CURRICULUM VITAE

DR. PATRICK BALLANTYNE

Postdoctoral Research Associate in Geographic Data Science
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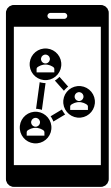**Phone:** +44 (7463 981689)

RESEARCH TOPICS AND INTERESTS

My research interests lie broadly within the themes of Geographic Data Science and Urban Analytics, with a specific focus on the following topics:
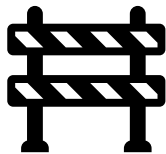
Retail and High Street Performance

▪ *Are spaces of consumption like retail centres, high streets and shopping centres performing well during economic and environmental crises?*
▪ *How can we use novel sources of data and innovative methodologies to better understand these processes?*

Urban Mobility and New Forms of Data

▪ *What are the opportunities and challenges of working with new forms of data, especially those derived from mobile phone applications?*
▪ *How can we use such datasets to understand how urban mobility is changing, especially in relation to external phenomena and economic crises?*

Accessibility and Social/Spatial Inequalities

▪ *What are the different approaches to conceptualising and measuring place-based accessibility and inequality?*
▪ *How can open-source routing tools and data, urban indicators and dashboard platforms generate positive outcomes for people and places?*

RESEARCH METHODS

I have knowledge and experience with the following methodologies and techniques:

Spatial Analysis | Spatial Modelling | Supervised and Unsupervised Machine Learning | Statistics | Scoring and Indicator Development | Area Classifications and Geodemographics | GIS | Data Visualisation & Cartography |

EMPLOYMENT

Postdoctoral Research Associate, Geographic Data Science Lab (June. 2022 – *present*)
Leading a variety of projects within the broad themes of Geographic Data Science and Urban Analytics. Developing research ideas and funding proposals around building more sustainable city centres and retail environments. Supporting research activities of Prof. Alex Singleton and the Consumer Data Research Centre (CDRC), as well as coordinating day-to-day research activities of the Geographic Data Science Lab.

Spatial Data Consultant, Liverpool City Region (Mar. 2023 – *present*)
Providing part-time freelance support to Liverpool City Region Combined Authority on the use of spatial data to provide a useful evidence base of inequality in the region. Development of a series of urban indicators and an interactive dashboard to facilitate targeting of policy interventions to areas experiencing multiple inequalities – transport, housing, health, and economic opportunities.

Data Scientist, Consumer Data Research Centre (Jan. 2021 – April 2022)
Development and enhancement of new and existing data products for CDRC, specifically relating to the 'UK Retail Centres' data product. Creation of supporting materials and training resources demonstrating how such products can be integrated within spatial analysis frameworks. Promotion of new and existing products through written data stories, and visualisation on the mapmaker interactive web mapping platform.

Senior Open Day Ambassador, University of Liverpool (Sept. 2017 – Sept. 2019)
Supporting open days and applicant discovery days (ADDs) for the Department of Geography and Planning. Delivery of talks, coordination and demonstration of practical activities and engaging with prospective students and their families.

EDUCATION

PhD & MSc Data Analytics and Society, University of Liverpool (Sep. 2018 – Dec. 2022)
"Retail Centre Geographies: Who, What, Where and How" (Pass with no corrections, examined March 2023 by Prof. Scott Orford, Prof. Mark Birkin, and Dr. Mark Green). Thesis summary: working with location and mobility datasets from SafeGraph and Geolytix to better understand the geographies of retail centres in the UK and US, and their response to COVID-19. Thesis was comprised of three empirical papers published in highly reputable journals.

BSc Physical Geography, University of Liverpool (Sep. 2015 – Jul. 2018)
First Class with Honours. Dissertation title: "Quantifying nutrient loading from septic tanks and agricultural land-use to streams in the Loweswater catchment". Successfully completed a number of relevant modules including Geographic Data Science, Statistics for Social Scientists and GIS for Human Geography.

RESEARCH

Peer-Reviewed Journal Articles

- **Ballantyne, P.,** Sanderson, R.K., Davies, A., Houlden, V., MacLachlan, A., Owen, G., Robinson, C., Shin, H., Wartmann, F.M., Wilkin, J. and Williams, I. 2023. 'There is no formula for life and career': A commentary on perspectives and experiences of early career quantitative human geographers. *The Geographical Journal*, *189* (1), pp.174-181. DOI: 10.1111/geoj.12499.
- **Ballantyne, P.,** Singleton, A. and Dolega, L. 2022. Using unstable data from mobile phone applications to examine recent trajectories of retail centre recovery. *Urban informatics*, *1* (1), p.21. DOI: 1007/s44212-022-00022-0.
- **Ballantyne, P.,** Singleton, A., Dolega, L. and Macdonald, J. 2023. Integrating the who, what, and where of US retail center geographies. *Annals of the American Association of Geographers*, *113* (2), pp.488-510. DOI: 10.1080/24694452.2022.2098087.

