Marcos Oliveira

Contact Information	Department of Computer Science University of Exeter, Exeter, UK	*E-mail*: *Web*:	m.a.oliveira@exeter.ac.uk https://marcosoliveira.info/

Research Interests

My research interests stem from my desire to understand the emergence of complex phenomena. I am interested in understanding real-world complex systems using data-driven approaches, with a focus on cities, human dynamics, and self-organizing mechanisms. My work explores how urban crime emerges and exhibits regularities in cities. I also investigate the mechanisms underlying inequality in urban areas and social environments.

keywords: complex systems | computational social science | city science | swarm intelligence

Education

2013–2017   Ph.D. Computer Science, *Florida Institute of Technology*, USA
Dissertation: "The Growth, Structure, and Dynamics of Crime in Cities"

2011–2013   M.Sc. Computer Engineering, *Universidade de Pernambuco*, Brazil

2006–2011   B.Sc. Computer Engineering, *Universidade de Pernambuco*, Brazil

Academic Positions

2020 – present   Lecturer (Assistant Professor) in City Science & Analytics
University of Exeter, Exeter, UK

2018 – 2021   Postdoctoral researcher
GESIS–Leibniz Institute for the Social Sciences, Cologne, Germany

2017 – 2017   Graduate Research Assistant
Florida Institute of Technology, Melbourne, USA

Administrative Responsibilities

2020 – present   Director of Global Development, Computer Science, University of Exeter, UK

Grants

2021-2022   "News diets & citizenship: A study combining web tracking data and surveys." (co-PI) Facebook Foundational Integrity & Impact Research: Misinformation and Polarization, Facebook Inc, $50,000.

2021-2022   "Lockdown on the Web: The unequal impact of the COVID19 pandemic on people's web browsing behaviour." (co-PI) Independent Research Grant, Universität Konstanz, €10,000.

2020-2021   "Automated Model Build for Decarbonisation and Climate Resilience." (co-PI) Innovate UK grant with City Science Ltd., UKRI, £265,561.

Selected Publication

Complete list at Google Scholar. Total citations: 295, h-index: 11, i10-index: 12 (January 2022).

Journal

- **Oliveira, M.** More crime in cities? On the scaling laws of crime and the inadequacy of per capita rankings—a cross-country study. *Crime Science* (2021) **10**:27.

- **Oliveira, M.**, Pinheiro, D., Macedo, M., Bastos-Filho, C., and Menezes, R. Uncovering the social interaction network in swarm intelligence algorithms. *Applied Network Science* (2020) **5**:24.

- **Oliveira, M.**, Ribeiro, E., Bastos-Filho, C., and Menezes, R. Spatio-temporal variations in the urban rhythm: the travelling waves of crime. *EPJ Data Science* (2018) **7**:29.
  - Highlight on SpringerBlog, EPJ.org, and PLOS Complexity Channel

- **Oliveira, M.**, Bastos-Filho, C., and Menezes, R. The scaling of crime concentration in cities. *PLOS ONE* (2017) **12**(8): e0183110. ● Highlight on Florida Tech's Blog

Conference (refereed)

- Kulshrestha, J., **Oliveira M.**, Karaçalık, O., Bonnay, D., and Wagner, C. Web Routineness and Limits of Predictability: Investigating Demographic and Behavioral Differences Using Web Tracking Data.

In: *Proceedings of AAAI International Conference on Web and Social Media (ICWSM)*, 2021.

- Barbosa, H., **Oliveira, M.**, Pacheco, D., Menezes, R., and Goshal, G. "The Influence of the Circadian and Ultradian Rhythms to Human Mobility: Empirical Evidences from Location-Based Check-Ins" In: *First Northeast Regional Conference on Complex Systems*, 2018. Binghamton, NY, USA.

- Pacheco, D., **Oliveira, M.**, and Menezes, R. Towards a framework to assess social disorganization in neighborhoods using social media: a case study on football supporters in the United Kingdom. In: *AI4BigData at the 30th International FLAIRS Conference*, 2017. Marco Island, Florida, USA.

- Elliott, D., Tomasini, M., **Oliveira, M.**, and Menezes, R. Tippers and Stiffers: an Analysis of Tipping Behavior in Taxi Trips. In: *IEEE Ubiquitous Intelligence and Computing*, 2017. San Francisco, California, USA.

- **Oliveira, M**., Pinheiro, D., Macedo, M., Bastos-Filho, C., and Menezes, R. Better Exploration–Exploitation Pace, Better Swarm: Examining the Social Interactions. In: *4th IEEE Latin American Conference on Computational Intelligence (LA-CCI)*, 2017. Arequipa, Peru.

- **Oliveira, M.**, Pinheiro, D., Andrade, B., Bastos-Filho, C., and Menezes, R. Communication Diversity in Particle Swarm Optimizers In: *Tenth International Conference on Swarm Intelligence (ANTS)*, 2016. Brussels, Belgium.

- **Oliveira, M.**, Serrano, H., Yehle, T., White, S., and Menezes, R. From Criminal Spheres of Familiarity to Crime Networks. In: *The 6th Workshop on Complex Networks (Complenet)*, 2015. New York, USA.

