

Curriculum Vitae: Dr Alexander D Singleton

Professor of Geographic Information Science

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Research Interests

My research sits at the boundary between the social and computational sciences; and has extended a tradition of area classification within Urban Analytics where I have developed an empirically informed critique of the ways in which geodemographic methods (unsupervised machine learning) can be refined for effective yet ethical use; and how systems comprising artificial intelligence can assist in public resource allocation applications. This research has developed from substantive interests around the social, spatial and temporal dimensions of urban systems; specifically focused on access inequalities in Higher Education, digital exclusion, aspects of retail and school commuting behaviour. My most recent work has focused on developing an understanding how both fast and slow human dynamics can be understood through emerging Geographic Data Science methodologies, and mapping such geographies at fine spatiotemporal scale. More generally, I have interests supporting the public understanding of science through online interfaces to data, and I am also a strong advocate of open source data, software and publishing.

Employment

- 2015: Professor - University of Liverpool, Department of Geography and Planning.
- 2013 – 2014: Reader - University of Liverpool, Department of Geography and Planning.
- 2010 – 2013: Lecturer - University of Liverpool, Department of Geography and Planning.
- 2005 – 2010: Research Fellow - University College London, Department of Geography.
- 2003-2005: Research Assistant - University College London, Department of Geography.

Education

- 2003 – 07: PhD in Geography (Examined Dec. 2007) - University College London, UK.
- 2000 – 03: BSc (1st class Hons) in Geography - University of Manchester, UK.

Awards, Honours and Distinctions

- 2021: Editorial Board International Journal of Urban Informatics
UK Statistics Authority Digital Economy Act SRS Research Approval Panel
- 2020: Carto Scientific Advisory Group
- 2019: Editorial Board Computers Environment and Urban Systems
- 2018: Editorial Board Annals of the Association of American Geographers
Editorial Board Geographical Analysis
Editorial Board Open geospatial Data, software and standards
- 2016: Visiting Professor Ritsumeikan University, Japan.
Europe, Middle East and Africa Editor - Transactions in GIS.
- 2014: Chair of the Royal Geographical Society (with IBG) GIScience Research Group.
Associate Editor of the Spatial Analytics Book Series (Sage).
- 2013: Honorary Visiting Researcher Ritsumeikan University, Japan.

2012:	Founding Editor in Chief of Regional Studies, Regional Science. Book Review Editor for Environment and Planning B. Chair GIS Research UK (GISRUK) 2013 Annual Conference.
2011:	Shortlisted for Scopus Young Researcher Award (Social Science). Royal Geographical Society Gildea Award.
2010:	Chair of the Output Area Classification User Group at the Royal Statistical Society.
2009:	Winner GIS Research UK Annual Conference Mashup Competition.
2008:	Chair of the Royal Geographical Society Quantitative Methods Research Group.
2006:	Winner GIS Research UK Annual Conference Poster Competition.
2004:	Winner UCL Graduate School Poster Competition.
2003:	Winner of Manchester Geographical Association Dissertation Prize.

Research Income and Grants

This following section provides a summary of research income to date which totals £21,846,153, with £1,118,668 as Principal Investigator (PI) and £20,727,485 as Co-Investigator (Co-I).

2021	Nuffield Developing a Minimum Digital Living Standard for Households with Children (Co-I) £491,440
2020:	ESRC Smart Street Sensor II. (Co-I) £300,000
2019:	ESRC CDT New Forms of Data. (Co-I) £6,100,000
2018:	Industrial Strategy Fellow: AI and Health (PI) £90,000 Industrial Strategy Fund: Envisaging Liverpool's Future Digital City Region and Smart Governance (PI) £23,000
2016:	ESRC CDT New Forms of Data. (Co-I) £6,100,000 ESRC Northern Regional Data Facility. (PI) £309,681 ESRC Smart Street Sensor. (Co-I) £301,681
2014:	ESRC Retail Business Data Safe. (Co-I) £6,117,615 ESRC The analysis of names from the 2011 Census of Population. (Co-I) £170,553 ESRC Population Change and Geographic Inequalities in the UK, 1971-2011. (Co-I) £198,315 University of Liverpool Big Data Visualisation of Broadband Equity. (PI) £4,000
2013:	ESRC Mapping Retail Sector Business Rate Inequalities. (PI) £58,404 ESRC The e- Resilience of British Retail Centres: Creating a nation model of retail area resilience to online shopping. (PI) £127,991 ESRC Leveraging the Google Cloud to Estimate Individual Level CO2 Emissions Linked to the School Commute. (PI) £118,481
2012:	ESRC Using Secondary Data to Measure, Monitor and Visualise Spatio-Temporal Uncertainties in Geodemographic Classification. (PI) £182,397 ESRC A Spatial Microsimulation Model of Co-morbidity. (Co-I) £198,485 EU INTERREG PURE HUBS. (Co-I) £679,365 ESRC Supporting undergraduate teaching in quantitative geography: making the connection between schools, universities and workplaces. (Co-I) £99,000 Royal Geographical Society CO2 emissions and the commute to school. (PI) £2,900 University of Liverpool North American Geodemographics. (PI) £5,000
2011:	Royal Geographical Society Exploring the Geography of Geographers. (PI) £1,500 University of Liverpool Alternate crime mapping visualisations with National Police Improvement Agency. (PI) £5,000 University of Liverpool Integration of school commuting data with vehicle emissions. (PI) £2,000

- ESPON Test the practical use of existing methods and tools for Territorial Impact Assessment in European region. (Co-I) £308,123
- 2010: AHRC Preparing a baseline from which to measure the Big Society. (Co-I) £30,039
- 2009: ESRC Knowledge Transfer Partnership with the Local Futures Group Ltd to develop state of the art web mapping and community interaction technology. (Co-I) £147,431
- 2008: ESRC Spatial Interaction Modelling, Geodemographics and Widening Participation in the Higher Education Sector. (PI) £94,157

Books

- 2017: Longley P, Cheshire J, Singleton A (2018) *Consumer Data Research*. London: UCL Press.
Singleton A, Spielman S, Folch D (2018) *Urban Analytics*. London: Sage.
- 2016: Ivan I, Singleton A, Horák J, Inspektor T (2016) *The Rise of Big Spatial Data*. Berlin: Springer.
- 2014: Brunsdon C, Singleton A (2014) *Geocomputation, A Practical Primer*. London: Sage.
- 2010: Singleton A (2010) *Educational Opportunity: The Geography of Access to Higher Education*. Farnham: Ashgate.
Singleton A, Unwin D, Kemp K (2010) *Instructor Manual: Geographic Information Systems and Science* (3rd Edition). Chichester: Wiley.

