

# Vitoria Aquino Guardieiro

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## Education

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### M.Sc. in Mathematical Modeling

Mar 2021 – Jun 2023

*Getulio Vargas Foundation (FGV)*

*Rio de Janeiro, Brazil*

- Advisors: Jorge Poco (FGV) and Marcos M. Raimundo (State University of Campinas)
- Dissertation: Multi-objective Optimization in Machine Learning - A Systematic Review

### B.Sc. in Applied Mathematics

Feb 2017 – Dec 2020

*Getulio Vargas Foundation (FGV)*

*Rio de Janeiro, Brazil*

- Advisors: Jorge Poco (FGV) and Marcos M. Raimundo (State University of Campinas)
- Bachelor's dissertation: Application of multi-objective optimization in machine learning problems to decrease discrimination

## Publications

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V. Guardieiro, M. M. Raimundo, and J. Poco. (2023). "Enforcing fairness using ensemble of diverse Pareto-optimal models". *Data Mining and Knowledge Discovery*.  
<https://doi.org/10.1007/s10618-023-00922-y>

V. Guardieiro, M. M. Raimundo, and J. Poco. (2022). "Analyzing the Equity of the Brazilian National High School Exam by Validating the Item Response Theory's Invariance". *Proceedings of the 15th International Conference on Educational Data Mining*. <https://doi.org/10.5281/zenodo.6852946>

V. Guardieiro and J. Poco. (2021). "Exploring counterfactual antecedents to reduce criminality in Rio de Janeiro" (Project report). School of Applied Mathematics, Getulio Vargas Foundation.  
<https://hdl.handle.net/10438/31623>

[Under review] P. Solunke, V. Guardieiro, J. Rulff, P. Xenopoulos, G. Y. Y. Chan, B. Barr, L. G. Nonato, and C. Silva. "Mountaineer: Topology-Driven Visual Analytics for Comparing Local Explanations".

[Under review] P. Silva, V. Guardieiro, B. Barr, C. Silva, and L. G. Nonato. "Visagreement: Visualizing and Exploring Explanations (Dis)Agreement".

## Research Experience

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### Research Scientist

Oct 2023 – Now

*New York University*

*New York, US*

- Research on Topological Data Analysis for Machine Learning explainability at the Visualization Imaging and Data Analysis Center (VIDA) with Professor Claudio Silva

### Visiting Researcher

Jan 2023 – Apr 2023

*New York University*

*New York, US*

- Research on Topological Data Analysis for Machine Learning explainability at the Visualization Imaging and Data Analysis Center (VIDA) with Professor Claudio Silva

### Undergraduate Research Assistant

2017 – 2020

*Getulio Vargas Foundation*

*Rio de Janeiro, Brazil*

- Worked with Waze data, developing a clustering algorithm for interval time-spatial structures. Advised by Prof Jorge Poco
- Studied Natural Language Processing, contributing to databases such as Open Multilingual Wordnet (OMW) and Suggested Upper Merged Ontology (SUMO). Advised by Prof Alexandre Rademaker
- Elaboration of the Consumer Price Index - Web (IPC-Web) for the Brazilian Institute of Economics (IBRE). Advised by Prof Renato Rocha Souza

### *Other Experience*

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<b>Teaching Assistant</b> <i>Getulio Vargas Foundation</i>	2018, 2021 – 2022 <i>Rio de Janeiro, Brazil</i>
<ul style="list-style-type: none"> <li>• Disciplines from the B.Sc. in Applied Mathematics and the B.Sc. in Data Science: Machine Learning (2022/1 and 2022/2), Continuous Optimization (2022/2), Optimization for Data Science (2022/2), Statistical Inference (2021/2), and Introduction to Computing (2018/1)</li> </ul>	
<b>Data Science Intern/Data Scientist</b> <i>Gabriel Tecnologia</i>	May 2020 – Jul 2021 <i>Rio de Janeiro, Brazil</i>
<ul style="list-style-type: none"> <li>• Gabriel is a SoftBank-funded AI startup that develops technology focused on public security</li> <li>• I developed computer vision object detection, classification, and tracking models for the automatic detection of anomalies in security camera videos (Python, Pytorch)</li> </ul>	
<b>IT Intern</b> <i>BTG Pactual</i>	Jan 2020 – Apr 2020 <i>Rio de Janeiro, Brazil</i>
<ul style="list-style-type: none"> <li>• BTG Pactual is the biggest investment bank in Latin America</li> <li>• I developed dashboards, visualizations, and metrics for internal IT products (SQL, C++)</li> </ul>	
<b>Mathematical Modelling Intern</b> <i>PSR - Energy Consulting and Analytics</i>	Jan 2019 – Sep 2019 <i>Rio de Janeiro, Brazil</i>
<ul style="list-style-type: none"> <li>• PSR is a global provider of technological solutions in the areas of electricity and natural gas (E&amp;G)</li> <li>• I developed optimization programs for maintenance scheduling in thermoelectric and hydroelectric plants (Julia, JuMP)</li> </ul>	

### *Awards & Scholarships*

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<b>Coordination for the Improvement of Higher Education Personnel (CAPES)</b> <i>M.Sc. Scholarship</i>	<i>Mar 2021 – Feb 2023</i>
<b>FGV's Center for the Development of Mathematics and Science (CDMC)</b> <i>B.Sc. Scholarship</i>	<i>2017 – 2020</i>
<b>Brazilian Mathematical Olympiad of Public Schools (OBMEP)</b> <i>One gold medal, two silver medals, and three bronze medals (Top 0.01%)</i>	<i>2011 – 2016</i>
<b>Jovens Gênio Algar (JoGAR) - Coding Marathon</b> <i>First place in the advanced category (2016), third place (2015), and fourth place (2014)</i>	<i>2014 – 2016</i>
<b>BeeCrowd (previously URI Online Judge) - Competitive Programming Platform</b> <i>Top 0.2% of users</i>	

### *Specialized Skills*

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**Programming Languages:** Python, Julia, MATLAB, R, C, C++, Javascript  
**Languages:** English (TOEFL 112/120), Portuguese (Native)