccination uptake rate and its socio-economic determinants)

Refereed journals

1. Huanfa Chen, Xiaowei Gao, Huanhuan Li, and Zaili Yang, A framework for the optimal deployment of police drones based on street-level crime risk, Applied Geography **162**, 103178 (2024).
2. Tao Cheng and Huanfa Chen, Special issue on "multi-scale and multimodal human mobility: pre, peri and post COVID-19 pandemic", Geo-spatial Information Science **26**, 599–602 (2023), publisher: Taylor & Francis _eprint: https://doi.org/10.1080/10095020.2023.2293370.
3. Gezhi Xiu and Huanfa Chen, Unravelling the variations of the society of England and Wales through diffusion mapping analysis of census 2011, Journal of The Royal Society Interface **20**, 20230081 (2023), publisher: Royal Society.
4. Huanfa Chen, Yanjia Cao, Lingru Feng, Qunshan Zhao, and José Rafael Verduzco Torres, Understanding the spatial heterogeneity of COVID-19 vaccination uptake in England, BMC Public Health **23**, 895 (2023).
5. Xiaowei Gao, Huanfa Chen, and James Haworth, A spatiotemporal analysis of the impact of lockdown and coronavirus on London's bicycle hire scheme: from response to recovery to a new normal, Geo-spatial Information Science **0**, 1–21 (2023), publisher: Taylor & Francis _eprint: https://doi.org/10.1080/10095020.2023.2233570.
6. Honghan Bei, Huanfa Chen, Lin Li, Xiaowei Gao, Yutong Xia, and Yutong Sun, Joint prediction of travel mode choice and purpose from travel surveys: A multitask deep learning approach, Travel Behaviour and Society **33**, 100625 (2023).
7. Huanfa Chen and Yan Cheng, Travel Mode Choice Prediction Using Imbalanced Machine Learning, IEEE Transactions on Intelligent Transportation Systems , 1–14 (2023).
8. Tongxin Chen, Di Zhu, Tao Cheng, Xiaowei Gao, and Huanfa Chen, Sensing dynamic human activity zones using geo-tagged big data in Greater London, UK during the COVID-19 pandemic, PLOS ONE **18**, e0277913 (2023).
9. Yutong Xia, Huanfa Chen*, and Roger Zimmermann, A Random Effect Bayesian Neural Network (RE-BNN) for travel mode choice analysis across multiple regions, Travel Behaviour and Society **30**, 118–134 (2023).
10. Yutong Xia, Huanfa Chen, Chengchao Zuo, and Nan Zhang, The impact of traffic on equality of urban healthcare service accessibility: A case study in Wuhan, China, Sustainable Cities and Society **86**, 104130 (2022).
11. Huanfa Chen, Alan T. Murray, and Rui Jiang, Open-source approaches for location cover models: capabilities and efficiency, Journal of Geographical Systems **23**, 361–380 (2021).
12. Huanfa Chen, Tao Cheng, and Xinyue Ye, Designing efficient and balanced police patrol districts on an urban street network, International Journal of Geographical Information Science **33**, 269–290 (2019).
13. Huanfa Chen, Tao Cheng, and John Shawe-Taylor, A Balanced Route Design for Min-Max Multiple-Depot Rural Postman Problem (MMMDRPP): a police patrolling case, International Journal of Geographical Information Science **32**, 169–190 (2018).
14. Huanfa Chen, Tao Cheng, and Sarah Wise, Developing an online cooperative police patrol routing strategy, Computers, Environment and Urban Systems **62**, 19–29 (2017).
15. Nilufer Sari Aslam, Mohamed R. Ibrahim, Tao Cheng, Huanfa Chen, and Yang Zhang, ActivityNET: Neural networks to predict public transport trip purposes from individual smart card data and POIs, Geo-spatial Information Science , 1–11 (2021).
16. Yibin Ren, Huanfa Chen, Yong Han, Tao Cheng, Yang Zhang, and Ge Chen, A hybrid integrated deep learning model for the prediction of citywide spatio-temporal flow volumes, International Journal of Geographical Information Science **34**, 802–823 (2020).
17. Yuerong Zhang, Stephen Marshall, Mengqiu Cao, Ed Manley, and Huanfa Chen, Discovering the evolution of urban structure using smart card data: The case of London, Cities **112**, 103157 (2021).
18. Jianan Li, Yu Lu, Huanfa Chen, Duan Zheng, Qinlin Yang, and Luiza C. Campos, Synthetic musks in the natural environment: Sources, occurrence, concentration, and fate-A review of recent developments (2010–2023), Science of The Total Environment **922**, 171344 (2024).