- **Ballantyne, P.,** Singleton, A. and Dolega, L. 2021. A regional exploration of retail visits during the COVID-19 pandemic. *Regional Studies, Regional Science*, *8* (1), pp.366-370. DOI: 10.1080/21681376.2021.1973548.
- **Ballantyne, P.,** Singleton, A., Dolega, L. and Credit, K. 2021**.** A framework for delineating the scale, extent and characteristics of American retail centre agglomerations. *Environment and Planning B: Urban Analytics and City Science*. DOI: 10.1177/23998083211040519.

Working Papers
- Gibbs, H., **Ballantyne, P.,** Cheshire, J., Singleton, A., Green, M. *under review.* Harnessing mobility data to examine changing work from home behaviours between censuses.
- Mahmood, K., Mahabir, R., Gkountouna, O., **Ballantyne, P**. *in preparation.* ChatGPT: Bridging the Gap between Human and Machine Communication - A Systematic Review of its Multifaceted Applications.
- **Ballantyne, P**., Singleton, A. *in preparation*. Composite spatial indicators to address social and spatial inequalities for a UK combined regional authority.
- Berragan, C., Singleton, A., Calafiore, A., **Ballantyne, P.,** Morley, J. *in preparation.* Regional Identity and Cohesion Identified in Britain Through Reddit Comments.
- **Ballantyne, P**., Singleton A. *in preparation for CEUS special issue.* Reconciling Supply and Demand in Accessibility Indices with Open-Source Routing Tools.

Conference Papers
- **Ballantyne, P.,** Singleton, A. 2023. Accessibility Indices for Regional Transport Equity Assessments: The Case of Liverpool City Region. *GIScience Annual Conference 2023.* https://osf.io/yhwrp.
- **Ballantyne, P.,** Singleton, A., Dolega, L. 2022. Evidence of structural, functional, and spatial inequalities in the post-pandemic recovery British retail centres. *RGS-IBG Annual Conference 2022*.
- **Ballantyne, P.,** Singleton, A., Dolega, L., Macdonald, J. 2022. Integrating the *who, what* and *where* of American retail centre geographies. *GIS Research UK (GISRUK) Annual Conference 2022.* https://zenodo.org/record/6410106#.ZEFYP87MK5c.
- **Ballantyne, P.,** Singleton, A., Dolega, L., Macdonald, J. 2021. American Retail Centre Geographies: Centres, Characteristics and Catchments. *American Association of Geographers (AAG) Annual Meeting 2021*.
- **Ballantyne, P.,** Singleton, A., Dolega, L., Macdonald, J. 2021. American Retail Centre Geographies: Centres, Characteristics and Catchments. *RGS-IBG Annual Conference 2021*.
- **Ballantyne, P.,** Singleton, A., Dolega, A., Credit, K. 2021. A Framework for Delineating the Scale, Extent and Characteristics of American Retail Centre Agglomerations: The Case of Chicago Metropolitan Area during COVID-19. *GIS Research UK (GISRUK) Annual Conference 2021.*
- **Ballantyne, P.,** Singleton, A., Dolega, A. 2020. An updated measure of the 'e-resilience' of retail centres. *GIS Research UK (GISRUK) Annual Conference 2020.*

Invited Presentations and Keynotes
- **Ballantyne, P.,** Singleton, A. 2023. *Generating Impact: Urban Indicators, Dashboards and Consumer Data Research.* CDRC-ESRC Showcase Event.
- **Ballantyne, P. 2023**. H3: *What is it? (and why should you be using it?).* Pets at Home Data and Insights Weekly Meeting.
- **Ballantyne, P.,** Singleton, A. 2023. *What if? Evaluating potential decarbonization strategies for maritime cargo flows in Liverpool City Region.* Geospatial Data Science for Future Cities and Society: Focusing on Analysis of Digital Footprint Data, University of Seoul/Korean Research Institute for Human Settlements.

