Sandro Sousa

PhD Candidate in Complex Systems at the School of Mathematical Sciences, QMUL

London, United Kingdom

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Personal information

Language   Portuguese (mother tongue), English (full professional proficiency)

Research Interest

- Dynamical processes on networks with focus on random walks
- Spatial heterogeneity of complex systems
- Networks approach to the analysis of data sets
- Applications of complex networks theory to society and urban systems
- Modelling population dynamics, urban segregation and mobility patterns

Employment history

Queen Mary University of London   *London, UK*

PhD Candidate in Mathematical Sciences - Complex Systems Group   *Sep 2017 - Sep 2021 (Expected)*

- Research concentrates on quantifying the heterogeneity of spatial systems through random walks on graphs.
- Development of a data-driven and graph-based method to quantify urban segregation in cities through diffusion (random walks).
- Development of a graph-based model for the emergence of segregation driven by mobility and homophily parameters.

University of São Paulo, Birkbeck University of London   *São Paulo, BR | London, UK*

Research Associate   *May 2016 - Aug 2017*

- Collaboration with Brazilian and British academics on a project (funded by ESRC (UK) and FAPESP (BR)) comparing the cities of London and São Paulo for social segregation and transport accessibility.
- Research, design and development of computational and statistical methods on Python to measure socio-economic segregation in urban areas.
- Development of a QGIS plugin to compute several segregation measures.

Braskem   *São Paulo, BR*

Business Intelligence Architect   *Dec 2011 - Jun 2014*

- Responsible for managing Business Intelligence projects on the SAP ERP and data warehouse platform.
- Research and design of innovative practices to maintain and improve the company-wide data warehouse.
- Involvement in projects full cycle, from ETL flow to analytic dashboards, including: budgeting, prototyping, development, testing and deployment of data solutions to support the purchasing department.

Accenture   *São Paulo, BR*

Business Intelligence Consultant   *Oct 2010 - Dec 2011*

- Contribution to global business intelligence projects in the SAP data warehouse platform.
- Involvement in mapping data needs, design, development, testing and deployment of data solutions.

DBM Systems   *São Paulo, BR*

Business Consultant   *Feb 2010 - Oct 2010*

- Responsible for mapping, design, development and deployment of business processes on the TOTVS ERP platform.
- Involvement in the project's full life cycle.

Totvs   *Maringá, BR*

Business Analyst   *Aug 2009 - Feb 2010*

- Design, development and deployment of business processes on the TOTVS ERP platform.

MRV Engenharia   *Belo Horizonte, BR*

ERP Systems support Intern   *Jul 2008 - Apr 2009*

- Responsible for supporting the TOTVS ERP platform and Microsoft Dynamics CRM.

Qualifications

QMUL (Queen Mary University of London)   *London, UK*

PhD in Mathematical Sciences   *Sep 2017 - Sep 2021 (expected)*

- Thesis: Quantifying the heterogeneity of spatial systems through diffusion.

USP (University of São Paulo)   *São Paulo, BR*
MSc in Complex Systems Modelling   *Feb 2014 - Jun 2016*
- Dissertation: Study of properties and robustness of the public transport network of São Paulo.

Business School São Paulo   *São Paulo, BR*
Postgraduate Certificate in Information Management and Business Intelligence   *Aug 2012 - Aug 2013*
- Dissertation: Failures in Business Intelligence projects: Complexity management tools to reverse this scenario.

Inforium College of Technology   *Belo Horizonte, BR*
Graduate Diploma in Computer Network Management   *Jul 2006 - Dec 2008*

Scholarships and Awards

2021	**Santa Fe Institute tuition assistance, $700**, SFI Complexity Interactive (SFI-CI), The Santa Fe Institute.	*Online*
2020	**Queen Mary Postgraduate Research Fund, £2.000**, Complex Systems Summer School*, The Santa Fe Institute.	*Santa Fe, US*
2020	**Institute of Mathematics and its Applications Small Grant, £600**, Complex Systems Summer School*, The Santa Fe Institute.	*Santa Fe, US*
2020	**Scholarships for Events on Complex Systems, €300**, Complex Systems Summer School*, The Santa Fe Institute.	*Santa Fe, US*
2019	**Complex Systems Society Scholarship, €500**, Mediterranean School of Complex Networks, Fondazione Bruno Kessler.	*Salina, IT*
2019	**Scholarships for Events on Complex Systems, €300**, Complexity72h Workshop, IMT School for Advanced Studies Lucca.	*Lucca, IT*
2017	**Queen Mary Principal's Award**, PhD Research Studentship, Queen Mary University of London.	*London, UK*
2016	**Technical Training Award**, Research Scholarship, Sao Paulo Research Foundation (FAPESP).	*Sao Paulo, BR*
2016	**Travel Grant**, Summer School on Understanding Urban Transformations thought Data, Manchester School of Architecture.	*Manchester, UK*
2014	**Research Studentship**, MSc Research Studentship, Coordenação de Aperfeicoamento de Pessoal de Nível Superior (CAPES).	*Sao Paulo, BR*

* The school was cancelled due to the COVID-19 epidemic.

