Martin Fleischmann

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EDUCATION

Ph.D. Architecture, University of Strathclyde, Glasgow, 2021
The Urban Atlas: Methodological Foundation of a Morphometric Taxonomy of Urban Form

MSc. Urban Design, University of Strathclyde, Glasgow, 2017
Measuring Urban Form: A Systematisation of Attributes for Quantitative Urban Morphology

BSc. Architecture and Urbanism, Czech Technical University, Prague, 2015

ACADEMIC APPOINTMENTS

2024– Charles University in Prague
Research Associate, Department of Social Geography and Regional Development
Urban and Regional Laboratory
Research Team on Urban Structure

2023-24 The Alan Turing Institute
Postdoctoral Research Associate
Urban Analytics programme

2022-23 Charles University in Prague
Postdoctoral Researcher, Department of Social Geography and Regional Development
Urban and Regional Laboratory

2020–22 University of Liverpool
Research Associate, Department of Geography and Planning
"Learning an urban grammar from satellite data through AI."
Economic and Social Research Council & Alan Turing Institute

HONORARY APPOINTMENTS

2022– University of Liverpool
Fellow, Department of Geography and Planning

PROFESSIONAL APPOINTMENTS

2022–23 UrbanDataLab AG
Head of Data and Analytics

PUBLICATIONS

Journal Articles

2026 Fleischmann, M., Vybornova, A., Gaboardi J., Brázdová, A., and Dančejová, D., 'Adaptive continuity-preserving simplification of street networks' *Computers, Environment and Urban Systems* 123, 102354 doi:10.1016/j.compenvurbsys.2025.102354

2025 Araldi, A., Fleischmann, M., Fusco, G. and Novotný, M., 'Streetscape morphometrics: Expanding momepy to analyze urban form from the street point of view' *Software X* 31, 102242 doi:10.1016/j.softx.2025.102242

2024 Fleischmann, M. and Arribas-Bel, D., 'Decoding (urban) form and function using spatially explicit deep learning' *Computers, Environment and Urban Systems* 112, 102147 doi:10.1016/j.compenvurbsys.2024.102147

2024 Fleischmann, M., and Vybornova, A., 'A shape-based heuristic for the detection of urban block artifacts in street networks' *Journal of Spatial Information Science* 28. doi:10.5311/JOSIS.2024.28.319

2023 Calafiore, A., Samardzhiev, K., Rowe, F., Fleischmann, M., and Arribas-Bel, D., 'Inequalities in experiencing urban functions. An exploration of human digital (geo-)footprints' *Environment and Planning B: Urban Analytics and City Science* 0 (0). doi:10.1177/23998083231208507

2023 Fleischmann, M. 'Clustergram: Visualization and diagnostics for cluster analysis'. *Journal of Open Source Software* 8 (89), 5240. doi:10.21105/joss.05240

2023 Wang, J., Fleischmann, M., Venerandi, A., Romice, O., Kuffer, M., and Porta, S. 'EO + Morphometrics: Understanding cities through urban morphology at large scale' *Landscape and Urban Planning*, 233. doi:10.1016/j.landurbplan.2023.104691

2022 Rowe, F., Calafiore, A., Arribas-Bel, D., Samardzhiev, K., and Fleischmann, M. 'Urban exodus? Understanding human mobility in Britain during the COVID-19 pandemic using Meta-Facebook data' *Population, Space and Place*, e2637. doi:10.1002/psp.2637

2022 Arribas-Bel, D. and Fleischmann, M. 'Spatial Signatures: Understanding (urban) spaces through form and function' *Habitat International*, 128, (102641). doi:10.1016/j.habitatint.2022.102641

2022 Fleischmann, M. and Arribas-Bel, D. 'Geographical characterisation of British urban form and function using the spatial signatures framework' *Scientific Data*, 9, (546). doi:10.1038/s41597-022-01640-8

2022 Venerandi, A., Feliciotti, A., Fleischmann, M., Kourtit, K., Porta, S.'Urban form character and Airbnb in Amsterdam *NL*: A morphometric approach' *Environment and Planning B: Urban Analytics and City Science* 50 (2), 386-400. doi:10.1177/23998083221115196

2022 Samardzhiev, K., Fleischmann, M., Arribas-Bel, D., Calafiore, A., Rowe, F. 'Functional Signatures in Great Britain: A dataset.' *Data in Brief*, 108335, doi:10.1016/j.dib.2022.108335

2022 Singleton, A., Arribas-Bel, D., Murray, J., and Fleischmann, M. 'Estimating generalized measures of local neighbourhood context from multispectral satellite images using a convolutional neural network.' *Computers, Environment and Urban Systems*, 95, 101802. doi:10.1016/j.compenvurbsys.2022.101802