Refereed Academic Journals

- 2021: Calafiore A, Singleton AD, Arribas-Bel D, Palmer (2020) A Geographic Data Science Framework for the Functional and Contextual Analysis of Human Dynamics within Global Cities. *Computers Environment and Urban Systems*. <https://doi.org/10.1016/j.compenvurbsys.2020.101539>
- Palmer G, Green M, Boyland E, Vasconcelos S, Savani R, Singleton A (2021) A deep learning approach to identify unhealthy advertisements in street view images. *Scientific Reports*. <https://doi.org/10.1038/s41598-021-84572-4>
- Green M, Musi E, Rowe F, Charles D, Darlington Pollock F, Kypridemos C, Morse A, Rossini P, Tulloch J, Davies A, Dearden E, Maheswaran H, Singleton AD, Vivancos R, Sheard S (2021) Identifying how COVID-19 related misinformation reacts to the announcement of the UK national lockdown: An interrupted time-series study. *Big Data and Society*. <https://doi.org/10.1177/20539517211013869>
- Yao L, Singleton A, Sun P, Dong G (2021) The Evolution Characteristics and Influence Mechanism of Chinese Venture Capital Spatial Agglomeration. *International Journal of Environmental Research and Public Health* 18 2974. <https://doi.org/10.3390/ijerph18062974>
- 2020: Liu Y, Singleton AD, Arribas-Bel D, Chen M (2021) Considering context and dynamics: A classification of transit-orientated development for New York City. *Journal of Transport Geography* 85 <https://doi.org/10.1016/j.jtrangeo.2020.102711>
- Comber S, Arribas-Bel D, Singleton AD, Dolega L (2020) Using convolutional autoencoders to extract visual features of leisure and retail environments. *Landscape and Urban Planning*. 10.1016/j.landurbplan.2020.103887
- Singleton AD, Alexandros A, Savani, R (2020) Mapping the Geodemographics of Digital Inequality in Great Britain: An Integration of Machine Learning into Small Area Estimation. *Computers Environment and Urban Systems*. <https://doi.org/10.1016/j.compenvurbsys.2020.101486>
- Chen M, Arribas-Bel D, Singleton AD (2020) Quantifying the Characteristics of the Local Urban Environment through Geotagged Flickr Photographs and Image Recognition. *International Journal of Geo-information*. <https://doi.org/10.3390/ijgi9040264>

- Davies A, Green M, Riddlesden D, Singleton AD (2020) Using loyalty card records and machine learning to understand how self-medication purchasing behaviours vary seasonally in England, 2012–2014. *Applied Marketing Analytics*. <https://tinyurl.com/ssbfx69s>
- 2019: Comber S, Arribas-Bel D, Singleton AD, Dong G, Dolega L (2020) Building Hierarchies of Retail Centers Using Bayesian Multilevel Models. *Annals of the American Association of Geographers*. <https://doi.org/10.1080/24694452.2019.1667219>
- Dolega L, Reynolds J, Singleton AD (2019) Beyond retail: New ways of classifying UK shopping and consumption spaces. *Environment and Planning B*. <https://doi.org/10.1177/2399808319840666>
- Singleton A, Arribas-Bel D (2019) Geographic Data Science. *Geographical Analysis*. <https://doi.org/10.1111/gean.12194>
- Singleton A, Longley P (2019) Data Infrastructure Requirements for New Geodemographic Classifications: the Example of London's Workplace Zones. *Applied Geography*. <https://doi.org/10.1016/j.apgeog.2019.102038>
- Liu Y, Singleton A, Arribas-Bel D (2019) A principal component analysis (PCA)-based framework for automated variable selection in geodemographic classification. *Geo-Spatial Information Science*. <https://doi.org/10.1080/10095020.2019.1621549>
- Daras K, Green MA, Davies A, Barr B, Singleton A (2019) Open data on health-related neighbourhood features in Great Britain. *Scientific Data* 6 (107) <https://doi.org/10.1038/s41597-019-0114-6>
- 2018: Thiele T, Pope D, Singleton A, Stanistreet D (2018) Exploring the Use of Mixed Methods in Research and Evaluation of Widening Participation Interventions: Guidance for Practitioners. *Widening Participation and Lifelong Learning* 20(4) 7-38 <https://doi.org/10.5456/WPLJ.20A.7>
- Davies A, Green M, Singleton A (2018) Using Machine learning to investigate self-medication purchasing in England via high street retailer loyalty card data. *PLoS ONE* 13(11) e020752. <https://doi.org/10.1371/journal.pone.0207523>
- Green M, Daras K, Davies A, Barr B, Singleton A (2018) Developing an Openly Accessible Multi-Dimensional Small Area Index of 'Access to Healthy Assets and Hazards' for Great Britain, 2016. *Health & Place* 54 11-19 <https://doi.org/10.1016/j.healthplace.2018.08.019>
- Chen M, Arribas-Bel D, Singleton, A (2018) Understanding the dynamics of urban areas of interest through volunteered geographic information. *Journal of Geographical Systems* <https://doi.org/10.1007/s10109-018-0284-3>
- 2017: Pavlis M, Dolega L, Singleton A (2017) A Modified DBSCAN Clustering Method to Estimate Retail Center Extent. *Geographical Analysis* 50 (2) 141-161 <http://dx.doi.org/10.1111/gean.12138>
- Harris R, O'Sullivan D, Gahegan M, Charlton M, Comber L, Longley P, Brunsdon C, Malleson N, Heppenstall A, Singleton A and Arribas-Bel D (2017) More bark than bytes? Reflections on 21+ years of geocomputation. *Environment and Planning B: Urban Analytics and City Science* 44(4) 598-617 <https://doi.org/10.1177/2399808317710132>
- 2016: Dolega L, Pavlis M, Singleton A (2016) Estimating Attractiveness Hierarchy and Catchment Area Extents for a National set of Retail Centre Agglomerations. *Journal of Retailing and Consumer Services* 28 78-90 <https://doi.org/10.1016/j.jretconser.2015.08.013>
- Gale C, Singleton A, Longley P (2016) Creating the 2011 Area Classification for Output Areas (2011 OAC). *Journal of Spatial Information Science* 12 1-27 <https://doi.org/10.5311/JOSIS.2016.12.232>
- Alexiou A, Singleton A, Longley P (2016) A Classification of Multidimensional Open Data of Urban Morphology. *Built Environment* 42(3) 382-395 <https://doi.org/10.2148/benv.42.3.382>