19. Yan Qiao, Huanfa Chen, Yiyang Lin, and Jianbin Huang, Controllable synthesis of water-soluble gold nanoparticles and their applications in electrocatalysis and surface-enhanced raman scattering, Langmuir **27**, 11090–11097 (2011).
20. Yan Qiao, Huanfa Chen, Yiyang Lin, Zhiyi Yang, Xinhao Cheng, and Jianbin Huang, Photoluminescent lanthanide-doped silica nanotubes: Sol-Gel transcription from functional template, Journal of Physical Chemistry C **115**, 7323–7330 (2011).
21. Yan Qiao, Yiyang Lin, Zhiyi Yang, Huanfa Chen, Shaofei Zhang, Yun Yan, and Jianbin Huang, Unique temperature-dependent supramolecular self-assembly: From hierarchical 1D nanostructures to super hydrogel, Journal of Physical Chemistry B **114**, 11725–11730 (2010).

Book chapters

1. Huanfa Chen and Alan T. Murray, Open-source approaches for location coverage modelling, in *Open Source Geospatial Science for Urban Studies. Lecture Notes in Intelligent Transportation and Infrastructure.*, edited by Amin Mobasheri (Springer, Cham, 2021) pp. 117–129.

Conference proceedings

1. Nick Bearman, Rongbo Xu, Patrick J. Roddy, James D. Gaboardi, Qunshan Zhao, Huanfa Chen, and Levi Wolf, Developing capacitated p-median location-allocation model in the spopt library to allow UCL student teacher placements using public transport, AGILE: GIScience Series **4**, 1–7 (2023), publisher: Copernicus GmbH.
2. Huanfa Chen and Yang Zhou, Forecasting high-street footfall in real time, in *Proceedings of Geographical Information Science Research - UK 2020* (Online, 2020).
3. Huanfa Chen, Yang Zhang, and Tao Cheng, Locating stations in bike-sharing service: a special maximal covering location problem, in *Proceedings of Geographical Information Science Research - UK 2019* (Newcastle, UK, 2019).
4. Huanfa Chen and Tao Cheng, Modelling Police Patrol Routing as Min-Max Postmen Problems, in *Proceedings of Geographical Information Science Research - UK 2017* (Manchester, UK, 2017).
5. Huanfa Chen and Tao Cheng, Designing police patrol districts on street network, in *Proceedings of the 14th International Conference of GeoComputation* (Leeds, UK, 2017).
6. Yajie Zhu, Qi Li, and Huanfa Chen, System Design of a Simulation System for Hazardous Chemicals Leakage, in *Proceedings of the 12th International Conference of GeoComputation* (Wuhan, China, 2013).
7. Huanfa Chen, Qi Li, Yajie Zhu, and Hamed Karimian, Research of 3D simulation system for chemical accidents based on atmospheric dispersion model, in *Proceedings of International Conference on Earth Science and Environmental Protection 2013* (Kunming, China, 2013).
8. Hamed Karimian, Qi Li, and Huanfa Chen, Correlation between AOD and Pm2.5 over Tehran Iran, in *Proceedings of International Conference on Earth Science and Environmental Protection 2013* (Kunming, China, 2013).

Project reports

1. Tao Cheng, Kate Bowers, Paul Longley, John Shawe-Taylor, Toby Davies, Gabriel Rosser, Sarah Wise, Chris Gale, Monsuru Adepeju, Jianan Shen, Huanfa Chen, Dawn Williams, Kira Kempińska, and Artemis Skarlatidou, *CPC: Crime, Policing and Citizenship – Intelligent policing and big data*, Tech. Rep. (UCL SpaceTimeLab, London, 2016).

