Marcos OLIVEIRA

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RESEARCH INTERESTS

My interests lie in complex systems, human dynamics, and self-organizing mechanisms, particularly in using network science and data analysis to assess the emergence of social phenomena in cities such as crime concentration and to unveil the intricacies that drive the intelligence in swarm intelligent algorithms.

EDUCATION

FALL 2013 — FALL 2017	Ph.D. COMPUTER SCIENCE, **Florida Institute of Technology**, USA "The Growth, Structure, and Dynamics of Crime in Cities" Supervisor: Prof. Ronaldo MENEZES
FALL 2011 — SPRING 2013	M.Sc. COMPUTER ENGINEERING, **Universidade de Pernambuco**, Brazil "Assessing and Modifying Information Flows in Particle Swarm Optimizers" Supervisor: Prof. Carmelo BASTOS-FILHO
FALL 2006 — SPRING 2011	B.Sc. COMPUTER ENGINEERING, **Universidade de Pernambuco**, Brazil "Hopfield Neural Networks in FPGA for Routing in Communication Networks" Supervisor: Prof. Carmelo BASTOS-FILHO

PUBLICATIONS

JOURNAL

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. **[doi]**

Oliveira, M., Bastos-Filho, C., and Menezes, R. "**The scaling of crime concentration in cities**" PLOS ONE 12(8): e0183110. 2017. **[doi]**

Oliveira, M., Bastos-Filho, C., and Menezes, R. "**Using Network Science to Assess Particle Swarm Optimizers**" Social Network Analysis and Mining 5.1 (2015): 1-13. 2015. **[doi]**

Oliveira, M., Pinheiro, D., Macedo, M., Andrade, B., Bastos-Filho, C., and Menezes, R. "**Unveiling Swarm Intelligence with Network Science—the Metaphor Explained**" (*manuscript submitted for publication*) **[arxiv]**

CONFERENCE

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: 2019 IEEE Congress on Evolutionary Computation (IEEE CEC), 2019. Wellington, New Zealand.

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: NERCCS 2018: First Northeast Regional Conference on Complex Systems, 2018. Binghamton, NY, USA.

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

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. **[doi]**

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. **[link]**

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

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

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

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. **[doi]**

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. **[doi]**

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, v. 476, p. 173-184. **[doi]**

Oliveira, M., Bastos-Filho, C., and Menezes, R. "**Using Network Science to Define a Dynamic Communication Topology for Particle Swarm Optimizers**" In: Studies in Computational Intelligence. Springer Berlin Heidelberg, 2013, v. 424, p. 39-47. **[doi]**

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. **[doi]**

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. **[doi]**

Bastos-Filho, C. J. A., 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. **[doi]**

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. **[doi]**

BOOK CHAPTER | Oliveira, M., and Menezes, R. "**Spatial concentration and temporal regularities in crime**" To appear in: "Understanding Crime through Science" (Springer, 2019). **[arxiv]**

Lins, A., Bastos-Filho, C.J.A., 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. **[doi]**

Bastos-Filho, C.J.A., 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. **[doi]**

ACTIVITIES

Co-Organizer of NetCrime—Symposium on the Structure and Mobility of Crime, a satellite event at the NetSci conference: NetCrime2015, NetCrime2017, NetCrime2018, NetCrime2019.

RESEARCH EXPERIENCE

Jan/2018 — current | Postdoc researcher
GESIS—Leibniz Institute for the Social Sciences, Germany

Aug/2017 — Dec/2017 | Graduate Research Assistant
"Predicting Human Dynamics under Restrictions of Partial or Incomplete Information"

Army Research Office (ARO) — *Florida Institute of Technology*, USA
PI: Prof. Ronaldo MENEZES and Prof. Gourab GOSHAL

Jun/2014 — Aug/2014	**Graduate Mentor**
	"Uncovering Criminal Networks using Crime Locations"
	National Science Foundation (NSF) — Research Experience for Undergraduates (REU) — *Florida Institute of Technology*, USA
	Undergraduates: Sarah White & Tobin Yehle
	Mentors: Hugo Serrano & Marcos Oliveira
	Supervisor: Prof. Ronaldo MENEZES

Aug/2009 — Oct/2010	**Scientific Initiation**
	"Simulation of Optical Networks using CUDA platforms"
	CNPq/FACEPE — *University of Pernambuco*, Brazil
	Supervisor: Prof. Carmelo BASTOS-FILHO

WORK EXPERIENCE

March 2011 — May 2013	**Software developer**
	FITec – Technological Innovations, Recife, Brazil
	GNU/Linux development for embedded system which included developing several device drivers in order to make use of some ARM features (PWM, GPIO, etc) and peripherals (Buzzer, Sound, WIFI Adapter, etc).

October 2010 — March 2011	**Internship**
	FITec – Technological Innovations, Recife, Brazil
	Development of graphical libraries for embedded systems.

TECHNOLOGIES

Programming languages	Python (pandas, shapefile, numpy, scipy, matplotlib, igraph, networkx), C/C++ (gdal, glib2, cairo, gtk), Bash scripting (bash, awk, sed), R, NetLogo, CUDA, and Java.
Others	MySQL, MongoDB, QGIS, Inkscape, LaTeX, Linux, and MacOS.

AWARDS

April 2016	**Outstanding Graduate Student of the Year**
	Florida Institute of Technology

April 2017	**Outstanding Graduate Student of the Year**
	Florida Institute of Technology

PERSONAL

Place of Birth	Recife, Brazil
Current city	Cologne, Germany