- Singleton A, Dolgea L, Riddlesden D, Longley P (2016) Measuring the Spatial Vulnerability of Retail Centres to Online Consumption through a Framework of e-Resilience. *Geoforum* 69 5-18 <https://doi.org/10.1016/j.geoforum.2015.11.013>
- Singleton A, Longley P, Pavlis M (2016) The Stability of Geodemographic Cluster Assignments over an Inter-censal period. *Journal of Geographical Systems* 18(2) 97-123 <https://doi.org/10.1007/s10109-016-0226-x>
- Singleton A, Spielman S, Brunsdon C (2016) Establishing a Framework for Open Geographic Information Science. *International Journal Of Geographical Information Science* 30(8) 1507-1521 <https://doi.org/10.1080/13658816.2015.1137579>
- Thiele T, Pope D, Singleton A, Snape D, Stanistreet D (2016) Experience of Disadvantage: The Influence of Identity on Engagement in Working Class Students' Educational Trajectories to an Elite University. *British Educational Research Journal* 43(1) 49-67 <https://doi.org/10.1002/berj.3251>
- Thiele T, Pope D, Singleton A, Stanistreet D (2016) Role of Students' Context in Predicting Academic Performance at a Medical School: A Retrospective Cohort Study. *BMJ Open* 6(3) e010169 <https://dx.doi.org/10.1136/bmjopen-2015-010169>
- 2015: Singleton A (2015) Transport Mode Choice and the Commute to Work. *Environment and Planning A* 47(7) 1401-1403 <http://dx.doi.org/10.1177/0308518X15595752>
- Singleton A and P Longley (2015) The Internal Structure of Greater London: A Comparison of National and Regional Geodemographic Models. *Geo: Geography and Environment* 21 69-87 <https://doi.org/10.1002/geo2.7>
- Spielman S, Singleton A (2015) Studying Neighborhoods Using Uncertain Data from the American Community Survey: A Contextual Approach. *Annals of the Association of American Geographers* 105(5) 1003-1025 <https://doi.org/10.1080/00045608.2015.1052335>
- 2014: Bearman N, Singleton A (2014) Modelling the Potential Impact on CO₂ Emissions of an Increased Uptake of Active Travel for the Home to School Commute using Individual Level Data. *Journal of Transport and Health* 14 295-304 <https://doi.org/10.1016/j.jth.2014.09.009>
- Harris R, Nicholas N, Souch C, Singleton A, Orford S, Keylock C, Jarvis C, Brunsdon C (2014) Geographers Count: A Report on Quantitative Methods in Geography. *Enhancing Learning in the Social Sciences* 6(2) 43-58 <https://doi.org/10.11120/elss.2014.00035>
- Riddlesden D, Singleton A (2014) Broadband Speed Equity: A new Digital Divide? *Applied Geography* 52 25-33 <https://doi.org/10.1016/j.apgeog.2014.04.008>
- Singleton A, Brunsdon C (2014) Escaping the Pushpin Paradigm in Geographic Information Science: (Re)presenting National Crime Data. *Area* 46(3) 294-304 <https://doi.org/10.1111/area.12116>
- Thiele T, Singleton A, Pope D, Stanistreet D (2014) Predicting Students' Academic Performance Based on School and Socio-Demographic Characteristics. *Studies in Higher Education* 41(8) 1424-1446 <https://doi.org/10.1080/03075079.2014.974528>
- 2013: Adnan M, Singleton A, Longley P (2013) OACoder: Postcode Coding Tool. *Journal of Open Research Software* 11 p e5 <https://doi.org/10.5334/511ba2c94d661>
- Phillips R, Frost D, Singleton A (2013) Researching the Riots. *The Geographical Journal* 179(1) 3-10 <https://doi.org/10.1111/j.1475-4959.2012.00463.x>
- Singleton A (2013) A GIS Approach to Modelling CO₂ Emissions Associated with the Pupil-School Commute. *International Journal of Geographical Information Science* 28(2) 256-273 <https://doi.org/10.1080/13658816.2013.832765>
- Singleton A, Spielman S (2013) The Past Present and Future of Geodemographic Research in the United States and United Kingdom. *Professional Geographer* 66(4) 558-567 <https://doi.org/10.1080/00330124.2013.848764>