Software

Other significant publications

RESEARCH SUPERVISION

1. University College London, UK, 2019 -

    (a) PhD/EngD students (As co-subsidiary supervisors)

    i. Xiaowei Gao (PhD Geographical Information Science, 2020 –) (Passed upgrade in 2022, expected to complete in 2024)
- Research topic: Spatio-temporal analytics of cycling mobility

    ii. Meihui Wang (PhD Geographical Information Science, 2020 –) (Passed upgrade in 2022, expected to complete in 2024)
- Research topic: Urban analytics based on street-view imagery

    iii. Chukun Gao (PhD Geographical Information Science, 2022 –)
- Research topic: Improving traffic simulations by incorporating heterogeneity into simulated agent

(b) Master students (Up to August 2023, supervised 39 MSc and 1 MRes students.) Selected MSc/MRes projects as below

    i. Lingru Feng (MSc Spatial Data Science and Visualisation, 2020 – 2021)
- Thesis: Comparing Floating Catchment Area Methods for Measuring Spatial Accessibility to COVID-19 Vaccination Service in England

    ii. Chenxi Zhao (MSc Spatial Data Science and Visualisation, 2020 – 2021)
- Thesis: The relationship between covid-19 and socio-demographic in London: the three lockdowns in 2020

    iii. Huaming Yan (MSc Spatial Data Science and Visualisation, 2020 – 2021)
- Thesis: Using spatial analysis to measure the fire incidents response time in Greater London

    iv. Yutong Xia (MSc Smart Cities and Urban Analytics, 2020 – 2021)
- Thesis: A Random Effect Bayesian Neural Network (RE-BNN) for Choice Analysis: Predicting Travel Mode Choice Across Multiple Regions

    v. Yixin Huang (MSc Smart Cities and Urban Analytics, 2020 – 2021)
- Thesis: Research on spatial accessibility and spatial inequality of vaccination sites in England

    vi. Xiaohan Feng (MSc Spatial Data Science and Visualisation, 2020 – 2021)
- Thesis: Decomposition Analysis of Index of Multiple Deprivation (IMD) Based on Shapley Value

    vii. Xiaomei Ge (MSc Smart Cities and Urban Analytics, 2019 – 2020)
- Thesis: Looking into home sharing platforms and their influence on local inequality and insecurity: a case study of London

    viii. Chuyin Deng (MSc Spatial Data Science and Visualisation, 2019 – 2020)
- Thesis: Exploring the influential factors of cases growth of COVID-19 with machine learning techniques

    ix. Zhenzhi Zhang (MSc Spatial Data Science and Visualisation, 2019 – 2020)
- Thesis: Understanding public confidence towards NHS by ordered logistics regression based on survey results

    x. Xiang Zhou (MSc Spatial Data Science and Visualisation, 2019 – 2020)
- Thesis: Solving vehicle routing problems in supply chain using genetic algorithms: a case study in Shanghai

    xi. Yu Fu (MSc Spatial Data Science and Visualisation, 2019 – 2020)
- Thesis: A real-time forecast of electricity consumption in residential buildings using machine learning approaches

    xii. Thomas Keel (MSc Spatial Data Science and Visualisation, 2018 – 2019)
- Thesis: Can we predict why people travel within a city? A cast study in Montreal, Canada

    xiii. Yang Zhou (MSc Smart Cities and Urban Analytics, 2018 – 2019)

- Thesis: Retail centre footfall: planning and forecasting using time series modelling
xiv. Yafei Ye (MRes Spatial Data Science and Visualisation, 2018 – 2019)
- Thesis: Understanding residents' attitudes towards services and safety issues by geodemographics based on city survey results
xv. Yunong Wang (MSc Spatial Data Science and Visualisation, 2018 – 2019)
- Thesis: Optimal siting and sizing of electric vehicle charging points: a case study in London
xvi. Maria del pilar Mayora (MSc Smart Cities and Urban Analytics, 2018 – 2019)
- Thesis: An environmental bicycle level of service index for the Buenos Aires cycle network
xvii. Ziyi Cheng (MSc Smart Cities and Urban Analytics, 2018 – 2019)
- Thesis: Exploring the spatial accessibility to green space in the Greater London area

CONFERENCES AND PRESENTATIONS

Invited Presentations

Geospatial machine learning: motivations and implications May 2020
Tianjin University [Online]

Machine learning for urban analytics and transport studies March 2021
Chinese Academy of Surveying and Mapping [Online]

GRANTS

GASPARI – GPU Accelerated Spatial AI Research Infrastructure (as Co-I) 2023
£80,518 support from Research Capital Investment Fund University College London, UK

