**OSCAR ALEJANDRO GOMEZ QUINTERO**

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|  | **EDUCATION** |  |

**B.S. Mathematics, Computer Science** (*Cum Laude)*GPA: 3.89 / 4.00

New York University Abu Dhabi, *Abu Dhabi, UAE* Aug 2016 –May 2020

NYU Courant Institute of Mathematical Sciences, *New York, USA*Feb 2019 –May 2019

**Relevant Coursework:** Machine Learning, Algorithmic Foundations of Data Science, Visual Analytics, Probability and Statistics, Advanced Probability, Mathematical Statistics, Software Engineering, Computational Social Science

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|  | **SKILLS** |  |

**Languages**: Python, R, JavaScript, C, C++, Java, Mathematica, SQL

**Libraries and Tools:**  SciPy, Numpy, Pandas, Sklearn, Keras, Spark, D3, Bokeh, Plotly, Tableau, Flask, Shiny, LaTeX, Git, Bash, Linux

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|  | **EXPERIENCE** |  |

**Statistical Mechanics Simulations and Models** Sept 2019 – July 2020

Mathematics Department at NYU Abu Dhabi, *Abu Dhabi, UAE*

* Proposed and studied a generalization of the Potts model with a penalty term on the number of colors in configurations.
* Developed Markov-Chain Monte Carlo simulations for the model based by generalizing the Swendsen-Wang algorithm.
* Analyzed the model’s properties analytically, finding its infinite phase transitions using the theory of random partitions.

**Data Science Intern**June 2019 – Aug 2019

nexquare, *Dubai, UAE*

* Developed and incorporated an interpretability module for machine learning models processing over 800 million data points across more than 220 schools in over 10 countries.
* Developed model agnostic interpretability algorithms (local feature importance and counterfactual explanations).
* Integrated the Python and R backend for the analytics app, allowing seamless use of models developed in both languages.

**Machine Learning Explainability and Visualization** June 2018 – Aug 2018

Visualization and Data Analytics Lab at NYU, *New York, USA*

* Trained SVMs, Random Forests, and Neural Networks to predict customer credit risk from a FICO home credit dataset.
* Generated instance explanations for the models based on feature importance and counterfactuals.
* Developed global explanations as interactive visualizations of clusters of individual instances.
* Developed the open source library *ViCE*, for interactive visualizations of counterfactual explanations - *Publication [1]*.

**Machine Learning for Musical Analysis** Feb 2017 – May 2018

Music and Sound Cultures Group at NYU Abu Dhabi, *Abu Dhabi, UAE*

* Lead the computational analysis for an Arab/African music collection with more than 5000 songs.
* Performed dimensionality reduction with deep autoencoders on the spectrogram of the audio and the extracted MFCCs.
* Developed an interactive webapp to explore musical similarity by using k-means clustering and t-SNE embedding, and collaborated to create a Virtual Reality rendering of the similarity space - *Publications [2], [3]*.

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|  | **LEADERSHIP** |  |

**President, NYUAD Mathematics Club** Jan 2017 – Dec 2018

New York University Abu Dhabi*, Abu Dhabi, UAE*

* Programmed activities for high school students and guest speaker talks for university students.
* Prepared the syllabus and led the weekly training sessions in preparation for international competitions.
* Coordinated and supervised NYUAD’s team participation in the International Mathematics Competition of 2018 and the Al-Khwarizmi International Mathematical Competition of 2018.

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|  | **AWARDS** |  |

**Second Place**, NYUAD International Hackathon for Social Good in the Arab World Apr 2020

**Second Place**, FICO Explainable Machine Learning ChallengeJan 2019

**Honorable Mention**, Al-Khwarizmi International Mathematical Competition Oct 2018

**Full Scholarship**, New York University Abu Dhabi Aug 2016

**Honorable Mention**, International Mathematical Olympiad (IMO) July 2016

**Best National Entrance Exam,** Universidad Nacional de Colombia Apr 2016

**Silver / Bronze Medals**, Centroamerican / Iberoamerican Mathematical Olympiads Sept / June 2014

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|  | **PUBLICATIONS** |  |

1. **ViCE: Visual Counterfactual Explanations for Machine Learning Models**. **Oscar Gomez**, Steffen Holter, Jun Yuan and Enrico Bertini. *ACM Conference on Intelligent User Interfaces (IUI 2020).*
2. **Exploring Music Collections: An Interactive, Dimensionality Reduction Approach to Visualizing Songbanks. Oscar Gomez**, Kaustuv Kanti Ganguli, Leonid Kuzmenko and Carlos Guedes. *ACM Conference on Intelligent User Interfaces (IUI 2020).* Demo paper.
3. **Mapping the Sounds of the Swahili coast and the Arab Mashriq: Music research at the intersection of computational analysis and cultural heritage preservation**.Konstantinos Trochidis, Beth Russell, Andrew Eisenberg, **Oscar Gomez**, Kaustuv Kanti Ganguli, Carlos Guedes, Virginia Danielson and Christos Plachouras.*6th International Conference on Digital Libraries for Musicology (DLfM 2019).* Poster paper.