Juan Lara

Computer Scientist & Applied Mathematician

larajuand@outlook.com | Web Page | Bogotá, Colombia
+57 315 512 8464 | julara | JuanLara18

Professional Summary

Computer Scientist and Mathematician trained at the Universidad Nacional de Colombia, with specialized expertise in Machine Learning. Currently collaborating on applied research at Harvard Business School, where I merge theoretical rigor with computational solutions to study the structure of firms.
Throughout my career, I have developed advanced mathematical models, implemented numerical simulations, and applied machine learning techniques to transform data into strategic insights. My interdisciplinary approach enables me to turn complex theories into practical and efficient tools that drive real-world impact.
Proactive, creative, and problem-solving-oriented, I excel at collaborating and communicating complex ideas clearly. I am particularly interested in research projects and consulting engagements that integrate mathematical foundations with computational solutions to address challenging organizational and strategic problems.

Professional Experience

Research Assistant
Harvard Business School

Sep 2022 - Present
Boston, USA (Remote)

Conduct advanced research in organizational economics with Professor Jorge Tamayo, focusing on two key areas:

- **Theoretical Modeling** – Formalized organizational hierarchies and resource optimization through economic frameworks based on established literature (Garicano, Caliendo & Rossi-Hansberg), creating rigorous mathematical proofs to analyze policy impacts on productivity.
- **Computational Implementation** – Translated theoretical concepts into actionable insights by developing ML models (XGBoost, clustering), implementing NLP pipelines for technical document analysis, and building modular data architectures that integrate statistical analysis with visualization techniques (UMAP, SVD).

Supervisor: Jorge Tamayo

Data Scientist
Ipsos

Feb 2024 - Jan 2025
Bogota, D.C., Colombia (Hybrid)

Transformed market research operations through strategic data science implementations:

- **Field Operations Innovation** – Developed a mobile R Shiny application with embedded machine learning models for pharmacy segmentation, integrating geospatial mapping (Leaflet) with cloud storage, resulting in 85% reduction in manual classification work.
- **NLP-Powered Analytics** – Created *TextInsight*, a comprehensive Python library using transformer models (BERT) and network visualization (NetworkX) for multilingual survey analysis, reducing processing time by 60% while delivering more nuanced insights.
- **Interactive Reporting** – Designed dynamic dashboards and visualization tools that streamlined decision-making processes across Latin American operations, earning recognition as Total Ops Star Employee for LATAM.

Supervisor: Sandra Pastrán

Education

B.S. in Computer Science — Feb 2019 - Nov 2023
Universidad Nacional de Colombia, Bogotá D.C.
Emphasis on Machine Learning — GPA: 4.7/5.0
Director: Omar Duque Gomez — Detailed List of Exams

B.S. in Mathematics — Feb 2018 - Jun 2022
Universidad Nacional de Colombia, Bogotá D.C.
Emphasis on Applied Mathematics — GPA: 4.7/5.0
Director: Omar Duque Gomez — Detailed List of Exams

Technical Baccalaureate in Business Administration — Feb 2015 - Nov 2017
Centro Educativo los Andes, Bogotá D.C.
Emphasis on Entrepreneurship and Investigation — GPA: 4.5
Director: Cristian Santiesteban — Detailed List of Exams

Technician in Maintenance of Computer Equipment — Nov 2015 - Dec 2016
Servicio Nacional de Aprendizaje - SENA, Bogotá D.C.
Emphasis on Corrective Software — GPA: 4.6/5.0
Director: Carlos Wilches — Detailed List of Exams

Technical Skills

Core Competencies

Areas of technical expertise where I have the most depth and experience

Machine Learning & AI
Design and implementation of ML models, NLP pipelines, and integration of large language models for practical business applications

Data Science
Implementing statistical analysis, predictive modeling, and advanced visualizations to transform complex data into actionable insights

Natural Language Processing
Building specialized NLP solutions with transformer architectures, semantic analysis, and text classification for multilingual contexts

Mathematical Modeling
Development of analytical frameworks and theoretical models for organizational economics and strategic decision-making

Interactive Applications
Creating responsive web applications and dashboards with R Shiny and Python frameworks for data-driven decision support

Research & Problem Solving
Bridging theoretical concepts with practical implementations to solve complex organizational and business challenges

Core Technical Expertise

Key areas of knowledge and methodological approaches

Mathematical Foundations	Mathematical Modeling, Graph Theory, Probability	Optimization, Numerical Simulation
Machine Learning & AI	NLP Pipelines, LLM Integration, Predictive Modeling	Transformer Models, Embeddings