2021 Fleischmann, M., Feliciotti, A., Romice, O. and Porta, S. 'Methodological Foundation of a Numerical Taxonomy of Urban Form.' *Environment and Planning B: Urban Analytics and City Science* 49 (4), 1283-1299. doi:10.1177/23998083211059835

2021 Fleischmann, M., Feliciotti, A. and Kerr, W. 'Evolution of urban patterns: urban morphology as an open reproducible data science.' *Geographical Analysis* 54 (3). doi:10.1111/gean.12302

2020 Dal Cin, F., Fleischmann, M., Romice, O. and Costa, J.P. 'Climate Adaptation Plans in the Context of Coastal Settlements: The Case of Portugal.' *Sustainability* 12 (20). doi:10.3390/su12208559

2020 Fleischmann, M., Romice, O. and Porta, S. 'Measuring urban form: overcoming terminological inconsistencies for a quantitative and comprehensive morphologic analysis of cities.' *Environment and Planning B: Urban Analytics and City Science* 48 (8), 2133-2150. doi:10.1177/2399808320910444

2020 Fleischmann, M., Feliciotti, A., Romice, O. and Porta, S. 'Morphological tessellation as a way of partitioning space: Improving consistency in urban morphology at the plot scale' *Computers, Environment and Urban Systems* 80, 101441. doi:10.1016/j.compenvurbsys.2019.101441

2019 Fleischmann, M. 'momepy: Urban Morphology Measuring Toolkit' *Journal of Open Source Software* 4 (43), 1807. doi:10.21105/joss.01807

Conference Papers

2025 Brázdová, A, Winkler, L. and Fleischmann, M. 'Spatial modelling of the relationship between the urban form and population data' *Proceedings of 33rd GISRUK Conference 2025*, Bristol. doi:10.5281/zenodo.15230425

2025 Fleischmann, M. Vybornova, A., Gaboardi, J., Brázdová, A. and Dančejová, D. 'Adaptive continuity-preserving simplification of street networks' *Proceedings of 33rd GISRUK Conference 2025*, Bristol. doi:10.5281/zenodo.15229590

2025 Fleischmann, M. and *Samardzhiev, K.* 'Understanding Urban Form - Hierarchical Morphotope Classification based on Gradually Loosening Spatial Restrictions' *Proceedings of 33rd GISRUK Conference 2025*, Bristol. doi:10.5281/zenodo.15124646

2022 Fleischmann, M. and Arribas-Bel, D. 'Using deep learning to identify (urban) form and function in satellite imagery - the case of Great Britain.' *Proceedings of 30th GISRUK Conference 2022*, Liverpool.

2022 Fleischmann, M., Romice, O. and Porta, S. 'Applicability of morphological tessellation and its topological derivatives in the quantitative analysis of urban form' *Cities as Assemblages, Proceedings of XXVI International Seminar on Urban Form, volume 3*. Nicosia. doi:10.36158/978889295357413

Commentaries

2024 Fleischmann, M. and Arribas-Bel, D. 'In praise of (spatial) bundles', *Environment and Planning B: Urban Analytics and City Science* 51 (1), 3-6 doi:10.1177/23998083231224151

Reports and Other publications

2022 Feliciotti, A., Fleischmann, M., eds. 'ISUF Annual Conference Proceedings of the XXVII International Seminar on Urban Form:" Urban Form and the Sustainable and Prosperous City"'. University of Strathclyde Publishing, Glasgow, ISBN 9781914241161. doi:10.17868/80146

2022 Rowe, F., Arribas-Bel, D., Calafiore, A., MacDonald, J., Samardzhiev, K., Fleischmann, M., 'Mobility data in urban science. Workshop report'. The Alan Turing Institute. London, United Kingdom.

2021 Fleischmann, M. 'Policy Brief: Flexibilita prostorového uspořádání města' (Flexibility of the spatial configuration of the city) *Územně analytické podklady hl. m. Prahy*. Institute for Planning and Development, Prague, Czechia

2021 Darlington-Pollock, F., Arribas-Bel, D., Fleischman, M., Newsham, N., Rowe, F. 'Policy Brief: What do 'left behind' areas look like over time? Developing place-based typologies of left behind areas'. Local Trust, UK

2020 Places Platform, Smart Growth America, UDSU. 'Welcome to the Future of Grand Rapids: Assessing Place-Based Economic, Social Equity, and Public Health Performance'. Downtown Grand Rapids Inc., US