- 2012: Riddlesden D, Singleton A, Fischer T (2012) A Survey of the use of Geographic Information Systems in English Local Authority Impact Assessments. *Journal of Environmental Assessment Policy and Management* 14(01) <https://doi.org/10.1142/S1464333212500068>
- Singleton A (2012) The Geodemographics of Access and Participation in Geography. *The Geographical Journal* 178(3) 216-229 <https://doi.org/10.1111/j.1475-4959.2012.00467.x>
- Singleton A, Wilson A, O'Brien O (2012) Geodemographics and Spatial Interaction: An Integrated Model for Higher Education. *Journal of Geographical Systems* 14(2) 223-241 <https://doi.org/10.1007/s10109-010-0141-5>
- 2011: Brunsdon C, Longley P, Singleton A, Ashby D (2011) Predicting Participation in Higher Education: a Comparative Evaluation of the Performance of Geodemographic Classifications. *Journal of the Royal Statistical Society: Series A (Statistics in Society)* 174(1) 17-30 <https://doi.org/10.1111/j.1467-985X.2010.00641.x>
- Mateos P, de Smith M, Singleton A (2011) Developments in Quantitative Human Geography Urban Modelling and Geographic Information Science. *Transactions in GIS* 15(3) 249-252 <https://doi.org/10.1111/j.1467-9671.2011.01258.x>
- Singleton A, Lewis D (2011) Including Accident Information in Automatic Bicycle Route Planning for Urban Areas. *Urban Studies Research* 1-10 <http://dx.doi.org/10.1155/2011/362817>
- Singleton A, Longley P, Allen R, O'Brien O (2011) Estimating Secondary School Catchment Areas and the Spatial Equity of Access. *Computers Environment and Urban Systems* 35(3) 241-249 <https://doi.org/10.1016/j.compenvurbsys.2010.09.006>
- 2010: Adnan M, Longley P, Singleton A, Brunsdon C (2010) Towards Real-Time Geodemographics: Clustering Algorithm Performance for Large Multidimensional Spatial Databases. *Transactions in GIS* 14(3) 283-297 <https://doi.org/10.1111/j.1467-9671.2010.01197.x>
- Cheshire J, Longley P, Singleton A (2010) The Surname Regions of Great Britain. *Journal of Maps* 61 401-409 <https://doi.org/10.4113/jom.2010.1103>
- Harris R, Singleton A, Grose D, Brunsdon C, Longley P (2010) Grid-enabling Geographically Weighted Regression: A Case Study of Participation in Higher Education in England. *Transactions in GIS* 14(1) 43-61 <https://doi.org/10.1111/j.1467-9671.2009.01181.x>
- Longley P, Singleton A, Yano K, Nakaya T (2010) Lost in Translation: Cross-Cultural Experiences in Teaching Geo-Genealogy. *Journal of Geography in Higher Education* 34(1) 21-38 <https://doi.org/10.1080/03098260902982476>
- Singleton A (2010) The Geodemographics of Educational Progression and their Implications for Widening Participation in Higher Education. *Environment and Planning A* 42(11) 2560-2580 <https://doi.org/10.1068/a42394>
- 2009: Longley P, Singleton A (2009) Classification Through Consultation: Public Views Of The Geography Of The E-Society. *International Journal of Geographical Information Science* 23(6) 737-763 <https://doi.org/10.1080/13658810701704652>
- Longley P, Singleton A (2009) Linking Social Deprivation and Digital Exclusion in England. *Urban Studies* 46(7) 1275-1298 <https://doi.org/10.1177/0042098009104566>
- Mateos P, Singleton A, Longley P (2009) Uncertainty in the Analysis of Ethnicity Classifications: Issues of Extent and Aggregation of Ethnic Groups. *Journal of Ethnic and Migration Studies* 35(9) 1437-1460 <https://doi.org/10.1080/13691830903125919>
- Singleton A (2009) Data Mining Course Choice Sets and Behaviours for Target Marketing of Higher Education *Journal of Targeting Measurement and Analysis for Marketing*. 17(3) 157-170 <https://doi.org/10.1057/jt.2009.13>
- Singleton A, Longley P (2009) Creating Open Source Geodemographics - Refining a National Classification of Census Output Areas for Applications in Higher Education. *Papers in Regional Science* 88(3) 643-666 <https://doi.org/10.1111/j.1435-5957.2008.00197.x>

- Singleton A, Longley P (2009) Geodemographics Visualisation and Social Networks in Applied Geography. *Applied Geography* 29(3) 89-298 <https://doi.org/10.1016/j.apgeog.2008.10.006>
- 2008: Gibin M, Singleton A, Milton R, Mateos P, Longley P (2008) An Exploratory Cartographic Visualisation of London through the Google Maps API. *Applied Spatial Analysis and Policy* 12 85-97 <https://doi.org/10.1007/s12061-008-9005-5>
- Haklay M, Singleton A, Parker C (2008) Web Mapping 2.0: The Neogeography of the GeoWeb. *Geography Compass* 26 2011-2039 <https://doi.org/10.1111/j.1749-8198.2008.00167.x>

Book Chapters

- 2021 Singleton A, Spielman (2021) Urban Governance. *Urban Informatics W Shi, M Goodchild, M Batty, MP Kwan, A Zhang* (eds) Singapore: Springer.
- 2017: Gale C, Singleton A, Longley P (2017) Classification of the UK using 2011 Census Data. *The Routledge Handbook of Census Resources Methods and Applications* J Stillwell (eds) London: Routledge.
- 2016: Singleton A (2016) Cities and Context: The Codification of Small Areas through Geodemographic Classification. *Code and the City*. R Kitchin and S Perng (eds) London: Routledge.
- 2014: Adnan M, Singleton A, Longley P, Turton I (2014) Parallel Processing Architectures of GPU: Applications in Geocomputational Geodemographics. *Geocomputation*. R Abrahart and L See (eds) (Second Edition) London: Taylor & Francis.
- Alexandros A, Singleton A (2014) Geodemographic Analysis. *Geocomputation: A Practical Primer*. C Brunsdon and A Singleton. London: Sage.
- Brunsdon C, Singleton A (2014) Reproducible Research: Concepts Techniques and Issues. *Geocomputation: A Practical Primer*. C Brunsdon and A Singleton. London: Sage.
- Brunsdon C, Singleton A (2014) The Future of Geocomputation. *Geocomputation: A Practical Primer*. C Brunsdon and A Singleton. London: Sage.
- 2010: Singleton A (2010) Neogeography. *Encyclopaedia of Geography*. B Wharf (eds) London: Sage.
- Singleton A (2010) Virtual Geodemographics: Consumer Insight in Online and Offline Spaces. *Handbook of Research on Methods and Techniques for Studying Virtual Communities: Paradigms and Phenomena*. B K Daniel Hershey. USA: IGI Global.

Professional Magazines / Reports

- 2020: Cheshire J, Singleton AD (2021) How England's Complicated Political Geography is Confusing Coronavirus Rules. The Conversation. <https://theconversation.com/how-englands-complicated-political-geography-is-confusing-coronavirus-rules-152036>
- Darlington-Pollock F, Yang Y, Dolega L, Singleton AD, Yates S (2020) Left Behind Neighbourhoods and Digital Poverty amongst Older People. APPG Left Behind Areas https://www.appg-leftbehindneighbourhoods.org.uk/wp-content/uploads/2020/11/Older-People-and-Digital-Poverty_FEB-1.pdf
- Boyle M, Jarvis S, Singleton AD, Jones A (2020) A Position Statement: Building a Data Ecosystem in Liverpool City Region to Unlock the Value of Big (Local) Data <https://www.liverpool.ac.uk/heseltine-institute/reports/buildingsmartcitieswithcitizensandforthepublicgood/>
- 2014: Singleton A (2014) Learning to Code. *Geographical Magazine* 77
- 2010: Singleton A (2010) Neogeography: Engaging People for Common Good. *GIS Development* 26-29
- 2008: Singleton A, Hudson-Smith A (2008) Digital Geography in a Web 2.0 World. *GIS Professional* 21, 20-21.