- **Ballantyne, P.**, Gibbs, H., Cheshire, J., Singleton, A., Dolega, L. 2023. *Mobility data: does it live up to the hype?* Quantitative Spatial Sciences (QuSS) Seminar Series, University of Bristol.
- **Ballantyne, P.,** Singleton, A., Dolega, L. 2022. *Using unstable data to examine recent trajectories of retail centre recovery.* Supporting Post Pandemic Recovery and Resilience Through New Forms of Data, University of Liverpool Exchange with Korean Research Institute for Human Settlements.
- **Ballantyne, P.** 2022. *Who, what, where and how: a quantitative investigation of retail centre geographies.* Maynooth University Social Science Institute (MUSSI) and National Centre for Geocomputation (NCG).

Other Research Activities

- **Ballantyne, P. 2022.** Workshop: Retail and Geodemographics: A Spatial Data Science Approach. *CARTO Spatial Data Science Conference, Google HQ, New York.* Materials available at: https://github.com/patrickballantyne/CARTO-SDSC2022.
- **Ballantyne, P. 2022.** Retail Indicators I. Identifying 'clone towns' across the UK. *CDRC Stories.* Available at: https://data.cdrc.ac.uk/stories/retail-indicators-i-identifying-clone-towns-across-uk.
- **Ballantyne, P.,** Sanderson, R., Davies, A., Houlden, V., Maclachlan, A., Owen, G., Robinson, C., Shin, H., Wartmann, F., Williams, I., Wilkin, J. 2021. The Ups and Downs of a PhD and Beyond. *Panel Session at the RGS Postgraduate Mid-Term Conference, sponsored by the Quantitative Methods Research Group.*
- **Ballantyne, P. 2020.** Moving the lab home: changes to research and data resulting from COVID-19. *Resilient and Sustainable Cities Podcast.* Listen at: https://open.spotify.com/episode/2OHngRBoOxoYMPxMzZ8N6c.
- **Ballantyne, P. 2020.** An approach to retail centre delineation based on graph structures and H3 geometries. *MethodsX Twitter Take-Over.*
- **Ballantyne, P. 2019.** Book Review: An introduction to R for Spatial Analysis and Mapping (2nd Edition) *International Journal of Geographic Information Science (IJGIS).* DOI: 10.1080/13658816.2019.1647541.

Awards and Prizes

- Robin Flowerdew Prize 2021. *Best postgraduate paper in the "Future of Quantitative Geography" sessions at the RGS-IBG Annual Conference 2021.* https://qmrg.github.io/blog/2021/10/12/Ballantyne-bio.

PROFESSIONAL RESPONSIBILITIES

Peer Reviewer

Journal of the Royal Statistical Society Series A: Statistics in Society	Environment and Planning B: Urban Analytics and City Science	Regional Studies, Regional Science.	Computers, Environment and Urban Systems (CEUS)
International Journal of Geographic Information Science (IJGIS)	Journal of Urban Design	Computers, Environment and Urban Systems (CEUS)	Urban Studies
Cities	Annals of the American Association of Geographers	Journal of Place Management and Development	

Organisational Roles and Membership within Professional Societies
- Strategic Delivery Manager of CDRC 2023 LinkedIn Marketing Strategy.
- UK-Coordinator for *Geospatial Data Science for Future Cities and Society: Focusing on Analysis of Digital Footprint Data* event, held at Korean Research Institute for Human Settlements (Sejong City, Korea), and University of Seoul.
- Coordinator for *Supporting Post Pandemic Recovery and Resilience through New Forms of Data* event, held at the University of Liverpool. Research exchange between GDSL and Korean Research Institute for Human Settlements (KRIHS).
- Postdoctoral Representative, School of Environmental Science Research Strategy Group (RSG), 2022 - *present*.
- Postgraduate Fellow (Royal Geographical Society), 2020 – *present*.
- Postgraduate Representative, Quantitative Methods Research Group (Royal Geographical Society), 2020 - 2021.
- Early-Career Committee and Organiser **(**GISRUK Annual Conference 2022).
- Social Media Co-ordinator **(**Geographic Data Science Lab), 2019 - 2022.
- Representative (Centre for Doctoral Training Liverpool 'Buddy' Scheme), 2019 - 2021.

PhD Students
- Cillian Berragan (2019 – *present),* ESRC CDAS CDT.
- Vyacheslav Wilks (2023 – *present*), ESRC CDAS CDT.

MSc Students
- Robert Edmiston (2022 – 2023), MSc Geographic Data Science.