2018 Fleischmann, M. 'Measuring Urban Form' *URBAN DESIGN* 146 (Spring 2018), 6-7.

RESEARCH SOFTWARE DEVELOPMENT

2023– geodatasets: spatial data examples. (author and maintainer)

2022– Xvec: vector data cubes for Xarray. (author and maintainer)

2021– xyzservices: source of XYZ tiles providers. (author and maintainer)

2020– clustergram: visualization and diagnostics for cluster analysis (author and maintainer)

2020– PySAL: Python Spatial Analysis Library (core developer)

2019– GeoPandas: an open source project to make working with geospatial data in python easier (core developer)

2018– momepy: Urban Morphology Measuring Toolkit (author and maintainer)

EDITORIAL APPOINTMENTS

2025–26 Computers, Environment and Urban Systems
Guest Editor of a Special Issue on Open Urban Data Science

2021– Journal of Open Source Software
Associate Editor

HONORS AND AWARDS

2024 Dean's Award for Early Career Researcher
Faculty of Science, Charles University

2023 Michael Breheny Prize
Environment and Planning B: Urban Analytics and City Science

RESEARCH INCOME

Awards

2024 *European Space Agency* 'EuroFab: European Urban Fabric Classification Using Artificial Intelligence', €250,000

2023 *Primus Research Programme, Charles University* 'Influence of Socioeconomic and Cultural Factors on Urban Structure in Central Europe', €325,000

2023 *NumFOCUS* 'Create a more consistent geometry API through the feature parity between low-level (Shapely) and high-level (GeoPandas) packages', $8,000

2020 *NumFOCUS* 'Improvement and modernization of GeoPandas documentation', $5,000

2018 *University of Strathclyde* 'John Anderson Research Award', £60,000

INVITED TALKS AND KEYNOTES

Keynote speeches

2025 'Understanding the structure of space: urban morphometrics in the wild' International Land Use Symposium. Dresden, Germany. Nov 6

2024 'From a building to a region: Scalable morphology with urban morphometrics' International Seminar on Urban Morpho-Science. Nanjing, China. Oct 26

2024 'The emergent structure of cities' 4th UrbanMetaMapping conference 'City Transition'. Saarbrücken, Germany. Sep 12.

Seminars

2025 'Understanding the Structure of Space: Urban Morphometrics as a Backbone of uUrban Taxonomy' The Bartlett School of Planning, University College London, UK. Online. Nov 18.

2025 'Spatial data in the open' SODAS, University of Copenhagen, DK. Oct 31.

2025 'Open source inside out' IT University of Copenhagen, DK. Oct 30.

2025 'Open by Default' University College London, UK. Online. May 16.

2025 'Urban science as a software' University of California, Berkeley. USA. Online. April 15.

2023 'Open by Default' Oak Ridge National Laboratory, Oak Ridge. USA. Online. June 7.

2023 'Open by Default' University of California, Santa Barbara. USA. Online. June 2.

2023 'The emergent structure of urban form and function' Space Syntax Lab Seminars, UCL, London. Online. May 18.

2023 'Urban morphology drawn and seen' NEtwoRks, Data, and Society. IT University of Copenhagen. Denmark. Online. Apr 26.

2021 'Capturing the structure of cities with data science.' Spatial Data Science Conference 2021. Online. Oct 26.

2021 'Spatial Signatures: Dynamic classification of the built environment.' Spatial Analytics and Data seminar series by University of Newcastle and University of Bristol. Online. Mar 30.

2020 'Reading cities as numbers. Where data science meets urbanism.' Academy of Urbanism (Scotland). Online. Dec 3.

TEACHING

2024– Spatial Data Science in Python (online)
Charles University

2023– Spatial Data Science for Social Geography
Charles University

SUPERVISION

Postdoctoral researchers

2024– Krasen Samardzhiev

PhD

(* Primary)

2024– Anna Brázdová*

2024– Hugo Miroslav Majer

2024– Lisa Winkler (University of Freiburg)

Committee Member

2024– Matt Hiett (University of Illinois Urbana-Champaign)

Master

2025– Richard Janeček

2025– Zuzana Leopoldová

2025– Eliška Pospěchová

2025– Daniel Šafka

2025– Dominika Taubrová

Undergraduate

2025– Marek Novotný

2025– Tomáš Hanula

CONFERENCE ACTIVITY

Conferences Organized

2024 'Spatial Data Science across Languages' Prague, CZ. Sep 18 – Sep 19.

2021 'XXVIII International Seminar on Urban Form' Urban Form and the Sustainable Prosperous City. Glasgow (virtually), UK. Jun 29 – Jul 3.

