

Marcos Oliveira

Contact Information Department of Computer Science
University of Exeter, Exeter, UK

E-mail: m.a.oliveira@exeter.ac.uk
Web: <https://marcosoliveira.info/>

Research Interests

My interests stem from my desire to tackle urgent societal challenges via theory-informed, data-driven, computational approaches, focusing on social inequalities, urban crime, and online social behavior.

keywords: computational social science | crime science | network science | computational intelligence

Education

2013 – 2017 **PhD in Computer Science**, Florida Institute of Technology, USA
2011 – 2013 **MSc in Computer Engineering**, Universidade de Pernambuco, Brazil
2006 – 2011 **BSc in Computer Engineering**, Universidade de Pernambuco, Brazil

Academic Positions

2020 – present **Lecturer / Assistant Professor in Computer Science**
University of Exeter, Exeter, UK
2018 – 2021 **Postdoctoral researcher**
GESIS–Leibniz Institute for the Social Sciences, Cologne, Germany

Publications

18 first-author/last-author contributions in journals and conferences.

Total citations: 524, h-index: 13, i10-index: 18 (August 2024).

Full list of publications at the end of this document.

Funding

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 with City Science Ltd., UKRI, £265,561.

Administrative Responsibilities

2020 – 2024 **Director of Global Engagement**, Computer Science, University of Exeter, UK

Teaching Experience

2020-2024 **Social and Professional Issues of the Information Age** (Lecturer; 230 students)
Module in the BSc programme for Computer Science (rated 4.3 out of 5 in student evaluation)
University of Exeter, UK
2022-2024 **Learning from Data** (Co-lecturer; 350 students)
Module in the MSc and BSc programmes for Computer Science (rated 4.5 out of 5 in evaluation)
University of Exeter, UK

- 2021 **Human dynamics and city science** (Lecturer; 10 students)
Online mini-module at the Exeter School on Urban Analytics
 University of Exeter, UK
- 2019 **Introduction to Python's graph-tool** (Co-lecturer; 10 students)
Tutorial session
 4th European Conference on Social Networks, Zürich, Switzerland
- 2019 **Introduction to Social Network Science with Python** (Co-lecturer; 25 students)
Methodenseminar
 GESIS–Leibniz Institute for the Social Sciences, Cologne, Germany
- 2018 **Performing embarrassingly parallel data analysis with IPython** (Lecturer; 10 students)
Tutorial session
 Complexity72h, Lucca, Italy
- 2017 **Complex Networks** (Guest lecturer; 20 students)
Module in the BSc Computer Science programme
 Florida Institute of Technology, Melbourne, USA
- 2016 **Data Structures** (Guest lecturer; 80 students)
Module in the BSc Computer Science programme
 Florida Institute of Technology, Melbourne, USA
- 2008 **Data Structures** (Teaching assistant; 40 students)
Module in the BSc Computer Engineering programme
 University of Pernambuco, Recife, Brazil

Teaching Training

- 2024 **Fellow of the Higher Education Academy**, Advance Higher Education, UK
- 2024 **ASPIRE Fellowship**, University of Exeter, UK

Supervision

- 2021 **Postdoctoral researcher: Dr. Ned Taylor** (co-supervision, University of Exeter)
 UKRI/Innovate UK project: “Automated Model Build for Decarbonisation and Climate Resilience”
- 2024- **PhD student: Anna Kaygorodova** (supervision, University of Exeter)
 Project: “Tackling societal challenges with complex systems and computational social science”
- 2023- **PhD student: Soroush Karimi** (co-supervision, University of Exeter)
 Project: “Complex networks to detect situational inauthentic behaviour online”
- 2021- **PhD student: Sima Farokhnejad** (co-supervision, University of Exeter)
 2024 Project: “Modelling the movement of livestock trade under uncertain conditions”
- 2020- **MSc students** (University of Exeter):
 2022 Supervision of students’ 4-month projects. Highlights:
 Griffiths, D. “The privacy bounds of web-browsing datasets” (manuscript submitted to journal)
 Zeng, W. “On the limits of particle swarm optimizers” (Best Project Award; manuscript in preparation)
- 2020- **Undergraduate students** (University of Exeter):
 2023 Supervision of final-year projects of students at the Computer Science programme. Highlights:
 Attié, M. “Predicting the Dismissal of Managers in Football” (accepted as conference paper)
 Puttock, S. “The role of cities’ attractiveness on urban crime” (in preparation for submission)

