

Ivan Dario Peñaloza Rojas

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ivan1016017@gmail.com

Education	Pontificia Universidad Javeriana, Bogotá, Colombia B.S. in Mathematics with a minor in Economics Field: Mathematical Analysis, and Econometrics Advisor: Prof. Gerardo Román Chacón	Jan 2007 - Dec 2012
	Universidad Nacional Autonoma de México México City, México M.S. in Mathematics with emphasis in probability theory and statistics Field: Probability, Statistics, and Mathematical Finance Advisor: Prof. Ramsés H. Mena	Jan 2014 - Dec 2015
	Universidad Nacional Autonoma de México, México City, México P.h.D in Mathematics with emphasis in mathematical finance and probability theory Field: Mathematical Finance, Machine Learning, Probability and Statistics Advisor: Prof. Pablo Padilla Longoria	Aug 2017 - Aug 2021
	University of Austin Texas and Greatlearning, Austin, Texas, USA Post Graduate Program in Artificial Intelligence and Machine Learning	May 2020 - Dec 2020
	Universidad de los Andes Bogotá, Colombia Online Master Degree Program in Software Engineering Field: Algorithm design, Software Architecture design, Backend programming (PostgreSQL, Python, etc.), Frontend programming (Javascript, Typescript, etc.), Automation Testing (programs such as Cypress, Playwright, and Python), DevOps (AWS, and Heroku).	Jan 2021 - March 2023
Experience	<i>Freelance GenAI Engineer</i> Independent Contractor Remote	January 2024 - Present
<ul style="list-style-type: none">• GrammarBridge - AI Language Learning Platform: Developed an MVP for a Praktika-like language learning application featuring real-time conversational AI for grammar practice. Built microservices architecture using Docker containerization, FastAPI for API endpoints, and VLLM as LLM server provider with advanced prompt engineering and guardrails implementation. Created robust backend infrastructure with Django and PostgreSQL for user management, course creation, and chat history retrieval. Designed responsive frontend using React, Vite, and Tailwind CSS for seamless user experience• Asclepius AI - Medical RAG Chatbot: Architected and deployed an enterprise-grade RAG (Retrieval-Augmented Generation) document Q&A chat-		

bot for medical literature, similar to OpenEvidence. Implemented backend with FastAPI and PostgreSQL with pgvector extension for semantic search capabilities. Orchestrated RAG pipeline using LangChain with AWS Bedrock (Llama 3-70B model and Amazon Titan embeddings) for accurate medical query responses. Built automated PDF ingestion pipeline from S3 bucket processing medical documents into vector embeddings. Developed React 18 + TypeScript frontend with Vite, implementing chat interface and conversation history management. Containerized entire stack using Docker Compose with hot-reloading for development efficiency

Data Scientist Manager
Banamex
Mexico City, Mexico

July 2022 -

- **ML Platform Leadership:** Leading the design and development of an enterprise ML platform similar to Uber's Michelangelo, integrating FastAPI, MLflow, Spark, TensorFlow, and Scikit-learn to accelerate model development and deployment processes across the bank, reducing time-to-production by 60%
- **Production ML Systems:** Developed ETL pipelines integrated with ML/NN models using PySpark, TensorFlow, and Scikit-Learn for advanced feature engineering, improving credit model KPIs by up to 5%
- **Recommender Systems Architecture:** Designed and deployed the first enterprise recommender system using ALS in PySpark, integrated with Adobe Ecosystem and AWS services, solving cross-border data transfer challenges while serving personalized content to mobile applications
- **Infrastructure Automation:** Designed and implemented Airflow orchestration on Cloudera for automated capacity monitoring, triggering alerts when databases reach maximum capacity on Hadoop clusters and RHEL servers
- **API Development & Cost Optimization:** Built resilient FastAPI applications for ETL pipeline orchestration, reducing operational costs by 30% through efficient resource management and automated scaling
- **Geolocation Intelligence System:** Developed an ML-powered ATM location optimization application using FastAPI and PyArrow for efficient data lake access, featuring interactive Google Maps-like visualization and WhisperAI voice search capabilities that allow querying by Estado, Municipio, Localidad, zip code, and population density metrics, enabling data-driven ATM placement decisions based on customer spending patterns and merchant sales data

Researcher Assitant
Autonomous University of Mexico
Mexico City, Mexico

August 2017 - February 2022

- **Advanced ML Research:** Conducted cutting-edge research in quantitative finance, applying machine learning techniques and stochastic calculus to develop novel algorithmic trading models, resulting in 1 peer-reviewed publications in top-tier financial journals
- **Algorithm Development & Innovation:** Co-designed and implemented sophisticated pricing algorithms for complex financial derivatives in American markets using Python and R, achieving improvement in pricing accuracy compared to traditional Black-Scholes models
- **Mathematical Modeling Excellence:** Applied advanced stochastic differential equations and Monte Carlo simulations to model market volatility and

risk assessment, contributing to award-winning doctoral thesis recognized by UNAM-BBVA Foundation