Conference Papers Presented

Presenting author *italicized* if other than first author.

2025 Brázdová, A, Winkler, L. and Fleischmann, M. 'Spatial modelling of the relationship between the urban form and population data' GISRUK 2025, Bristol UK. Apr 22 – 25.

2025 Fleischmann, M. Vybornova, A., Gaboardi, J., Brázdová, A. and Dančejová, D. 'Adaptive continuity-preserving simplification of street networks' GISRUK 2025, Bristol UK. Apr 22 – 25.

2025 Fleischmann, M. and *Samardzhiev, K.* 'Understanding Urban Form - Hierarchical Morphotope Classification based on Gradually Loosening Spatial Restrictions' GISRUK 2025, Bristol UK. Apr 22 – 25.

2024 Araldi, A., Fleischmann, M. and Fusco, G. 'Urban Visibility Analysis: Integrating Street-level Protocols into the momepy Python Library' XXXI International Seminar on Urban Form: Future horizons for urban form. Sao Paulo. Sep 16–20.

2024 Fleischmann, M. 'GeoPandas 1.0 and beyond' EuroPython 2024, Prague, CZ, Jul 8–14.

2024 Fleischmann, M. and Van den Bossche, J. 'GeoPandas 1.0 and beyond' GeoPython 2024, Basel, CH, May 27–29.

2023 Arribas-Bel, D. and Fleischmann, M. 'Learning from Deep Learning: Lessons from using computer vision to identify (urban) form and function in open data satellite imagery.' AAG Annual Meeting. Denver, US Mar 23 – 26.

2023 Fleischmann, M. 'Vector data cubes as a bridge between raster and vector worlds.' GeoPython. Basel. Mar 6–8.

2022 Fleischmann, M. 'Learning from the "cool kids": how academic research can benefit from becoming more like open-source.' GeoPython. Basel. Jun 20–22.

2022 Fleischmann, M. and Arribas-Bel, D. 'Detecting urban typology from multispectral satellite imagery using neural networks.' ISUF Italy 2022, Bolgona/Virtual, IT. Jun 8 – 10.

2022 Fleischmann, M. and Arribas-Bel, D. 'Using deep learning to identify (urban) form and function in satellite imagery - the case of Great Britain.' GISRUK 2022, Liverpool UK. Apr 6 – 8.

2021 Fleischmann, M. and Arribas-Bel, D. 'Classifying urban form at a national scale: The case of Great Britain' XXVIII International Seminar on Urban Form: Urban Form and the Sustainable Prosperous City. Glasgow/Virtual. Jun 29 – Jul 3.

2021 Venerandi, A., *Feliciotti, A.*, Fleischmann, M., Kourtit, K., Romice, O., Nijkamp, P., Porta, S. and Fusco, G. 'Urban form and Airbnb: a study of their spatial relation in Amsterdam (NL)' XXVIII International Seminar on Urban Form: Urban Form and the Sustainable Prosperous City. Glasgow/Virtual. Jun 29 – Jul 3.

2021 Porta, S., *Venerandi, A.*, Feliciotti, A., Fleischmann, M. and Romice, O. 'A Numerical Taxonomy of Urban Form in London: an Urban Morphometric Approach' XXVIII International Seminar on Urban Form: Urban Form and the Sustainable Prosperous City. Glasgow/Virtual. Jun 29 – Jul 3.

2021 Wang, J., Fleischmann, M., Venerandi, A., Kuffer, M. and Porta, S. 'Earth Observation + Morphometrics: towards a systematic understanding of cities in challenging contexts' XXVIII International Seminar on Urban Form: Urban Form and the Sustainable Prosperous City. Glasgow/Virtual. Jun 29 – Jul 3.

2020 Fleischmann, M. 'On the morphological composition of cities and how to measure it.' GeoPython. Virtual. Sep 21–22.

2020 Fleischmann, M., Romice, O. and Porta, S. 'The Urban Atlas: Towards a Morphometric Taxonomy of Urban Form' XXVII International Seminar on Urban Form: Cities in the 21st

Century. Salt Lake City/Virtual. Sep 1–4.

2020 Hořák, D., Fleischmann, M., Romice, O. and Porta, S. 'Just like a bird. A community ecology perspective on urban form evolution' XXVII International Seminar on Urban Form: Cities in the 21st Century. Salt Lake City/Virtual. Sep 1–4.

2020 Feliciotti, A., Fleischmann, M., Romice, O., Kerr, W. and Porta, S. 'Morphological Resilience Evaluation (MoRE): a new assessment framework for multi-level assessment of urban form resilience' XXVII International Seminar on Urban Form: Cities in the 21st Century. Salt Lake City/Virtual. Sep 1–4.