Pre-prints and papers in preparation

1. S. Sousa, V. Nicosia. Quantifying ethnic segregation in cities through random walks, Pre-print.
   Arxiv: arxiv.org/abs/2010.10462

2. A. Bassolas, A. Santoro, S. Sousa, S. Rognone, V. Nicosia. Optimising the mitigation of epidemic spreading through targeted adoption of contact tracing apps, Pre-print. Arxiv: arxiv.org/abs/2102.13013

3. S. Sousa, V. Nicosia. The emergence of segregation driven by mobility and homophily, in preparation.

Papers in international journals

1. A. Bassolas, S. Sousa, V. Nicosia, Diffusion segregation and the disproportionate incidence of COVID-19 in African American communities, **J. R. Soc. Interface**, 18:20200961 (2021). Doi: doi.org/10.1098/rsif.2020.0961

Teaching experience

2019/2021 **Teaching Assistant**, Introduction to Computer Programming in Python (MTH5001).   *QMUL, UK*
2018/2019 **Demonstrator**, Probability and Statistics I (MTH4116/MTH4216).   *QMUL, UK*

Conferences, Schools and Workshops

Conference abstracts (Oral presentation)

Dec 2020 **Conference on Complex Systems**, *The emergence of segregation driven by mobility and homophily.*   *e-Conference, GR*
Sep 2018 **Conference on Complex Systems**, *Quantifying spatial heterogeneity through random walks.*   *Thessalokini, GR*
Sep 2015 **Complex Systems Digital Campus'15 – World**, *Empirical analysis and modelling of urban public transport network of Sao Paulo.*   *e-Conference, US*

Dec 2019	**Alan Turing Institute Data Study Group**, *The National Archives data challenge.*	*London, UK*
Jun 2019	**Complexity72h Workshop**, *Community Detection in the Hyperbolic Space*, arxiv.org/abs/1906.09082.	*Lucca, IT*
Sep 2016	**DACAS Summer school on Understanding Urban Transformations through Data**, Project collaboration.	*Manchester, UK*
Jun 2016	**DACAS/ICTP Workshop on Modelling of Urban Systems**, Project collaboration.	*Sao Paulo, BR*
Sep 2015	**School on Complex Networks and Applications to Neuroscience**, Project collaboration.	*Sao Paulo, BR*

OTHER RELEVANT ACADEMIC ACTIVITIES

Mar 2021	Fourth Northeast Regional Conference on Complex Systems NERCS.	*e-Conference, US*
Oct 2020	Fifth symposium on spatial networks (SSN5).	*e-Conference, UK*
Sep 2020	NetSci International Conference on Network Science.	*Online, IT*
Sep 2019	Mediterranean School of Complex Networks.	*Salina, IT*
Jul 2019	3rd UK Network Science Workshop.	*Leeds, UK*
Jul 2019	International Workshop on Networks and Urban Systems.	*London, UK*
Oct 2018	2nd UK Network Science Workshop.	*London, UK*
Jun 2018	NetSci International Conference on Network Science.	*Paris, FR*
May 2018	Network Micro-structures Workshop.	*London, UK*
Apr 2018	The Second King's Workshop on Random Graphs and Random Processes.	*London, UK*
Jan 2018	Next Generation Network Analytics.	*London, UK*
Mar 2016	Workshop on Agent-Based Modelling for Social Sciences.	*Sao Paulo, BR*

Outreach

Co-organiser Pint of Science *London, UK*
QUEEN MARY UNIVERSITY OF LONDON CHAPTER *2020*
• Outreach event to bring scientists to talk about their work to a general audience (https://pintofscience.com).

CO-organiser PubhD *London, UK*
PUBHD LONDON CHAPTER - SELF ORGANISED *2019 - 2020*
• Self organised event to bring PhDs to talk about their research in a pub.

Computing Skills

Adanced	Python, Git, QGIS, SAP BW.
Intermediate	macOS, SQL Database, Shell scripting, GNU Parallel, LaTeX.
Basics	R language, Netlogo, Qt framework.