Maria Oros Barron

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Professional Summary

I am a data scientist at the Data Science Institute at the University of Wisconsin-Madison. My research interests encompass the bayesian statistical methods and machine learning applications. My current work focuses on hybrid modeling applications with applications in the pharmaceutical and agricultural sectors.

Education

University of Navarra-DATAI, Data Science Graduate Certificate — June 2022

- **Focus Areas:** Supervised Machine Learning

University of Guanajuato-CIMAT, Bachelor of Science in Mathematics — Aug 2018

- **Thesis:** Hamiltonian Systems and Applications in Optics, under the supervision of Carlos Valero Valdez Ph.D and Rafael Herrera Guzman Ph.D
- **Relevant Coursework:** Stochastic Processes, Algorithm Design, Statistical Inference, Mathematical Analysis

Professional Experience

Data Scientist *(Supervisor: Kyle Cranmer, Ph.D.)* — June 2023 – Present
Data Science Institute, University of Wisconsin-Madison

- Developed hybrid modeling approaches to characterize cost-benefit treatment applications in soybean, corn, and alfalfa crops, resulting in multiple publications and a ROI tool for farmers published in the Crop Protection Network, Professor Damon Smith Ph.D
- Created an open-source forecasting tool for disease risk assessment in plant pathology, enabling agricultural practitioners to make data-driven decisions based on environmental conditions, Professor Damon Smith Ph.D
- Machine Learning Applications on soil organic carbon and soil organic carbon stocks prediction across the CONUS, Professor Jingyi Huang Ph.D
- Collaborated with industry partners to implement large language models (LLMs) for anomaly detection in time series data, Safe Set

Senior Data Scientist *(Supervisor: Marcel Stockly Contreras)* — Sept 2022 – June 2023
Bisonic Inc. – Remote, CA

- **Game Economy Design** of Forgotten Runiverse MMORPG: Developed key performance indicators for the in-game crafting system to support strategic decision-making processes
- **NFT Rarity Scoring:** Led the development of a statistical framework to quantify Non-Fungible Token (NFT) rarity, culminating in an interactive dashboard built with Streamlit

Senior Data Scientist *(Supervisor: Ivan Solorzano, MSc.)* — March 2021 – Sept 2022
BBVA Mexico – Mexico City

- **Credit Risk Statistical Modeling:** Developed and maintained statistical models underlying core credit card lending operations, including ML techniques for customer segmentation. Achieved 15% performance improvement over previous models. Increase the credit portfolio 8% *Technologies: PySpark, R, SAS*
- **Customer Attrition Analysis:** Finalist (Top 3) in BBVA Mexico internal modeling competition. Developed a custom clustering model (KNN) to identify customers with highest attrition probability, delivering a comprehensive workflow and dynamic visualization tool for stakeholder use. *Technologies: PySpark, GCP*

Data Scientist *(Supervisor: Dulce Ambrocio and Fatima Herrera)* — Feb 2019 – Feb 2021
True Home – Mexico City

- **Automated Real Estate Valuation:** Developed and deployed a machine learning-based pricing model to estimate property values across Mexico City and metropolitan areas, served through AWS API infrastructure. *Technologies: Python, PostgreSQL, AWS, SQL, GeoPandas*
- **Strategic Analytics Consulting:** Provided statistical consulting services to inform property acquisition decisions

and business expansion strategies throughout Mexico

Research Assistant Aug 2015 – Aug 2018
CIMAT (Center for Research in Mathematics)

- **Supervisors:** Carlos Valero Valdez, Ph.D. and Rafael Herrera Guzmán, Ph.D.
- Investigated the mathematical properties of differential forms and characterized Hamiltonian systems, including their relationships to Mechanical and Lagrangian Dynamical Systems
- Explored theoretical applications in optics and mathematical physics

Mathematics and Physics Instructor June 2011 – Feb 2019
Independent Contractor

- Provided online tutoring services through Superprof platform, covering advanced mathematics and physics topics including Markov chain theory, classical mechanics, and calculus. Successfully taught students internationally.
- Delivered on-demand educational services, leveraging expertise gained through university-level science communication work

Publications

Meta-analytic and Economic Analysis in Soybean Production: Northwestern Region Submitted to Phytofrontiers — July 2025
Hope Reinforest, Ph.D., ***Maria Oros***, Professor Damon Smith, Ph.D.

