# Sandro Sousa

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

*London, United Kingdom*

✉ sandrofsousa@gmail.com | 🏠 sandrosousa.com | ⌂ sandrofsousa | 🐦 @sandrofsousa | arxiv.org/a/ferreirasousa_s_1

## Research Interest

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

## Employment history

### Queen Mary University of London
*London, UK*

PhD Candidate in Complex Systems — *Jun 2017 - Current*

- Research concentrates on quantifying the heterogeneity of spatially-embedded systems through random walks.
- Development of a method using random walk on graphs to quantify urban segregation in real cities.
- Development of a segregation model driven by mobility and homophily.

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

Research Associate — *May 2016 - May 2017*

- Contribution to the project in collaboration with Brazilian and British academics entitled RESOLUTION where the cities of London and São Paulo were compared in respect to social segregation and transport accessibility (funded by ESRC (UK) and FAPESP (BR)).
- Development of a QGIS plugin to compute a set of segregation measures.

### Braskem
*São Paulo, BR*

Business Intelligence Architect — *Dec 2011 - Jun 2014*

- Management of business Intelligence projects.
- Involvement in project's full cycle including design, development and deployment of data solutions on the SAP ERP platform.

### Accenture
*São Paulo, BR*

Business Intelligence Consultant — *Oct 2010 - Dec 2011*

- Design, development and deployment of business Intelligence solutions on the SAP platform and SQL Server databases.

### DBM Systems
*São Paulo, BR*

Business Consultant — *Feb 2010 - Oct 2010*

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

### Totvs
*Maringá, BR*

Business Analyst — *Aug 2009 - Feb 2010*

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

### MRV Engenharia
*Belo Horizonte, BR*

ERP Systems support Intern — *Jul 2008 - Apr 2009*

- Technical support to TOTVS ERP platform and Microsoft Dynamics CRM.

## Education

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

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

- Thesis: Quantifying the heterogeneity of spatially-embedded systems through random walks.

### USP (University of São Paulo)
*São Paulo, BR*

MSc in Complex Systems Modelling — *2014 - 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 — *2012 - 2013*

- Dissertation: Failure in Business Intelligence projects: Complexity management tools to reverse that scenario.

**Inforium College of Technology**                                                                        *Belo Horizonte, BR*
GRADUATE DIPLOMA IN COMPUTER NETWORK MANAGEMENT                                                            *2006 - 2008*

## Scholarships and Awards

2020  **Queen Mary Postgraduate Research Fund, £2.000**, Complex Systems Summer School*, The Santa Fe      *Santa Fe, US*
      Institute.

2020  **Institute of Mathematics and its Applications Small Grant, £600**, Complex Systems Summer School*, The   *Santa Fe, US*
      Santa Fe Institute.

2020  **Scholarships for Events on Complex Systems, €300**, Complex Systems Summer School*, The Santa Fe     *Santa Fe, US*
      Institute.

2019  **Complex Systems Society Scholarship, €500**, Mediterranean School of Complex Networks, Fondazione   *Salina, IT*
      Bruno Kessler.

2019  **Scholarships for Events on Complex Systems, €300**, Complexity72h Workshop, IMT School for Advanced  *Lucca, IT*
      Studies Lucca.

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   *Manchester, UK*
      of Architecture.

2014  **Research Studentship**, MSc Research Studentship, Coordenação de Aperfeicoamento de Pessoal de Nível   *Sao Paulo, BR*
      Superior (CAPES).

\* 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: https://arxiv.org/abs/2010.10462

2. 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)

## 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 modeling of urban public transport*   *e-Conference, US*
          *network of Sao Paulo.*

### WORKSHOP COLLABORATIONS

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.*                          *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

Oct 2020  Attended, Fifth symposium on spatial networks (SSN5)                                               *e-Conference, UK*
Sep 2020  Attended, NetSci International Conference on Network Science                                        *Online, IT.*
Sep 2019  Attended, Mediterranean School of Complex Networks                                                 *Salina, IT.*

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| Jul 2019 | Attended, 3rd UK Network Science Workshop | *Leeds, UK.* |
| Jul 2019 | Attended, International Workshop on Networks and Urban Systems | *London, UK.* |
| Oct 2018 | Attended, 2nd UK Network Science Workshop | *London, UK.* |
| Jun 2018 | Attended, NetSci International Conference on Network Science | *Paris, FR.* |
| May 2018 | Attended, Network Micro-structures Workshop | *London, UK.* |
| Apr 2018 | Attended, The Second King's Workshop on Random Graphs and Random Processes | *London, UK.* |
| Jan 2018 | Attended, Next Generation Network Analytics | *London, UK.* |
| Mar 2016 | Attended, 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*
- 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

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| **Adanced** | Python, Git/GitHub, QGIS, SAP BW |
| **Intermediate** | macOS, SQL Database, UML, Linux, LaTeX. |
| **Basics** | R language, Netlogo |