

# Juan Diego Mejía Becerra

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Quantitative researcher—time series, machine learning, and market microstructure

## Education

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- University of California, Santa Barbara**, PhD in Statistics & Applied Probability 2026 (expected)
- **Dissertation:** Perspectives on Statistical Limit Order Book Modeling
  - **Committee:** Gareth W. Peters (Co-chair); Ruimeng Hu (Co-chair); Michael Ludkovski
  - **Concentration:** Financial Mathematics & Statistics
- University of California, Santa Barbara**, MA in Statistics 2025
- **Relevant Coursework:** *Advanced Financial Modeling, Stochastic Control, Functional Analysis, Statistical Machine Learning, Mathematical Statistics*
- Universidad Nacional de Colombia**, MSc in Actuarial Science & Finance 2020
- **Relevant Coursework:** *Stochastic Analysis, Option Pricing Theory, Risk Theory, Generalized and Multilevel Linear Models*
- Universidad Nacional de Colombia**, BSc in Mathematics (Hons.) 2019
- **Relevant Coursework:** *Partial Differential Equations, Real Analysis, Topology, Abstract Algebra, Numerical Analysis*
- Universidad Nacional de Colombia**, BSc in Statistics (Hons.) 2017
- **Relevant Coursework:** *Time Series, Linear Regression Analysis, Spatial Statistics, Stochastic Processes*

## Research and Industry Experience

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- Graduate Research Assistant**, University of California, Santa Barbara – Santa Barbara, CA Jun. 2024 – Sept. 2024;  
Jun. 2025 – Sept. 2025
- Designed a two-time-scale transfer learning framework to forecast micro-returns using features derived from the limit order book (LOB): CNN-LSTM backbone; ARMAX-GARCH adapter; adaptive LASSO updates
  - Engineered LOB reconstruction; implemented market replay and a market simulation framework; versioned experiments and pipelines
- Research Associate**, Santa Barbara Actuaries Inc. – Santa Barbara, CA Jun. 2022 – Jul. 2022;  
Jun. 2023 – Aug. 2023
- Modeled enrollment-benefit relationships in Medicare Advantage using CMS public data; quantified associations across plans and geographies
  - Measured market share concentration across states and carriers
- Graduate Research Assistant (ESdRAS)**, University of California, Santa Barbara – Santa Barbara, CA Sept. 2020 – Jun. 2021
- Mapped claims for 19M enrollees to 255 diagnosis categories; engineered cohort/cost aggregates and quality-control checks
  - Scoped a condition-based risk-adjustment model and budget-projection methodology; defined features, validation, and success metrics
  - Produced executive briefings for the Ministry of Health (Colombia), Colombian Association of Financial Institutions (ANIF), and UnitedHealth Group
- Professional Contractor**, Secretariat of Health – Bogotá, Colombia Mar. 2020 – Sept. 2020
- Implemented a city-level SARS-CoV-2 transmission model; ran scenario analyses to inform response planning and capacity triggers
  - Maintained  $R_{t,i}$ , incidence, and short-term projections for 20 districts; forecast ICU occupancy and validated against realized utilization

## Publications

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**On the Asymptotic Properties of the Conditional Maximum Likelihood Estimator for Time Series Regression Models with Conditional Heteroskedasticity** (*working paper*) Jun. 2026

Juan Diego Mejía Becerra, Gareth W. Peters, Ruimeng Hu

<https://ssrn.com/abstract=6810099>

**Two-Time-Scale Transfer Learning for Limit Order Book Forecasting** (*working paper*) Mar. 2026

Juan Diego Mejía Becerra, Gareth W. Peters, Ruimeng Hu

<http://dx.doi.org/10.2139/ssrn.6424798>

**What Benefits Drive Membership in Medicare Advantage Plans?** Jul. 2025

Ian Duncan, Juan Diego Mejía Becerra, Jiarui Yu

10.1007/978-3-031-98588-1

**A Proposed Condition-Based Risk Adjustment System for the Colombian Health Insurance Program** Aug. 2024

Ian Duncan, Juan Diego Mejía Becerra, Tamim Ahmed

10.1080/10920277.2024.2387116

## Relevant Projects

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**Two-Time-Scale Transfer Learning** [judmejiabe/ttstl\\_repo.git](https://github.com/judmejiabe/ttstl_repo)

- Developed Two-Time-Scale Transfer Learning (TTSTL), a time series and deep learning hybrid framework for LOB forecasting
- Languages: Python, R
- Tools: rpy2, rugarch, PyTorch

**MeatPy** (*fork*) [judmejiabe/MeatPy.git](https://github.com/judmejiabe/MeatPy)

- Extended the functionality of the MeatPy library: added a market simulation framework and implemented LOB reconstruction methods supporting Databento data
- Languages: Python
- Tools: NumPy, Databento, Docker

## Relevant Teaching

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**Teaching Assistant:** Risk Theory, Applied Stochastic Processes, Mathematical Finance, Probability Theory and Stochastic Processes

**Instructor:** Linear Regression Analysis

## Technical Skills

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**Languages:** Python, R, SQL

**Time Series & Econometrics:** statsmodels, rugarch, glmnet, urca

**ML/DL:** PyTorch, scikit-learn

**Data & Pipelines:** NumPy, pandas, rpy2

**Infrastructure & Reproducibility:** Git, Docker, conda, Linux/Bash, Google Cloud Storage (GCS)