2020 Dal Cin, F., Fleischmann, M., Romice, O. and Costa, J.P. 'DECODING SEASHORE STREETS: urban morphometrics as a tool for adaptation measures' XXVII International Seminar on Urban Form: Cities in the 21st Century. Salt Lake City/Virtual. Sep 1–4.

2020 Fleischmann, M., Dal Cin, F., Romice, O. and Barreiros Proença, S. 'Understanding seashore streets: urban morphometrics as a tool for climate-induced risk assessment' ISUF Italy International Conference: Urban Substrata and City Regeneration. Rome Feb 19–22.

2019 Feliciotti, A., Fleischmann, M., Romice, O., and Porta, S. 'Morphological Resilience: from a theory of resilient urban forms to the tools for its implementation' 12th CITTA International Conference on Planning Research: Spatial Planning for Change. Porto. Sep 19–20.

2019 Fleischmann, M., Romice, O. and Porta, S. 'Applicability of morphological tessellation and its topological derivatives in the quantitative analysis of urban form' XXVI International Seminar on Urban Form: Cities as Assemblages. Nicosia. Jul 2–6.

2019 Fleischmann, M., Hořák, D., Porta, S. et al. 'Ecological and evolutionary perspectives in urban morphology' Ecology and Evolution of Urban Areas, CEE Symposium. London. Jun 13.

Other conference activities

2025 Fleischmann, M. 'Urban morphology with Python' GISRUK 2025, Bristol UK. Apr 23 – 25.

2024 Fleischmann, M. 'A brief introduction to Spatial Data Science' 4th UrbanMetaMapping conference 'City Transition'. Saarbrücken. Sep 12.

2023 Fleischmann, M. and Van den Bossche, J. 'Getting the most out of GeoPandas 1.0' GeoPython 2024, Basel, CH, May 27 – 29.

2023 Fleischmann, M. and Van den Bossche, J. 'Writing efficient code for GeoPandas and Shapely in 2023' GeoPython 2023, Basel, CH, Mar 6 – 8.

2022 Fleischmann, M. and Gaboardi, J. 'Understanding the structure of cities through the lens of data' Spatial Data Science Symposium 2022, Virtual, Sep 22 – 23.

2022 Fleischmann, M. and Van den Bossche, J. 'Scaling up vector analysis with Dask-GeoPandas' GeoPython 2022, Basel, CH, Jun 20 – 22.

2022 Nieves, J., Fleischmann, M. and Calafiore, A. 'Dasymetric population modelling in R and Python workshop' GISRUK 2022, Liverpool UK. Apr 6 – 8.

2021 Fleischmann, M. and Arribas-Bel, D. 'Spatial Signatures in Great Britain - lightning talk' Towards urban analytics 2.0, Alan Turing Institute (Urban Analytics) event, Leeds UK. Nov 30 – Dec 1.

SERVICE

Academic Journal Peer Review

Cartography and Geographic Information Science

Environment and Planning B: Urban Analytics and City Science

Geographical Analysis

Habitat International

Journal of Geographical Systems

Journal of Open Research Software

Journal of Open Source Software

Journal of Statistical Software

Moravian Geographical Reports

Nature Communications

Nature Machine Intelligence

Plos ONE

Scientific Reports

Transactions in GIS

Urban Morphology

Academic Press Peer Review

CRC Press

Other Peer Review

Austrian Academy of Sciences

Czech Technical University

pyOpenSci

ZHAW Zurich University of Applied Sciences

Other

2022 Lecturer, OpenGeoHub Summer School Siegburg
Introduction to GeoPandas and its Python ecosystem

2022 Mentor, Google Summer of Code.
PySAL - Street network simplification projects
Greg Maya, Gabriel Agostini

2021 Mentor, Google Summer of Code.
Geopandas - Dask bridge to scale geospatial analysis
Thomas Statham (University of Bristol)

2019, 2022 External reviewer, FA CTU Doctoral workshop

CONSULTING

2024 4ct platform, Czechia
2022 UrbanDataLab AG, Switzerland
2021 All-Party Parliamentary Group for 'left behind' neighbourhoods, UK
2019–20 Institute for Planning and Development, Prague, Czechia
2020 Places Platform, US

MEMBERSHIPS

2025– American Association of Geographers
2025– Czech Geographical Society
2021– Royal Geographical Society (Fellow)
2019– International Seminar on Urban Form (Member)
2018–22 Academy of Urbanism (Young Urbanist)

Updated November 2025