Participation in Conferences and Professional Meetings

Conferences

- 2021: Ballantyne P, Singleton A, Dolega L, 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 during COVID-19. GIS Research UK, Cardiff.
- Liu Y, Chen M, Arribas-Bel D, Singleton A (2021) Profiling the Dynamic Pattern of Bike-sharing Stations: a case study of Citi Bike in New York City. GIS Research UK, Cardiff.
- 2019: Singleton A, Arribas-Bel D, Calafiore A, Comber S, Palmer G (2019) A Geographic Data Science Framework for the Functional and Contextual Analysis of Human Dynamics within Global Cities. Netmob, Oxford University, Oxford.
- 2018: Davies A, Green M, Singleton A (2018) Using New Forms of Data to Investigate Self-Medication. Association of American Geographers Conference, New Orleans.
- Green M, Daras K, Bayliss D, Barr B, Singleton A (2018) Measuring Healthy Assets and Hazards Across the Leeds City Region. NHS 70th Anniversary celebration, University of Leeds.
- 2017: Green M, Singleton A (2017) Opening up data to researchers. ESRC Strategic Network on Big Data for Obesity, Leeds Beckett University, Leeds.
- Green M, Daras K, Bayliss D, Barr B, Singleton A (2017) Creating open access measures of health-related neighbourhood features. Small Area Statistics 50th Anniversary Symposium, RGS, London.
- Daras K, Green A, Davies A, Singleton A (2017) Using Consumer and Public Service Data for Determining Accessibility to Healthy Places in Great Britain. GIS Research UK, Manchester.
- Liu Y, Arribas-Bel D, Dong G, Singleton A (2017) Towards Automated Variable Selection in Geodemographic Analysis: A Case Study of New York City. GIS Research UK, Manchester.
- Singleton A (2017) The End of Geodemographics. Bit Congress GCKE-2017, Qingdao, China.
- 2016: Alexiou A, Singleton A (2016) Exploring the Relationships of Built Environment Attributes with Socio-economic Classifications. GIS Research UK, Greenwich.
- 2015: Singleton A, Longley P (2015) The Internal Structure of Greater London. Association of American Geographers Conference, Chicago.
- Singleton A, Spielman S, O'Sullivan D (2015) Our Town: How Socioeconomics Shape Functional Neighborhoods in American Cities. Geocomputation, University of Texas - Dallas US.
- 2014: Alexandros A, Singleton A (2014) Comparing the Internal Socio-Economic Structure of Regions - Spatial Disparities and Geodemographic Form. Regional Studies Association Winter Conference, London.
- Alexandros A, Singleton A (2014) Establishing Dynamic Measures of Built Environment Characteristics and their Relationship to Patterns of Socio-Spatial Structure. Association of American Geographers Conference, Tampa.
- Bearman N, Singleton A (2014) Modelling Home to School Travel for State Pupils in England 2008-2011. GIS Research UK, Glasgow.
- Dolgea L, Singleton A (2014) e-Resilience of UK town centres. Regional Studies Association, European Conference Izmir Turkey.
- Dolgea L, Singleton A (2014) E-resilience of UK town centres. Regional Studies Association Winter Conference, London.
- Pavlis M, Singleton A (2014) Updating OAC - Assessing Classification Uncertainty and Cluster Stability During Intercensal Periods. Association of American Geographers Conference, Tampa.

- Riddlesden D, Singleton A (2014) Identifying Regional Digital Cultures - A National classification of Internet Use and Engagement. Regional Studies Association Winter Conference, London.
- Singleton A (2014) Transformative Research in Geographic Information Science. Association of American Geographers Conference, Tampa.
- 2013: Riddlesden D, Singleton A (2013) Exploring the Geography of Access to Fixed Line Broadband Services in England through Crowd Sourced Speed Check Data. Association of American Geographers Conference, Los Angeles.
- Satani T, Yano K, Nakaya T, Singleton A, Brunsdon C (2013) Construction and Dissemination of the Open Atlas of the 2010 Population Census of Japan. Japanese GIS Association Conference, Tokyo.
- Singleton A (2013) CO₂ Emissions and the School Commute. GIS Research UK, Liverpool.
- 2012: Singleton A (2012) Geography a Thriving or Declining Discipline? Association of American Geographers Conference, New York.
- 2011: Adnan M, Singleton A (2011) Building Geodemographics on Parallel Graphics Processing Unit Architecture. Geocomputation, London.
- Adnan M, Singleton A, Longley P (2011) The Specification Estimation and Testing of Real-time Geodemographics using Parallel Graphics. GIS Research UK, Portsmouth.
- 2010: Adnan M, Singleton A (2010) Parallel K-Means Clustering using Graphical Processing Units for the Geocomputation of Real-time Geodemographics GIS Research UK London
- O'Brien O, Singleton A (2010) Spatial Interaction Modelling and Geodemographics for Higher Education Advances. Spatial Analysis and e-Social Science London.
- 2009: Adnan M, A Singleton, Brunsdon C, Longley P (2009) Moving to Real Time Segmentation: Efficient Computation of Geodemographic Classification. GIS Research UK, Durham.
- O'Brien O, Singleton O (2009) Lightning Talk: OSM Data as a Context Layer for Choropleth Maps. State of the Map, Amsterdam.
- Singleton A (2009) Geographic Data Mining of Online Social Networks. GIS Research UK, Durham.
- Singleton A (2009) Geographic Visualisation: Neogeography and Area Classification. OACUG Geodemographic Visualisation Conference, London.
- Singleton A (2009) Public Engagement: The London Profiler Public Profiler and the E-Society Classification. S4 Conference, London.
- Singleton A, Longley P (2009) Some Developments in the Specification Estimation and Testing of Geodemographic Models. S4 Conference, London.
- Singleton A, Longley P (2009) Virtual Geodemographics. Association of American Geographers Conference, Las Vegas.
- 2008: Gibin M, Mateos P, Singleton A, Longley P, Atkinson P (2008) Monitoring Fine Scale Ethnic Changes in General Practices Catchment Areas within Inner London. Association of American Geographers Conference, Boston.
- 2007: Singleton A, Longley P (2007) Modifying the 2001 Census Output Area Classification for Applications in Higher Education. GIS Research UK, Maynooth.
- 2006: Lloyd D, Singleton A, Longley P (2006) Towards a World Wide Genealogical Website: People Places and Geographical Genealogy. Royal Geographical Society Annual Conference, London.
- Longley P, Singleton A (2006) Circling the Drain Royal Geographical Society Annual Conference, London.
- Singleton A (2006) Bespoke Versus General Purpose Discrete Classifications: Segmentation of Higher Education Market Data. GIS Research UK, Nottingham.