Meta-analytic and Economic Analysis in Corn Production Submitted to Phytofrontiers — July 2025
Kiersten Wise, Ph.D., ***Maria Oros***, Professor Damon Smith, Ph.D.

Meta-analytic and Economic Analysis in Alfalfa Production Submitted to Phytofrontiers — July 2025
Maria Oros, Shalini Yerukala, Ph.D., Professor Damon Smith, Ph.D.

Hamiltonian Systems and Applications Thesis to mayor in mathematics. — Aug 2018
Maria Oros

Conference Presentations and Workshops

Midwest Machine Learning Symposium, University of Chicago, IL — June 2025
Poster Presentation: Meta-analytical application and Open Source Tools in Agriculture Link

Data Science Institute Internal Reading Group, at the University of Wisconsin–Madison — May 2025
Invited Talk: Can LLMs be anomaly detectors?

Research Bazaar, University of Wisconsin–Madison — Feb 2025
Lightning Talk: An open-source crop disease forecasting tool Link

El Zoominario at the Plant Pathology Department, University of Wisconsin–Madison — Sept 2024
Invited Talk: The Data Science Institute Services

Research Bazaar, University of Wisconsin–Madison — Feb 2024
Poster Presentation: Meta-analytic and economic approaches in corn research

Data Science Institute Internal Reading Group, at the University of Wisconsin–Madison — Dec 2023
Invited Talk: The Metropolis Hasting Algorithm

Aquelarre Matemático, Autonomous National University of Mexico (UNAM), Mexico City — Oct 2018
Invited Talk: Advanced topics in mathematical physics Link

Leadership and Service

Organizational Committee Member Jan 2015 – June 2018
National Elementary and Middle School Mathematical Olympiad Program (ONMAPS)

Served on the organizational committee for the National Elementary and Middle School Mathematical Olympiad Program (ONMAPS) in Guanajuato state. Responsibilities included designing, administering, and evaluating selection examinations; training selected students; and conducting professional development workshops for educators across multiple school districts. Book Link

Science Education Volunteer Jan 2012 – Dec 2014
Educational Extension Department, CIMAT

Volunteered with the Mathematics Educational Extension department (Matemorfosis) at CIMAT. Designed and delivered interactive mathematics workshops for K-12 students throughout Guanajuato state, promoting mathematical literacy and scientific engagement among young learners and their parents.

Technical Skills

Programming Languages: Python, R, SQL, HTML/CSS

Tech Stack: Docker, GitHub, Flask

Cloud Platforms: Amazon Web Services (AWS), Google Cloud Platform (GCP)

Miscelaneous: Shell, LATEX, MS Office, Postgres SQL

Visaulization: R shiny, Streamlit, AWS QuickSight, Tableau

Additional Certifications

University of Illinois, Microeconomics Principles Specialization Feb 2025

- **Curriculum Coverage:** Microeconomic principles, market equilibrium analysis, government policy and elasticity, theory of the firm, public goods, common resources, and externalities*f*

Fundamentals of AI Agents Using RAG and LangChain, IBM Feb 2025
How to apply the fundamentals of in-context learning and advanced prompt engineering to improve prompt design Link

Statistical Inference, Johns Hopkins University Feb 2025
Hypothesis Testing Link

Data Science: Inference and Modeling, Harvard University July 2021
Hypothesis Testing Link

TOEFL Reading and Listening Sections Skills Mastery Feb 2025
English Proeficiency Link