Professional Service

- 2023 **Network Structure: The Causes & Effects of Social Phenomena** (co-organizer)
 Satellite workshop at NetSci 2023, Vienna, Austria (10 July)

- 2021 **Sustainability Summer Programme** (co-organizer)
 • Highlight on [Excellence 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 (co-organizer) [\[proceedings\]](#)
 2020 11th CompleNet, Exeter, UK (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

Reviewer	Nature Communications	Nature Cities
	EPJ Data Science	Journal of Quantitative Criminology
	Applied Network Science	Journal of the Royal Society Interface
	PLOS One	Big Data & Society
	PLOS Complex Systems	European Journal on Criminal Policy and Research
	Engineering Optimization	International Journal of Environmental Health Research
	MethodsX	IEEE Transactions on Evolutionary Computation
	Heliyon	IEEE Computational Intelligence Magazine
Editorial Board	PLOS Complex Systems	
Guest Editor	Applied Network Science journal	
	Organized a special issue on “ Structure and dynamics of crime. ”	
Grant Reviewer	EPSRC (UK Research and Innovation)	
	Swiss National Science Foundation	

Awards

- 2024 **Above and Beyond Award for excellent staff performance**, University of Exeter
 2023 **Above and Beyond Award for excellent staff performance**, University of Exeter
 2017 **Outstanding Graduate Student of the Year**, Florida Institute of Technology
 2016 **Outstanding Graduate Student of the Year**, Florida Institute of Technology

List of Publications

Complete list also at <https://scholar.google.com/citations?user=adQX88UAAAAJ>.
 Total citations: 524, h-index: 13, i10-index: 18 (August 2024).

Journal

- [9] Karimi, F., and **Oliveira, M.** [On the inadequacy of nominal assortativity for assessing homophily in networks.](#) *Nature Scientific Reports* (2023) **13**. • Highlight on [Phys.org](#).
- [8] Génois, M., Zens, M., **Oliveira, M.**, Lechner, C., Schaible, J., and Strohmaier, M. [Combining sensors and surveys to study social contexts: Case of scientific conferences.](#) *Personality Science* (2023) **4**.
- [7] **Oliveira, M.**, Karimi, F., Zens, M., Schaible, J., Génois, M., and Strohmaier, M. [Group mixing drives inequality in face-to-face gatherings.](#) *Nature Communications Physics* (2022) **5**, 7.
- [6] **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.

- [5] 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.](#) *Swarm and Evolutionary Computation* (2021) **7**.
- [4] **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.
- [3] **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](#)
- [2] **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](#)
- [1] **Oliveira, M.**, Bastos-Filho, C., and Menezes, R. [Using Network Science to Assess Particle Swarm Optimizers.](#) *Social Network Analysis and Mining* (2015) **5**.1.

Conference (peer-reviewed)

- [20] Barros-Filho, U., Rocha, P., **Oliveira, M.**, Ribeiro, A., Monteiro, R., and Pinheiro, D. [Regularizing Neural Networks with Noise Injection for Classification of Brain Tumor in Magnetic Resonance Imaging.](#) In: *IEEE Latin American Conference on Computational Intelligence (LA-CCI)*, 2023. Recife, Brazil.
- [19] Attié, M., Pacheco, D., and **Oliveira, M.** [Getting the Boot? Predicting the Dismissal of Managers in Football.](#) In: *International Conference on Complex Networks (CompleNet)*, 2023. Aveiro, Portugal.
- [18] Farokhnejad, S., **Oliveira, M.**, Ribeiro, E., and Menezes, R. [Using Vector Fields in the Modelling of Movements as Flows: A Case Study with Cattle Trade Networks.](#) In: *International Conference on Complex Networks (CompleNet)*, 2023. Aveiro, Portugal.
- [17] 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.
- [16] Taw, L., Gurrapadi, N., Macedo, M., **Oliveira, M.**, Pinheiro, D., Bastos-Filho, M., and Menezes, R. [Characterizing the Social Interactions in the Artificial Bee Colony Algorithm.](#) In: *IEEE Congress on Evolutionary Computation (IEEE CEC)*, 2019. Wellington, New Zealand.
- [15] 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.
- [14] 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.
- [13] 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.
- [12] **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.
- [11] **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.
- [10] **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.
- [9] 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.