TEACHING

Teaching Assistant, Ritsumeikan University Kyoto (Sep. 2022).
Delivery of "Geographic Data Science for Urban Analytics" short course to master's students with Prof. Alex Singleton. Responsible for delivery of six practical sessions on the use of R for Geographic Data Science, one guest lecture on "new forms of data and the analysis of cities", and assessment of group-based projects.

Training Course Delivery, CDRC (May. 2021).
Developed an online tutorial for the CDRC "Advanced GIS Methods Training: Retail Centres and Catchment Areas". The tutorial uses R to introduce and explore retail centres, hierarchies, and catchment delineation approaches. I took sole responsibility for writing the content of the course in R, working with Dr. Les Dolega and Dr. Nick Bearman to co-design and deliver it.

Teaching Assistant, University of Liverpool (Sep. 2018 – June 2022).
Supported teaching on a range of undergraduate and postgraduate modules for the Department of Geography and Planning, including a mixture of guest lecturers, seminars and computer practical's. Modules include Study Skills and GIS (ENVS100), Research Skills (ENVS203), Statistics for Social Scientists (ENVS225), GIS for Human Geography (ENVS257), Contemporary Population Dynamics (ENVS311), Human Geography Dissertation (ENVS321), Geographic Data Science (ENVS363), Geographic Information Science (ENVS609).

Teaching Assistant, Geospatial Training Solutions (Jun. 2019).
Supported delivery of "Introduction to Spatial Data and Using R as a GIS" content as a teaching assistant with Dr. Nick Bearman. Assisting students with installation of R and R Studio, error de-bugging and facilitating discussions between hands-on coding exercises.

TECHNICAL SKILLS

R ***
Data cleaning and manipulation, data exploration and visualisation, spatial analysis and modelling, machine learning, statistics, GIS, cartography, big data management, parallel computing, package development.

QGIS ***
GIS, spatial analysis, cartography.

Python **
Data cleaning and manipulation, data exploration and visualisation, spatial analysis.

GitHub **
Project management, version control, website design, collaborative research, open-source tools and packages.

CARTO **
Dashboard creation, design and modification, data storage and querying.

SQL *
Database management, data manipulation and exploration.

Other Technical Skills
Microsoft Office Suite**, SPSS**, Mendeley**, Docker* JavaScript*, Davinci Resolve Video Editing Software*.
*** *Advanced, ** Intermediate, * Novice*

Training
Safe to Create Training – Active Bystander, Unconscious Bias, Tackling Bullying and Harassment at Work [June 2023].
UK Data Service Safe Researcher Training Course [February 2021].
Introduction to SQL [February 2020].
Intermediate R [January 2020].
Spatial Modelling for Retail Analytics [January 2019].
Introduction to GIS and Spatial Analysis for Retail Applications I [November 2018].

SCIENTIFIC SOFTWARE, DATA AND TEACHING MATERIALS

"US Retail Centre Boundaries and Classification"
Data products to accompany paper on US retail centres published in Annals of the American Association of Geographers. Obtained permission for output release from SafeGraph, and released derived data products on CDRC data store. Data product available at:
https://data.cdrc.ac.uk/dataset/us-retail-centre-boundaries-and-classification.

"Advanced GIS Methods Training: Retail Centres and Catchment Areas"
Materials consisted of two R markdown files, a series of video tutorials and discussions, and an accompanying GitHub repository for flagging of any issues and integrating updates.
Materials: https://data.cdrc.ac.uk/dataset/advanced-gis-methods-training-retail-centres-and-catchment-areas
GitHub repository: https://github.com/patrickballantyne/CDRC-Retail-Catchment-Training.

"CDRC Retail Centre Indicators"
Developed a series of indicators and catchments for the 2021 release of the CDRC retail centre boundaries data product, to be disseminated and used in further research and by external organisations.
Data product available at: https://data.cdrc.ac.uk/dataset/retail-centre-indicators.
GitHub repository: https://github.com/patrickballantyne/CDRC-Retail-Indicators.

"Tidylodes": An R package for extracting, processing and 'spatialising' data from the US Census Bureau's LODES database.
Developed a quick R package for working with the LODES data from the US Census Bureau. Package enabled extraction of LODES data in 'tidy' spatial formats, for mapping and further spatial analysis.
GitHub repository: https://github.com/patrickballantyne/tidylodes.

PERSONAL

Citizenship
United Kingdom / Republic of Ireland [Dual Citizenship]
Location
Liverpool, England.

Other Details
Full UK Drivers Licence.
GCSE's: 10 A* - C (including English and Maths).
A-levels: ABB (Geography, Music, Biology).

(Updated 19/09/2023)