- **Research Infrastructure & Collaboration:** Built scalable REST APIs using Flask and FastAPI to distribute real-time financial modeling results to international research collaborators, enabling seamless data sharing across several research teams.
- **Data Science & Analytics:** Processed and analyzed large-scale financial datasets (10M+ transactions) using statistical learning methods, time series analysis, and ensemble models to identify market patterns and anomalies

Publications

Theses

- *A pricing method in an incomplete and constrained market with differential informational frameworks.* PhD's Thesis, 2021.
- *A general mixture-diffusion SDE and calibration to market volatility smiles.* Master's Thesis, 2016.
- *Dynamics of linear operators.* Bachelor's Thesis, 2012.

Published papers in peer-reviewed journals and book chapters

- *A pricing method in an incomplete and constrained market with differential informational frameworks.* with Pablo Padilla Longoria. Computational Economics, Springer, Netherlands, 2021.

Honors and Awards

- Meritorious Undergraduate Thesis (2012)
- Scholarship for entire master studies from CONACYT-National Autonomous University of Mexico (2014-2015)
- Scholarship for entire doctorate studies from CONACYT-National Autonomous University of Mexico (2017-2021)
- Award on best doctorate thesis in Finance. Money prize 250,000 MXN. UNAM-BBVA Foundation (2023)

Technical Expertise

- **Languages:** English (Fluent), Spanish (Native)
- **Programming Languages:** Python (Expert), JavaScript/TypeScript (Proficient), Java (Proficient)
- **Backend Frameworks & APIs:** FastAPI (Expert), Django (Expert), Flask (Proficient), NodeJS (Proficient)
- **Frontend Development:** React (Proficient), Redux (Proficient), TypeScript (Proficient), HTML/CSS (Proficient), AngularJS (Basic), Bootstrap3 (Basic), Material UI (Basic)
- **Databases & Data Storage:** PostgreSQL (Expert), HDFS (Proficient), MongoDB (Proficient), MySQL (Expert)
- **Big Data & Distributed Computing:** Apache Spark/PySpark (Expert), Hadoop Ecosystem (Proficient), Airflow (Proficient)
- **Machine Learning & Deep Learning:** TensorFlow (Proficient), PyTorch (Proficient), Scikit-learn (Expert), MLflow (Proficient)
- **Cloud Platforms & DevOps:** AWS (Proficient - S3, Bedrock, EC2, Lambda), Docker (Proficient), Heroku (Basic)
- **Testing & Quality Assurance:** Pytest (Proficient), Playwright (Basic), Cypress (Basic), Jasmine (Basic)

- **Architecture & Design:** Software Architecture (Expert), Cloud Architecture (Proficient), Microservices Design (Proficient), StarUML (Proficient), Draw.io (Proficient)
- **Version Control & Collaboration:** Git (Expert), GitHub (Expert), Bitbucket (Proficient)
- **Data Science Tools:** Jupyter (Expert), R (Proficient), Pandas (Expert), NumPy (Expert)
- **Documentation & Publishing:** LaTeX (Expert), Markdown (Expert), Microsoft Office (Proficient)

Conferences Attended

- Escuela de verano Bath University, National Autonomous University of Mexico, Mexico City, 2016.
- National Calculus Winter Meeting, Bogotá, Colombia, December 2007

Research Interests

- Stochastic calculus and applications to finance.
- Stochastic processes
- Machine Learning Techniques

Professional References

- Dr Pablo Padilla Longoria
Professor
Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas
Universidad Nacional Autonoma de México
pablo@mym.iimas.unam.mx
pabpad@gmail.com
<https://mym.iimas.unam.mx/pablo/index.html>
- Dr Gerardo Roman Chacón
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<https://www.researchgate.net/profile/Gerardo-Chacon>
- Dr Sergio Pulido
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<https://sites.google.com/site/sergiopulidonino/>
- Juan Sebastian Leguizamon
Senior Java Developer
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- Ivan Mateo Castaño Gomez
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- Wenceslao Crhistopher Paez Chavez
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- Herald Matias Olivares Zarsoza
Technical Leader, Full Stack Engineer
IT Crowd Argentina, Peru
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- Jorge Galicia
Data Engineer
Stefanini, Brazil, México
jorge.galicia@latam.estefanini.com

Publications

- *A pricing method in an incomplete and constrained market with differential informational frameworks*. Springer, Netherlands, 2021.
 - https://link.springer.com/article/10.1007/s10614-021-10178-7?error=cookies_not_supported&code=c52adaef-1fc8-4be4-bd94-4df97163cf7a
 - In this project I used some of the most advanced techniques such as stochastic calculus, time series analysis, montecarlo simulations, etc., to compute the market price in a small market where there are many small agents, and a big agent. In this project I include all the source code in R that is required to compute the price of derivatives in this type of market.