- Singleton A (2006) Geodemographic Segmentation of Higher Education Market Data Regional Science Annual Conference, Jersey.
- Singleton A (2006) Higher Education Segmentation. Royal Geographical Society Annual Conference, London.
- 2005: Singleton A (2005) The Social Space of UK Higher Education Acceptances. Royal Geographical Society Conference, London.
- Singleton A (2005) Widening Access and Participation in Higher Education. GIS Research UK, Glasgow.
- 2004: Farr M, Longley P, Singleton A (2004) Widening Access and Participation in Higher Education. GIS Research UK Norwich.

Invited Presentations, Panels or Keynotes at Research and Professional Seminars, Conferences and Workshops

All invited talks are single author unless specified; and conference keynotes or panels indicated.

- 2020: Supporting COVID-19 Response with Consumer Data Research. Spatial Data Science Conference 2020. London, UK.
- 2019: Panel: Data Science in Geography? Association of American Geographers Conference, Washington D.C., USA.
- How Data Philanthropy can Help us Understand Contemporary Urban Environments. Centre for Interdisciplinary Methodology, University of Warwick, Warwick.
- 2018: Data Philanthropy and Consumer Data Analytics. Social Data Science for Evidence-Based Policy, Alan Turing Institute, London.
- Turning Spatial Data into Information using GIS. King Edward VI Camp Hill School for Girls, Birmingham.
- Consumer Data and Retail Analytics. Oxford Retail Future Conference. University of Oxford, Oxford. [with Dolega L]
- Keynote: The Role of Data Philanthropy in Urban Analytics. Carto Spatial Data Science Conference, Brooklyn.
- Panel: Crowdsourcing, Geocomputation and Spatiotemporal Analysis. Illuminating Space and Time in Data Science. Harvard University, Cambridge.
- Keynote: Illuminating the Structure and Function of Cities through Consumer Data. Researcher Links Workshop: Data Analytics for Future Cities Research, GCRF / British Council, Danang City, Vietnam.
- Future Urban Analytics. Ocean University of China, Qingdao, China.
- Keynote: Open Data are not Enough. GIS Research UK, Leicester.
- Discussant: A Globe-Shaped Crystal Ball: The Next Fifty Years of Geographical Analysis. American Association of Geographers Conference, New Orleans.
- Panel: Open Spatial Science Symposium: The Future of Open GIScience. American Association of Geographers Conference, New Orleans.
- A New Classification of British Consumption Spaces. University of Oxford, Challenges and Opportunities in Retail Location Analysis, Oxford.
- 2017: Understanding Cities through Urban Analytics. RSA Russia Division Global Challenges for Regions and Cities: Adaptation, Development, Governance, Yekaterinburg, Russia.
- Advances in Geographic Data Science and Urban Analytics. Urban Data Science Seminar, AMS-MIT, Amsterdam.

- Mapping Urban Structure through Geodemographic Classification. Korean Research Institute for Human Settlements (KRIHS), Sejong, South Korea.
- Keynote: A New Methodology for Geodemographics Using Open and Commercial Big Data. International Conference on Geospatial Information Science, Seoul, South Korea.
- Keynote: British Town Centres and High Streets: Current Trends and Performance. Royal Town Planning Institute, Kendal [with Dolega L]
- 2016: Human Dynamics and Urban Structure. UBDC, Glasgow University, Glasgow
- Urban Analytics - City Structure and Function. CURDS, Newcastle University, Newcastle.
- Consumer Data Research and Census Enumeration. Office for National Statistics, Southampton for National Statistics, Southampton.
- E-Resilience and Retail. Said Business School, University of Oxford, Oxford.
- Education Panel. ESRI UK Conference, London.
- Geographic Data Science New Forms of Data and Policing. Crime, Policing and Citizenship Closing Event, London.
- Keynote: Geography and Access. Brilliant Club, Stoke on Trent.
- Keynote: Teaching to the Converted: From GIS to Geographic Data Science. OSGIS 2016, Ostrava, Czech Republic.
- Turning Big Data Into Information. University of Cambridge / Princes Teaching Trust, Cambridge.
- 2015: Geographic Data Science and School Markets. Oxford-Man institute, University of Oxford, Oxford.
- Geodemographics in an Academic Context. University of Liverpool, Liverpool.
- Developments in Spatial Data Visualisation. Said Business School, University of Oxford, Oxford.
- Reproducible Research: Open Methods and Data. Regional Studies Association, Sheffield.
- 2014: What is so Big about Big Data? Some Observations on Open Data and Systems. National University of Maynooth, Ireland.
- Cities and Context: The Codification of Small Areas through Geodemographic Classification. Code and the City Conference, Ireland.
- The Geodemographics of Use and Engagement with the Internet. Market Research Society, London.
- Changed Face of GIS – Curriculum Challenges and Reproducible Methods. Irish Organisation for Geographic Information, Ireland.
- Advances in the Geodemographic Study of Population and Place. University of Oxford, Oxford Institute of Ageing.
- The Past Present and Future of Spatial Analytics with Big Data. Department of Geography, University of Leeds, Leeds.
- Geodemographics and the Internal Structure of Cities. Cardiff University, Cardiff.
- 2013: Advances in Geographic Information Science and the Population of Blackpool. Blackpool Geographical Association, Blackpool.
- Geodemographics and Higher Education. Kings College London, London.
- 2012: Advances in Geographic Visualisation. University of Oxford, Oxford.
- 2011: Advances in Geographic Visualisation. University of Oxford, Oxford.
- Spatial Analysis using the National Pupil Database. PLASC/PLUG User Conference, London.