Data Science	Interactive Visualization, Statistical Analysis, Text Mining, Dimensionality Reduction
Application Development	Shiny, Web Development, Cloud Integration, API Implementation, Responsive Design
Research & DevOps	Academic Research, Containerization, CI/CD Pipelines, Model Deployment, Technical Documentation

Technical Proficiency

Languages, frameworks and tools where I have the most experience

Programming Languages	
Python	*Advanced (4+ years)*
R, SQL	*Intermediate-Advanced*
Other Languages	*Intermediate (C++, JavaScript)*
Data Science & ML	
GenAI	*Advanced (OpenAI GPT, Llama, Claude)*
Data Visualization	*Advanced (Matplotlib, NetworkX, PyVis, Leaflet)*
NLP	*Intermediate-Advanced (BERT, Transformers)*
ML Frameworks	*Intermediate (Scikit-learn, TensorFlow & PyTorch)*
Web & Application Development	
Interactive Apps	*Advanced (Streamlit, R Shiny)*
AI Frameworks	*Advanced (Langchain, LlamaIndex, Gradio)*
Web Development	*Intermediate (React, FastAPI, Tailwind CSS)*
DevOps & Tools	
Version Control	*Advanced (Git, GitHub)*
Deployment	*Intermediate (Docker, MLflow)*
Cloud Services	*Basic-Intermediate (GCP, AWS, Azure)*

Key Projects

Cunservicios Platform

2025

Full Stack Developer

Technologies: React, FastAPI, SQLAlchemy, Tailwind CSS, JWT, Formik

Developed a web platform for water and sewage utility services management with a modern microservices architecture. The system features user-facing modules for bill consultation and payment, service requests, PQR (petitions, complaints, claims) management, and administrative tools. Implemented responsive design, form validation, API integration, and database modeling using industry best practices. The platform streamlines customer service operations while providing a seamless user experience across devices.

TextInsight - Python Library
2023-2024

Lead Developer

Technologies: Python | Transformers | OpenAI | NetworkX | PyVis

Built a multilingual text analysis library combining BERT for sentiment analysis, GPT-3.5 for text correction and topic generation, and embeddings for graph visualization. Features include batch processing for large datasets, flexible API, and interactive visualizations. Deployed at Ipsos to analyze survey data, cutting analysis time by 60% while delivering deeper insights.

Pharmacy Segmentation Application
2024

Lead Developer

Technologies: R Shiny | Google Cloud Storage | Random Forest | Reactive UI | Leaflet

Developed a responsive mobile field application for pharmacy segmentation using R Shiny and integrated with Google Cloud Storage. The system combines survey data collection with real-time machine learning classification to categorize pharmacies into strategic segments (NUEVA FARMA, MEGA FARMA, TRADI FARMA, FARMA ESENCIAL). Features include geolocation mapping with Leaflet, route management for field agents, real-time data validation, and secure cloud integration. Implemented for Familia/Ipsos to optimize product distribution strategies, reducing manual segmentation effort by 85% while improving market targeting precision.

Research Interests

AI Agents & Multi-agent Systems

Exploring the development and optimization of autonomous AI agents and their interactions within multi-agent environments, with applications in organizational decision-making and strategic simulations.

Computational Organizational Theory

Investigating mathematical models of organizational structure, knowledge flows, and decision hierarchies using computational simulations and empirical validation.

Distinctions & Awards

Total Ops Star Employee - LATAM
April 2024

Ipsos

Recognized for developing TextInsight, demonstrating exceptional initiative, technical expertise, and commitment to operational excellence across Latin America operations.

Best Averages Scholarship
2018-2023

Universidad Nacional de Colombia

Awarded for 10 consecutive semesters to the top 15 students with highest academic performance in the program, maintaining excellence throughout entire academic career.

Additional Training

AI Agents Fundamentals
February 2025

Hugging Face
Certificate

Credential ID: juanlara

Artificial Intelligence Expert Certificate (CAIEC)
November 2024

Certiprof
Certificate

Credential ID: TLZVDQTVTGG-XWHHHQPTQ-RDJFLDLRK

Artificial Intelligence Bootcamp — May-October 2024
Talento Tech Cymetria — *159 hours*
Credential ID: 2518458921

DevOps Certification — October 2024
Platzi — *Comprehensive Program*
Credential ID: cc4cfe8a-d78a-4883-8a75-ca90931151f6

Algorithmic Toolbox — 2023
Coursera — *Advanced Course*
Credential ID: 8GR62BCT499V

Linux and Bash for Data Engineering — 2023
Coursera — *Technical Course*
Credential ID: CAZUJPW6D4BP

Python and Pandas for Data Engineering — 2023
Coursera — *Technical Course*
Credential ID: 72QS5JSBC67L

Languages

Spanish	Native
English	Advanced