Freelance Works

- Project during the first semester in the Master Degree program in Software Engineering
 - <https://github.com/ivan1016017/VynilAngularProject.git>
 - In this project my team and I built a full-stack application using Angular Js, Postgres, Javascript, Typescript, Playwright, Cypress, and Github. The program is a platform is a marketplace where users can upload, update, buy, share and exchange song and albums.
- Coupon Ecommerce Project:
 - <https://drive.google.com/file/d/1Srtwad86GBJShQNFKKq0m5778g3yrBlm/view?usp=sharing>
 - Fully integrated app making use of Django, React, Redux and PostgreSQL.
- Stock market project:
 - https://drive.google.com/file/d/1VzUc_0a65iP7xqSzd7WwjiZupnW7giVi/view?usp=sharing
 - App making use of Django, some Javascript libraries, Python Data Science libraries, Bootstrap, PostgreSQL, and some APIs.
- Inventory Project:
 - https://drive.google.com/file/d/1SHiLcqh1v66sekJE8cajUsx3dX_SmDvo/view?usp=sharing
 - App making use of Django, some Javascript libraries, and Bootstrap.
- Data Science Projects:
 - https://drive.google.com/file/d/1pyLqlV6yRfZ71TBuz__XF0fQ7z7fHw1S/view?usp=sharing

- Data science project of credit card products using a holistic approach. Feature Engineering, Pipelines, the most current ensemble methods: XGBoost, Random Forest, LightGBM, etc.; regression methods, hyperparameter tuning, and more.
- Basic Machine Learning Model Deployment Example:
 - <https://drive.google.com/file/d/19GxH30mf7P-eFIUbKPePF195fziwLrkX/view?usp=sharing>
 - Machine learning model deployed using python libraries, Django, Material UI, and React.
- Ecommerce in Django with e2e and unit tests:
 - https://drive.google.com/file/d/1Q5xcjWkX_h06V684BpKgGM1RUTF5Csh-/view?usp=sharing
 - Ecommerce app built using Django, Selenium, Javascript, Postgres, HTML, CSS, Bootstrap.
- AWS Machine Learning Dashboard with e2e and stress testing:
 - <https://drive.google.com/file/d/1e4yZ3AYqH3-0b8kgGzyy6HuC6johedXE/view?usp=sharing>
 - Flask AWS API for Machine Learning models integrated with a Dashboard in Django. Made of Selenium for e2e testing and JMeter for stress testing in production environment with dashboard of software metrics to predict churn rates.
- Docker + Kafka + Pyspark Streaming application + Flask + FastAPI + Architecture:
 - https://www.youtube.com/watch?v=Z58gkoGrYDk&ab_channel=ivandariope%C3%B1alozarojas
 - Kafka producer and subscribe ecosystem using Docker. Kafka consumer and producer FastAPI app using kafka-python and publishing ML scores into a new kafka topic. Spark streaming application that takes ML scores and uses windowing to aggregate values into a MongoDB database to finally be used by a Flask application.
- Docker + Apache Airflow pipeline implementation + architecture:
 - https://www.youtube.com/watch?v=V9zlwcQq5b0&ab_channel=ivandariope%C3%B1alozarojas
 - Apache Airflow basic implementation plus architecture of a recommender system project.

Public Repositories

- LeetCode interview problems
<https://github.com/ivan1016017/LeetCodeAlgorithmProblems.git>
- Project during the first semester in the Master Degree program in Software Engineering
<https://github.com/ivan1016017/VynilAngularProject.git>

Professional Certificates

- AWS Certified Data Engineer - Associate
https://www.credly.com/badges/65f7d1fe-9620-462d-9cfc-e0a8cc2a585c/linked_in_profile
- AWS Certified Developer – Associate
https://www.credly.com/badges/e7b64e1d-c7b1-44fb-8340-5f91cea04023/linked_in_profile
- AWS Certified Machine Learning – Specialty
https://www.credly.com/badges/a1ce6225-4619-4090-8dff-99abe78f2f6f/linked_in_profile
- AWS Certified Solutions Architect – Associate
https://www.credly.com/badges/0df650f5-b6a0-4417-8033-0c49f5bbdbed/linked_in_profile
- Dataiku Core Designer
<https://verify.skilljar.com/c/xkec4abthylv>
- Dataiku ML Practitioner
<https://verify.skilljar.com/c/445em5tbb6og>
- Python Programming Masterclass
<https://www.udemy.com/certificate/UC-13d0a1b6-1901-4b30-b82f-798b7283cf5f/>
- SQL and PostgreSQL: The Complete Developer's Guide
<https://www.udemy.com/certificate/UC-5d50d4ec-f21f-4502-8fa5-6cdce576d1fc/>
- Neural Networks and Deep Learning - DeepLearning.AI
https://www.coursera.org/account/accomplishments/verify/4QZ79XQKBCKW?utm_product=course
- Object-Oriented Design - University of Alberta
<https://www.coursera.org/account/accomplishments/verify/XFVTVBB4WTFT>