- 2010: Advances in Geographic Visualisation. University of Oxford, Oxford.
Thought Provoking Applications of OAC: Widening Participation in Higher Education.. LARIA: Output Area Classification: Current and Potential Uses, Birmingham.
- 2009: Geodemographic Visualisation. Society for Location Analysis, London.
Geographic Visualisation: Neogeography and Area Classification. OACUG Geodemographic Visualisation Conference, London.
Introduction to the Output Area Classification Online. ESRC Research Methods Workshop: Measuring Segregation: Methods, Tools and Data, Bristol.
Public Engagement: The London Profiler, Public Profiler and the E-Society Classification.. S4 Conference, London.
Putting Social Care Commissioning at the Heart of Personalisation. Local Government Information Unit, London.
- 2008: Communicating Geodemographics. Market Research Society, London.
Research Frontiers: Neogeography and GIS applications for Spatial Decision Making. University of Nottingham, Nottingham.
What are Geographic Information Systems for the Google generation?. 3rd ESRC Research Methods Festival, Oxford.
- 2007: The Geography of Classification: Geodemographic Analysis and Mapping. Teacher Schools Network Master Class, Norwich.
A Meritocratic Market? Tailoring Geodemographics for use in Higher Education Widening Participation. University of Bristol, Bristol.
Open Source Geodemographics: Applications for Education. University of Sheffield, Sheffield.
Turning Data into Information: Geodemographic Applications. Ritsumeikan University, Kyoto, Japan.
- 2006: Demonstration of Institutional and Subject Geodemographic Profiling. University College London, London.
- 2005: Marketing a New Market?. UCAS Admission Officers Conference, Keele.
- 2004: Geodemographics for Education. UCAS Admission Officers Conference, Reading.
Tailored Geodemographics - The Construction of an Educational Mosaic. LSDA Research Conference, London.

Professional and Administrative Activities

Journal Editorial

- 2015-2019 Europe, Middle East and Africa Editor - Transactions in GIS.
- 2013-2015 Editor in Chief - Regional Studies and Regional Science (First Open Access journal from Taylor and Francis))
- 2012 – 2015 Book Reviews Editor - Environment and Planning B.

Administrative Experience

- 2020 - Academic Sponsor for the new ~£40m Env. Science Building
- 2018 - Co-Lead of University “Digital” Research Theme
- 2018 - Cover for Faculty of Science & Engineering APVC for 6 weeks
- 2018 - Industrial Strategy Committee

2017-2018	REF Geography Impact Lead
2017-	Course Director MSc/PhD Data Analytics and Society
2014-2016	Course Director - MSc Geographic Data Science.
2012-2013	Management of Department of Geography and Planning website. REF internal reviewer Undergraduate admissions (strategic)
2011-2012	Year tutor REF internal reviewer
2010-2011	Staff student liaison committee

External Examination Experience

2019-2021	Maynooth University, Ireland: MSc GIS and Remote Sensing.
2019-2021	University of Leicester: MSc Geographic Information Science.
2015-2018	University of Warwick: MSc in Big Data and Digital Futures, and MSc in Urban Informatics and Analytics).
2016-2019	University College London: MSc Geospatial Analysis.

External Review / Panel Experience

2021	ESRC Steered Studentship Assurance Checking Panel
2020	UK Statistics Authority Digital Economy Act SRS Research Approval Panel ESRC Steered Studentship Assurance Checking Panel
2019	ESRC Turing Fellowship
2018	ESRC Review DTP National Productivity Investment Fund. ESRC Steered Studentship Assurance Checking Panel.
2017 -	UKCRIC (UK Collaboratorium for Research on Infrastructure and Cities) Data and Analytics Facility for National Infrastructure (DAFNI) Expert Panel.
2017	JISC - Geospatial Platform Evaluation.
2015-2016	University of Leeds: MOT Project (EPSRC), Advisory Panel.

Organisational Roles within Professional Societies

- Chair of the GIScience Research Group at the Royal Geographical Society with the Institute of British Geographers (2014–15).
- Chair of the Output Area Classification User Group at the Royal Statistical Society (2010-14).
- Chair of the Quantitative Methods Research Group at the Royal Geographical Society with the Institute of British Geographers (2008-11).

Membership of Professional Societies

- Fellow of the Royal Geographical Society (2003 -).
- Member of the Association of American Geographers (2003 -).

Academic and Professional Duties

Current PhD Students

- Patrick Ballantyne (2018 –) ESRC CDAS CDT

- Sian Teesdale (2018 –) ESRC CDAS CDT
- Melanie Green (2017 –) ESRC CDAS CDT
- Susannah Philp (2017 –) ESRC CDAS CDT
- Krasen Samardzhiev (2017 –) ESRC CDAS CDT
- Sam Comber (2016 -) ESRC NWSSDTP
- Meixu Chen (2016 –) Self Funded

Completed PhD Students

- Yunzhe Liu (2016 - 2021) Self Funded
- Alec Davies (2015 - 2020) ESRC NWSSDTP
- Ellen Talbot (2015 - 2021) ESRC NWSSDTP
- Alexander Alexiou (2013 – 2017) - ESRC NWSSDTP
- Linda Blade (2012-2016) - ESRC NWSSDTP
- Liam Bratley (2012-2016)
- Dean Riddlesden (2011-2015) - ESRC NWSSDTP
- Tammy Thiele (2012 – 2015) – University of Liverpool
- Chris Gale (2011-2014) – University College London
- Paul Richards (2010-2013) - ESRC
- Muhammad Adnan (2009-2012) - University College London

Post-Doctoral Researchers / Support Staff

- Gregory Palmer (2019 - 2020)
- Jacob Macdonald (2019 -) - Data Scientist / PDRA
- Nina Yang (2019-2020)
- Andy Lee (2018 -) – Secure Lab Manager
- Konstantinos Daras (2016 -2019) – Data Scientist / PDRA
- Hai Nyguen (2015 – 2019) – Data Scientist / PDRA
- Alexander Alexiou (2017 – 2018) – Data Scientist / PDRA
- Patrick Bonnet (2015-2017) – Secure Lab Manager
- Nick Bearman (2014 – 2016) – PDRA
- Les Dolega (2014-2017)
- Michail Pavlis (2014 – 2017)
- Ferran Espuny (2014 - 2016)
- Oliver O'Brien (2008 – 2009)

PhD Examination

- Grant Tregonning, Newcastle University (2021)
- Amanda Otley, University of Leeds (2021)
- James Smith, Kings College London (2019)
- Alyson Lloyd, University College London (2018)
- Vasileios Vlastaras, University of Manchester (2018)
- Adi Yudono, Sheffield University (2017)
- Matthew Wallace, University of Liverpool (2016)
- Elena Kirby-Hawkins, University of Leeds (2016)
- Ashley McCormick, University of Liverpool (2012)

Referee on Articles Submitted to International Journals

Area; Environment and Planning B (Planning and Design); Computers, Environment and Urban Systems;
 International Journal of Health Geographics; International Journal of Pattern Recognition; Papers in Regional
 Science; Geographical Analysis; Annals of the AAG; Applied Spatial Analysis and Policy; Environmental Modelling;

International Journal of Geographic Information Science; Educational Research Journal; URISA Journal; Journal of Maps; Journal of Urban Technology; PLOS One.