- [8] **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.
- [7] **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.
- [6] **Oliveira, M.**, Bastos-Filho, C., and Menezes, R. [Assessing Particle Swarm Optimizers Using Network Science Metrics](#). In: *Studies in Computational Intelligence*. Springer Berlin Heidelberg, 2013.
- [5] **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.
- [4] **Oliveira, M.** and Bastos-Filho, C. [Uma Implementação em FPGA de Redes Neurais de Hopfield para Roteamento em Redes de Comunicação](#) (in Portuguese) In: *Anais do X Congresso Brasileiro de Inteligência Computacional*, 2011. Fortaleza, Brazil.
- [3] **Oliveira, M.**, Lacerda, M., Barbosa, E., Barbosa, P., and Bastos-Filho, C. [Car Setup Optimization Using Multi-Objective Swarm Algorithms](#) In: *Anais do X Congresso Brasileiro de Inteligência Computacional*, 2011. Fortaleza, Brazil.
- [2] Bastos-Filho, C., **Oliveira, M.**, Silva, D., and Santana, R. [Optimizing a Routing Algorithm Based on Hopfield Neural Networks for Graphic Processing Units](#) In: *Proceedings of IEEE Symposium on Foundations of Computational Intelligence*, 2011. Paris, France.
- [1] 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 (peer-reviewed)

- [4] 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.
- [3] **Oliveira, M.**, and Menezes, R. “Spatial concentration and temporal regularities in crime” To appear in: *Understanding Crime through Science* (Springer). [\[arxiv\]](#)
- [2] Lins, A., Bastos-Filho, C., Nascimento, D., **Oliveira, M.**, and Lima-Neto, F. [Analysis of the Performance of the Fish School Search Algorithm Running in Graphic Processing Units](#). In: *Theory and New Applications of Swarm Intelligence*. 1ed.: InTech, 2012, v. 1, p. 17-32.
- [1] Bastos-Filho, C., **Oliveira, M.**, and Nascimento, D. [Running Particle Swarm Optimization on Graphic Processing Units](#). In: *Search Algorithms and Applications*. 1ed.: InTech, 2011, v. 1, p. 47-68.

Others

- [1] Karimi, F., **Oliveira, M.**, and Strohmaier, M. [Marginalization Effects in Face-to-face Social Networks](#). Invited post on *SIAM News Blog*, 2022.

In Press

- Poudyal, B., Pacheco, D., **Oliveira, M.**, Chen, Z., Barbosa, H., Menezes, R., and Ghoshal, G. “Dynamic predictability and spatio-temporal contexts in human mobility” (*accepted in Royal Society Interface*) [\[arxiv\]](#)
- Divakamurthy, P., Requião, B., Passold, J., **Oliveira, M.**, and Menezes, R. “On the Dynamics of Circulation of Child Sexual Exploitation Material on the Dark Web” (*accepted in PLOS One*)

Under Review

- **Oliveira, M.**, Yang, J., Griffiths, D., Bonnay, D., and Kulshrestha, J. “Browsing behavior exposes identities on the Web” (*manuscript submitted for publication*) [\[arxiv\]](#)
- Karimi, F., **Oliveira, M.**, and Strohmaier, M. “Minorities in networks and algorithms” (*manuscript submitted for publication*) [\[arxiv\]](#)

- Karimi, S., **Oliveira, M.**, and Pacheco, D. “Modelling Misinformation Spread: The Role of Network Density in Diverse Social Structures” (*manuscript submitted for publication*)
- Xavier, I., Viega, E., Ribeiro, A., Monteiro, R., **Oliveira, M.**, Amaro, R., and Pinheiro, D. “Towards the Identification of Money Laundering in Bank Transactions using Recurrent Neural Networks” (*manuscript submitted for publication*)
- Barros-Filho, U., Ribeiro, A., Monteiro, R., Paiva, R., **Oliveira, M.**, Bastos-Filho, C., and Pinheiro, D. “Achieving Robust Generalization in Out-of-Distribution Data for Deep Neural Networks through Combined Data Augmentation Strategies using Noise Injection” (*manuscript submitted for publication*)

Personal

Birthplace Recife, Brazil

Current city Exeter, UK