- White, S., Yehle, T., Serrano, H., **Oliveira, M.**, and Menezes, R. The Spatial Structure of Crime in Urban Environments. In: *The 6th International Conference on Social Informatics. First Workshop on Criminal Network Analysis and Mining*, 2014. Barcelona, Spain.

- **Oliveira, M.**, Bastos-Filho, C., and Menezes, R. Towards a Network-based Approach to Analyze Particle Swarm Optimizers. In: *Proceedings of IEEE Swarm Intelligence Symposium*, 2014. Orlando, USA.

- **Oliveira, M.**, Bastos-Filho, C., and Menezes, R. Political Social Networks Reveal Strong Party Loyalty in Brazil and Weak Regionalism In: *The Sixth ASE International Conference on Social Computing*, 2014. Stanford, USA.

- **Oliveira, M.**, Bastos-Filho, C., and Menezes, R. Using Network Science to Define a Dynamic Communication Topology for Particle Swarm Optimizers. In: *The 3rd Workshop on Complex Networks (Complenet)*, 2012. Melbourne, Florida, USA.

- Bastos-Filho, C., **Oliveira, M.**, Nascimento, D., and Ramos, A. Impact of the Random Number generator quality on particle swarm optimization algorithm running on graphic processor units In: *Proceedings of the Tenth IEEE International Conference on Hybrid Intelligent Systems*, 2010. Atlanta, USA.

Book Chapter

- Schaible, J., **Oliveira, M.**, Zens, M., and Génois, M. Sensing close-range proximity for studying face-to-face interaction. In: *Handbook of Computational Social Science*. Routledge, 2021.

- **Oliveira, M.**, and Menezes, R. "Spatial concentration and temporal regularities in crime" To appear in: *Understanding Crime through Science* (Springer, 2022). **[arxiv]**

Manuscripts

Under Review

- **Oliveira, M.**, Karimi, F., Zens, M., Schaible, J., Génois, M., and Strohmaier, M. "Group mixing drives inequality in face-to-face gatherings" (*manuscript submitted for publication*) **[arxiv]**

- Pacheco, D., **Oliveira, M.**, Chen, Z., Barbosa, H., Foucault-Welles, B., Ghoshal, G., and Menezes, R. "Predictability states in human mobility" (*manuscript submitted for publication*) **[arxiv]**

In Press

- Santana, C., **Oliveira, M.**, Bastos-Filho, C., and Menezes, R. "Beyond exploitation: measuring the impact of local search in swarm-based memetic algorithms through the interactions of individuals in the population" (*accepted for publication in Swarm and Evolutionary Computation*)

Supervision

2021	Postdoctoral researcher: Dr. Ned Taylor (co-supervision)
	UKRI/Innovate UK project: "Automated Model Build for Decarbonisation and Climate Resilience"
2021	PhD student: Sima Farokhnejad (co-supervision)
	Project: "Modelling the movement of livestock trade under uncertain conditions"
2020-2021	MSc students: supervision of 10 students' 4-month projects. Highlights:
	Wenkai Zeng. "On the scalability limits of particle swarm optimizers" (2021 Best Project Award)
	Daniel Griffiths. "The privacy bounds of web-browsing datasets"

Teaching Experience

2020-2021	*Social and Professional Issues of the Information Age* (University of Exeter)
	Module in the CS programme (received 4.2/5 total rating from student evaluations)
2021	*Human dynamics and city science*
	Online mini-module at the Exeter School on Urban Analytics, Exeter, UK
2019	*Introduction to Python's graph-tool*
	Tutorial at the 4th European Conference on Social Networks, Zürich, Switzerland
2019	*Introduction to Social Network Science with Python*
	GESIS Methodenseminar, Cologne, Germany
2018	*Performing embarrassingly parallel data analysis with IPython*
	Tutorial at Complexity72h, Lucca, Italy

Professional Service

2021	Sustainability Summer Programme (co-organizer) ● Highlight on Excelence in Education blog
	Summer school on sustainability at the University of Exeter, Exeter, UK
	CompleNet—International Conference on Complex Networks
2021	12th CompleNet Live 2021 (as a co-organizer) [proceedings]
2020	11th CompleNet, Exeter, UK (as the poster chair) [proceedings]
	Social Complex Networks (co-organizer)
2019	Session at the 4th European Conference on Social Networks, Zürich, Switzerland
	NetCrime—Symposium on the Structure and Mobility of Crime (co-organizer)
2019	Satellite workshop at NetSci 2019, Burlington, USA (27 May)
2018	Satellite workshop at NetSci 2018, Paris, France (11 June)
2017	Satellite workshop at NetSci 2017, Indianapolis, USA (19 June)
2015	Satellite workshop at NetSci 2015, Zaragoza, Spain (1 June)

Reviewing & Editing

| Ad Hoc Reviewer | Journal of Quantitative Criminology, Journal of the Royal Society Interface, EPJ Data Science, IEEE Transactions on Evolutionary Computation, PLOS One, Applied Network Science, Heliyon, Engineering Optimization, IEEE Computational Intelligence Magazine, MethodsX. |
| Guest Editor | Applied Network Science journal, special issue: "Structure and dynamics of crime." |

Awards

| 2017 | Outstanding Graduate Student of the Year, Florida Institute of Technology |
| 2016 | Outstanding Graduate Student of the Year, Florida Institute of Technology |

Personal

| Birthplace | Recife, Brazil | Current city | Exeter, UK |