

# RUBÉN BALBASTRE ALCOCER

## AI Engineer

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## Professional Summary

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AI Engineer specializing in LLM-based systems, multi-agent architectures, and applied AI research, with experience deploying production-grade solutions across supply chain domains.

## Experience

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### Senior AI Engineer

*Accenture - Madrid, Spain | Jan 2025 - Present*

- Architected and led R&D of an LLM-based, multi-agent supply chain network visibility application, integrating GraphRAG, large language models, and deep research agent based workflows.
- Developed and deployed a machine learning time series forecast solution to support demand planning, leveraging a multi-output XGBoost architecture.
- Designed and led the development of an LLM-powered multi-agent system for automated supply chain decision-making, leveraging RAG, function calling, and post-training alignment techniques (instruction fine-tuning, DPO).

### Data Scientist / AI Engineer

*Accenture - Madrid, Spain | Sept 2022 - Jan 2025*

- Led the R&D of a data quality application for duplicate detection using LLMs and Retrieval-Augmented Generation (RAG).
- Developed and deployed a simulation engine to model production impact from supply chain disruptions, using object-oriented design in Python for a construction-sector client.
- Developed and deployed an optimization-based algorithm for hidden risk detection in supply chains, based on a framework proposed in an MIT-published study, in collaboration with a multinational consumer goods company.
- Built a monitoring system leveraging machine learning forecasting to predict supplier on-time delivery and quality metrics for an aerospace and defense client.

### Data Scientist Intern

*Accenture - Madrid, Spain | Jun 2022 – Sep 2022*

- Contributed to an internal machine learning time series forecasting library.

## Astrophysics Researcher Intern

*University of Valencia - Valencia, Spain | Oct 2020 - Apr 2021*

- Conducted research on star formation processes in large-scale cosmological structures, applying statistics to simulation data.

## Independent Research

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### Kerr PINN Models for Binary Black Hole Systems

*University of Valencia | May 2023 – Dec 2024*

- Transitioned a Physics-Informed Neural Network (PINN) framework from Schwarzschild to Kerr spacetime, incorporating black hole spin into the governing equations.
- Recovered Kerr gravitational waveforms, demonstrating improved modeling fidelity for rotating binary black hole systems.

## Technical Skills

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- **AI / ML Methods:** Large Language Models (LLMs), Retrieval-Augmented Generation (RAG), LLM Post-Training (SFT, DPO), Physics-Informed Neural Networks (PINNs), Multi-Agent Systems, Time Series Forecasting (ML-based), Knowledge Graphs, Optimization, Simulations.
- **ML Frameworks:** PyTorch, Hugging Face Transformers, TRL, XGBoost
- **LLM & Agent Tooling:** LangGraph, LangChain, OpenAI API, FAISS, ChromaDB
- **Cloud & Data Platforms:** AWS (SageMaker, Glue), Azure (Databricks, Azure Functions), Palantir Foundry
- **Programming Languages:** Python, PySpark, Julia, SQL
- **Software & MLOps:** Git, Software Design (OOP), CI/CD, Docker, MLFlow

## Education

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### M.Sc. in Data Science

*University of Valencia | 2021-2023*

- Thesis: Application of Physics-Informed Neural Networks (PINNs) to recover binary black hole systems.

### B.Sc. in Physics

*University of Valencia | 2017-2021*

## Languages

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English (C1), Spanish (Native), Catalan (Native)