HONORS AND AWARDS

UCL Q-Step Internship Programme 2021
£3,000 Support for supervising the 6-week internship project UCL, UK
- Title: Evaluating and Comparing accessibility to Covid-19 vaccination services across different countries

2019 AAG Applied Geography Specialty Group Project Development Award 2019
$500 Support for the research project: Uncovering the underlying demand of sharing bicycles in urban areas US

2019 AAG Applied Geography Specialty Group Travel Award 2019
$250 Support for attending the AAG annual event US

Roger Tomlinson Prize 2018
Recognition for the best PhD thesis submitted to UCL which relates to the development of GIS UCL, UK

Finalist of EPSRC Connected Nation Pioneers Award 2018
Recognition as one of 16 finalists of all UK PhD students due to pioneering research UK

Future Star Award in Shanghai Open Data Apps Competition 2017
Team leader and algorithm designer Shanghai, China
- Project title: Planning Docking Stations and Optimising Operations in Sharing Bicycle Management

Travel Fund for Early-Career Researchers 2017
Receive €300 to attend a three-day Workshop Leiden University, Netherlands
- Workshop on 'Movement: New Sensors, New Data, New Challenges'

UCL-CSC Joint Research Scholarship 2014 – 2018
Full PhD scholarship, including tuition fees and expenses. UCL, UK

Excellent Prize in 2015 ISPRS-Scientific Initiative Open Data Challenge 2015
Top 10/100 teams due to outstanding algorithm performance Shenzhen, China

| **Honourable Mention for Best Young Researcher Paper** | 2015 |
| Receiving $500 in the first International Symposium on Spatiotemporal Computing | Fairfax, US |

| **China National Petroleum Corporation Scholarship in Peking University** | 2010 |
| Receiving ¥5,000 due to outstanding academic performance as top 10/150 students | Beijing, China |

| **Merit Student Awards in Peking University** | 2008 |
| Awarded due to outstanding overall performance as top 20/150 students | Beijing, China |

TEACHING EXPERIENCE

| **CASA0007: Quantitative Methods** | 2019 – |
| Teaching mathematical techniques for describing cities and geographies | UCL |

| **CASA0013: Introduction to Programming for Spatial Analysts** | 2019 – |
| Hands-on Python course, covering pandas/geopandas/matplotlib/sklearn | UCL |

| **CASA0006: Data Science for Spatial Systems** | 2019 – |
| Statistical & machine-learning methods for spatial analysis | UCL |

| **CASA0009: Spatial Data Capture, Storage, & Analysis** | 2019 – |
| Various topics including MySQL, Javascript, web applications | UCL |

| **CASA0011: Agent Based Modelling for Spatial Systems** | 2021 – |
| Spatially-explicit agent-based models using NetLogo | UCL |

| **CEGE0076: Spatio-Temporal Data Mining** | 2015 – 2021 |
| Leading tutorials of spatio-temporal analytics using R & NetLogo | UCL |

| **CEGE0082: GIS Principles and Technology** | 2016 – 2017 |
| Leading tutorials of ArcGIS analysis | UCL |

PROFESSIONAL ACTIVITIES

Professional Membership

| **Member, the American Association of Geographers** | 2015 – |

Professional Service

| **Board Member, the Chinese Professionals in Geographic Information Sciences** | 2021 – |

| **General Secretary, Peking University Alumni Association in UK** | 2016 – 2018 |
| Coordinating 20-person committee and organising 150-person annual meetings. | UK |

| **President, London PhD Network** | 2016 – |
| Hosting quarterly academic conferences and monthly seminars | UK |

EDITORSHIP

| **Associate Editor, Annals of GIS** | 2023 – |

| **Editor Board Member, Humanities and Social Sciences Communications** | 2022 – |

| **Guest Editor on Covid-19 Impact on Human Mobility** | 2021 – 2022 |
| Geo-spatial Information Science | |

REFEREE

Journal

International Journal of Geographic Information Science 2015 –

Computers, Environments, and Urban Systems 2018 –

Transportation Research Part C: Emerging Technologies 2019 –

Journal of Homeland Security and Emergency Management 2022 –

SKILLS

Languages: Mandarin (Native), English (Fluent), Cantonese (Fluent), Teochew (Native)
Programming: Python, R, Java, C++, Linux Bash
Applications: Esri ArcGIS, Microsoft Office Suite, LaTex, Markdown
Interests: badminton, travel, reading, blogging