Conference and Seminar Organisation

- 2019: Session Organiser: Urban Data Science. Association of American Geographers Conference, Washington D.C.
- 2018: Programme Committee GIScience 18, Melbourne
Session Organiser: New Horizons in Human Dynamics Research: Innovations in Urban Analytics. Association of American Geographers Conference, New Orleans.
- 2017: Session Organiser: Geographic Data Science. Association of American Geographers Conference, Boston.
- 2016: OSGIS 2016 Programme Committee.
Session Organiser: Symposium on Human Dynamics Research: Urban Analytics. Association of American Geographers Conference, Boston.
Programme Committee GIScience 16, Montreal
- 2015: Session Organiser: New Methods in the Spatial Analysis of Populations. Association of American Geographers Conference, Chicago.
- 2014: OSGIS 2014 Programme Committee.
Session Organiser: Demography, Identity and Dynamics. Association of American Geographers Conference, Tampa.
- 2013: GIS Research UK Conference Chair (<http://liverpool.gisruk.org>).
GIS Ostrava 2013 Member of the Scientific Committee, Czech Republic
- 2012: OSGIS 2012 Programme Committee.
Session Organiser: New approaches in quantitative social geography: new data, new methods, new insights. Association of American Geographers Conference, New York.
- 2010: Making Efficiency Saving with OAC by Understanding Total Place. Output Area Classification User Conference, London.
Session Convenor The Spatial Dimensions of Health. Royal Geographical Society Annual International Conference, London.
- 2009: Session Convenor New Urban Geography: Evolving Area Classification for Socio-Spatial Generalisation. Royal Geographical Society Annual International Conference, Manchester, 26-28 August.
Organising committee for the 2010 GIS Research UK Conference. London, University College London.
Conference Organiser - Output Area Classification User Conference.
- 2006: Co-Organiser, Spatial Literacy in Teaching: Communicating GIScience, London.
Co-Organiser, Spatial Literacy, Student Recruitment and Widening Participation, London.

Impact, Industrial Collaboration and Professional Practice

Impact – REF 2021

Lead author of a REF2021 Impact case study for Unit of Assessment 11 (Computer Science and Informatics) titled “Geodemographic classifications boost public service provision, encourage sustainable travel, promote the arts, and aid advocacy efforts”. The University of Liverpool’s Geographic Data Science Lab (GDSDL) applied machine learning to create geodemographic classifications from high-dimensional spatial data. These classifications are open, reproducible,

and more accurate than their predecessors. They have generated extensive impact in the public, private, and third sectors, including on public health, sustainable travel, and promotion of the arts, for example:

- Hull City Council built a classification using GDSL's methodology to boost services and promote the arts for ~260K residents.
- Transport for London collaborated with GDSL to create a classification that transformed travel policy development and implementation, benefitting those making ~29M daily trips.
- The Office for National Statistics enhanced six impactful surveys using a GDSL classification.
- A West End theatre production used a GDSL classification for the regional rollout of shows.
- US-based company CARTO used GDSL's classifications in their platform (300K+ users).

Industrial Collaboration

The ESRC Consumer Data Research Centre (CDRC) is part of the ESRC Big Data Network Phase II which was funded to establish centres of excellence for collaborative research involving business and local government data. All CDRC research is conducted in collaboration with national retailers and consumer data companies. Data holdings have included but not limited to: Shop Direct, Appliances Online and the Local Data Company. Additionally the CDRC Masters dissertation scheme includes the following additional retailers: Tesco, GlaxoSmithKline, British Gas, Easy Jet, E.ON, Sainsbury's, The Co-Operative, Argos, Thomas Cook, Camelot, Boots, Go Henry and CACI.

Ongoing Recent Knowledge Exchange

Retail Centre Catchments: An outcome of the ESRC grant *The e- Resilience of British Retail Centres* was software code that implements a modified Huff model to estimate catchment areas for retail centres. This software has been utilised by Countdown Supermarkets, New Zealand for store location analysis; and outputs are incorporated into the Local Data Company, UK suite of products.

Internet User Classification: An output of Singleton et al (2016) was a geodemographic of contemporary Internet use and behaviour. This has been used within Boots customer segmentation models; and has been presented at the Office for Nation Statistics as a potential method for exploring future Census undercounting when the survey is conducted online. The success of this project also led to a double page feature in the ESRC Magazine – Britain in 2016.

London Output Area Classification (LOAC): Created in collaboration with the Greater London Authority the LOAC classification summarises the characteristics of London neighbourhoods and provides an open source alternative to commercial geodemographics. The classification has gained widespread use, and now forms input to a recent Transport for London passenger segmentation utilised in their demand planning process.

US Open Geodemographics: This was the first US open geodemographic classification as detailed in Spielman and Singleton (2015), but with the classification, code and data disseminated publically. The classification has been utilised by the Center for Health and Social Research for health segmentation and additionally the US charity People for Bikes.

Other Education and Qualifications

NVQ Level 4 in Management (part time) (2003-05).

NVQ Level 3 in Supervisory Management (part time) (1998-99).

A Levels in Biology (B), Business (B), Geography (A) (1996-98)

Other Work Experience

Researcher - Open University: Knowledge Media Institute (Summer Work) (2003).

Web Designer - BDH TBWA New Media Department (Summer Work) (2002).

Marketing and Information Technology Assistant - Cascade Consulting (Summer Work) (2002).

Researcher - Open University: Centre for New Media (Summer Work) (2001).

Researcher - Open University: Knowledge Media Institute (Summer Work) (2000).

Web Developer and Webmaster - Denbigh School (Gap Year) (1999).

Recruitment Assistant - Alenia Marconi (Gap Year- Year in Industry Scheme) (1998).

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