Lucas Gómez-Tobón

Human-AI Interaction & Multi-Agent Systems

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EDUCATION

PhD in Computer Science — Sep 2024 – Exp 2028
University of Waterloo, ON, Canada — GPA: 90%
- Advised by Prof. Edith Law (**Google Chair in the Future of Work and Learning**).

Master of Arts in Economics — 2022
Universidad de los Andes, Bogotá, Colombia — GPA: 92%
- Full Scholarship Recipient.

Bachelor of Arts in Economics — 2020
Universidad de los Andes, Bogotá, Colombia — GPA: 89%

CURRENT RESEARCH

Social Agentics | University of Waterloo — *Current PhD Research*

- **Research Goal:** Investigating how to situate generative AI within specific social and organizational contexts, specifically addressing how agents handle social ambiguity and conflicting norms in collaborative environments.
- **Implementation:** Developed the **Coordination Laboratory**, a multi-agent testbed that utilizes **Activity Theory** to model persona-based social reasoning. The system simulates complex scheduling negotiations (demonstrated using characters from *The Office*) to evaluate agent alignment with human workplace goals.

Learning by Teaching | University of Waterloo — *Current PhD Research*

- **Research Goal:** Designing pedagogical agents that shift AI from an "oracle" to a "teachable peer", leveraging cognitive and metacognitive mechanisms (e.g., knowledge reorganization, gap awareness) to enhance student retention.
- **Implementation:** Engineered **Learning by Debugging**, a full-stack platform (React, FastAPI) where students pair-program with an AI agent that makes *intentional* coding errors. The system forces students to debug the agent's code, scaffolding learning through active error correction and explanation.

PROFESSIONAL EXPERIENCE

Corredores Davivienda — Bogotá, Colombia
Financial Risk Manager — Dec 2023 – Sep 2024
- Managed risk operations for **100,000+ client accounts** and **$4.8 billion USD in AUM**, leading a team of 10 analysts across Colombia, Panamá, and Miami.

Quantil — Bogotá, Colombia
Senior Researcher — Oct 2021 – Dec 2023
- **Open Source:** Developed tidyX Python library to facilitate text preprocessing for Spanish social media data, achieving **7,000+ downloads**.
- **Algorithmic Fairness:** 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.

- **Social Network Analysis:** Processed **45 million+ tweets** from the 2021 National Strike to classify ideological polarization; calculated Coleman's homophily and Freeman's segregation indices using Graph-Tool.

Quantil   Bogotá, Colombia
Researcher   Jan 2020 – Oct 2021
- **Predictive Modeling:** Built a production ML pricing model for the Colombian insurance industry, reducing Mean Absolute Percentage Error (MAPE) from **20% to 7%** across all national vehicle references.

TEACHING

Google & University of Waterloo   Waterloo, ON, Canada
Futures Lab Workshop   Oct 2025 – Present
- Co-organizing an 8-week workshop on GenAI-driven product design.
- Investigating how GenAI tools influence collaboration between technical and non-technical teams.

Universidad de los Andes   Bogotá, Colombia
Adjunct Professor, Department of Economics   Jul 2022 – Present
- Instructed a 48-hour Python course on data analysis and introductory machine learning.
- Achieved an 89% overall approval rating in student reviews, with commendation for "fostering critical thinking" and "presentation skills", each at 91%.

Coursera   Bogotá, Colombia
Course Developer & Lead TA   Jun 2021 – Dec 2023
- Created the instructional materials for the Unsupervised Learning course part of the University of Los Andes' Master of Data Analytics on Coursera.
- Managed and mentored a cohort of 180+ international students.

SELECTED PUBLICATIONS

- **Gómez-Tobón L**, Law E. (2025) "Values in the Loop: Designing Interactive Optimization with Conversational Feedback". *CUI Demo.* https://doi.org/10.1145/3719160.3735655.
- Castrillón F, **Gómez-Tobón L**, Herrera S, Rodríguez T. (2025) "Violence in the streets and ideological segregation in twitter during the national strikes in Colombia, May-June, 2021". *Work in progress.*
- **Gómez-Tobón L**, Law E. (2025) "How Work Really Gets Done: Activity Theory and Persona-Based Social Reasoning for AI Agents". *COMPASS Positional Paper.*
- Riascos Villegas ÁJ, Ñungo JS, **Gómez-Tobón L**, Dulce Rubio M, Gómez F. (2023) "Modelling underreported spatio-temporal crime events". *PLoS ONE.* https://doi.org/10.1371/journal.pone.0287776. Presented findings at the 15th Latin American Congress of Statistical Societies (CLATSE), October 2023.
- **Gómez-Tobón L**. (2022). "The Beat of Confidence: Leveraging Music in Statistical Analysis." *Honors Thesis.* Presented in **PyData Eindhoven 2023**.

TECHNICAL SKILLS

- **Languages:** Python, JavaScript (React.js), R, SQL, LaTeX.
- **Frameworks & Tools:** FastAPI, Docker, PyTorch, scikit-learn, Git.