

LUCAS GÓMEZ TOBÓN

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EDUCATION

Master of Arts in Economics, <i>Universidad de los Andes</i>	Oct 2022
Bachelor of Arts in Economics, <i>Universidad de los Andes</i>	Apr 2020

RESEARCH AND WORK EXPERIENCE

Research assistant of Ph.D. Tomas Rodríguez , <i>Universidad de los Andes</i>	Jul 2023 - Present
<ul style="list-style-type: none">Analyzed over 45 million tweets from the 2021 Colombian protests, classifying users ideologically, constructing daily interaction networks, and developed Python functions using Graph-Tool framework to calculate Coleman's inbreeding homophily index and Freeman's segregation index.	
Deputy Associate Director, Quantil , <i>Data mining area</i>	Jul 2022 – Present
<ul style="list-style-type: none">Developed tidyX, a Python package downloaded over 7,000 times, designed for preprocessing social network text, enhancing machine learning applications, particularly in Spanish.Designed algorithms for Colombia's tax and customs authority to identify tax evaders, employing the Saez (2010) methodology for analyzing bunching at kink points in the income tax schedule; utilized Archimedes' principle and unsupervised learning for anomaly detection in density estimations of imported packages; and applied satellite imagery to identify informal parking companies.Led a project submitted to the Llama Impact Grant, focusing on fine-tuning Llama 2 with LoRa and implementing prompt engineering using Retrieval-Augmented Generation (RAG) to analyze over 20,000 legal judgments in Colombia, aimed at resolving legal uncertainties and facilitating investment in post-conflict areas.	
Senior Researcher, Quantil , <i>Data mining area</i>	Oct 2021 – Jul 2022
<ul style="list-style-type: none">Conducted algorithmic fairness assessment in credit scoring model using ROC and calibration curves for bias analysis across gender, age, socioeconomic status, and residency; identified and mitigated lower performance for women by modifying the loss function.Built a machine learning model for pricing all automobiles and motorcycles references in Colombia, supporting the "Guía de Valores Fasecolda" – a pivotal reference for Colombian insurers. This model, updated monthly with data from top online sales portals, effectively monitors market volatility and significantly reduced the Mean Absolute Percentage Error (MAPE) from approximately 20% to 7%.	
Junior Researcher, Quantil , <i>Data mining area</i>	Jan 2020 – Oct 2021
<ul style="list-style-type: none">Created a model that uses satellite images to generate early warnings of deforestation for the Ministry of Environment and Sustainable Development of Colombia.	
Research assistant of Ph.D. Tomas Rodríguez , <i>Universidad de los Andes</i>	Jan 2019 – Dec 2019
<ul style="list-style-type: none">Scraped and analyzed over 30,000 tweets related to the 2019 Bogotá mayoral elections, performing community detection, sentiment analysis, and centrality measures to describe the political context.	

TEACHING EXPERIENCE

Adjunct Professor, <i>Universidad de los Andes, Department of Economics</i>	Jul 2022 – Present
<ul style="list-style-type: none">Develop and teach the introductory programming course for the Master's in Applied Economics program.Design and instruct a 48-hour course on structuring and developing analytical projects in Python. Which includes modules on data analysis in Python, and an introduction to machine learning and business intelligence.	
Research Assistant of Ph.D. Ignacio Sarmiento Barbieri , <i>Coursera and Universidad de los Andes</i>	Jun 2021 – Present
<ul style="list-style-type: none">Built the course material for the unsupervised learning course that is part of the world's first virtual master's program in data analytics offered in Spanish. As Lead Teaching Assistant, I provide guidance to over 180 students across 8 American countries and support fellow TAs.Lead Teaching Assistant guiding over 180 students from 8 countries and providing support to fellow TAs.	
Graduate Teaching Assistant, <i>Universidad de los Andes, Department of Economics</i>	Jan 2020 – Sep 2023
<ul style="list-style-type: none">Taught six courses across graduate and undergraduate levels, achieving an 89% overall approval rating in student reviews, with commendation for “fostering critical thinking” and “presentation skills”, each at 91%.Courses taught include 'Machine Learning for Applied Economics', 'Big Data', 'Advanced Game Theory', 'Game Theory', 'Introduction to Econometrics', and 'Microeconomics III'.	

PUBLICATIONS, CONFERENCES AND PRESENTATIONS

Published Papers

- Riascos Villegas AJ, Ñungo JS, **Gómez Tobón L**, Dulce Rubio M, Gómez F (2023) [“Modelling underreported spatio-temporal crime events”](#). PLOS ONE 18(7): e0287776. <https://doi.org/10.1371/journal.pone.0287776>. Presented findings at the [15th Latin American Congress of Statistical Societies \(CLATSE\)](#), October 2023.

Working Papers

- Gómez Tobón L** (2022) [“The Beat of Confidence: Leveraging Music in Statistical Analysis”](#) (Honors Thesis). A beta version of an application that predicts the probability of songs ranking in Colombia's top 50 chart is available at perreologia.quantil.co. Scheduled to present at [PyData Eindhoven 2023](#).

VOLUNTEERING

Mentor, Mechanism Design for Social Good Summer of Science Program	Sep 2023 - Present
<ul style="list-style-type: none">Mentored a project evaluating the effectiveness of a Tének-language HPV educational intervention for indigenous teenagers at a San Antonio public high school in San Luis Potosí. This culminated in the students presenting their findings in a poster session at the ACM EAAMO Conference on Equity and Access.	
Co-founder and Director, Mochileros x Colombia	Jan 2019 – Mar 2023

- Presided over [“Estamos Contigo Chocó”](#) an initiative that raised around 10,000 USD to buy groceries and food for approximately 100 poor families in Quibdó, Chocó during four months of COVID-19 lockdowns in 2020.
- Received the [Medalla al Mérito Turístico](#) granted by the Ministry of Commerce, Industry, and Tourism in recognition for the work of our team promoting community tourism as a tool for social transformation.

Volunteer, *Fundación Irradia*

Feb 2018 – Nov 2028

TECHNICAL SKILLS

Programming Languages:

- Proficient: Python, R.
- Familiar: Stata, Matlab, ArcGIS, Unix Shell Scripting (bash).

Database Management:

- Familiar: SQL.

Machine Learning and AI Frameworks:

- Proficient: Scikit-Learn, caret, tidymodels.
- Familiar: PyTorch, TensorFlow.

Operating Systems:

- Proficient: Linux, macOS, Windows.

Other Skills:

- Proficient: LaTeX, Version Control using Git.