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Héctor David Bahena Garza

Mathematics, Data Science and Finance

EDUCATION

University of Essex — *MSc Mathematics and Finance*

September 2024 - September 2025 | Colchester, England

Relevant Coursework: *Stochastic Processes, Statistical Methods, Bayesian Computational Statistics, Big Data in Finance, Mathematics of Portfolios, Financial Derivatives.*

Tecnológico de Monterrey — *B.S. in Data Science and Mathematics — 9th Semester*

August 2021 - December 2025 | 97.8/100 Current GPA | Monterrey, México

Relevant Coursework: *Statistical Modeling, Multivariate Statistical Analysis, Topological Data Analysis, Artificial Intelligence, Deep Learning, Neural Network Design, Linear Programming, Combinatorial Optimization, Agile Project Management.*

Currently enrolled in both Tecnológico de Monterrey and University of Essex as part of a study abroad program.

SKILLS

Languages/Frameworks: *Python (Pandas, NumPy, Scikit-learn, Matplotlib), R, Java, C#, SQL, Excel, Tableau, GAMS, MATLAB*

Other: *Fluent in Spanish (Native) and English, Intermediate in German. Some Competitive Programming and Math Experience.*

PROJECTS

Evolution of Rapid Transit Functional Networks over Time (2025) — *MSc Dissertation (Ongoing)*

- Decomposed London rapid transit passenger flow data with **STL time series analysis** to isolate trends, seasonality, and irregular components.
- Constructed **functional transit networks** using **Granger causality** and **partial correlation**, linking spikes in density/connectivity to real-world events.
- Assessed network evolution and resilience with **graph theory metrics** (centrality, modularity, assortativity) in Python (Pandas, NetworkX).

On-Board Sales Prediction and Optimization (2024) — *DSC Datathon (2nd Place)*

- Cleaned, processed and analyzed **passenger count** and **in-flight food sales** data for over **120,000** Viva Aerobus flights over the course of the last year using **Python (Pandas, Numpy)**.
- Built prediction models in **Python (Scikit-learn)** for passenger count ($R^2 = 0.503$) and in-flight food sales. Employed **data binning** for the latter and designed custom **performance metrics** in accordance to the company's needs.
- Designed and implemented an **ILP model** in **Python (Pyomo)** to optimize the restocking of in-flight food at various airports along a flight's route, taking into account **predicted sales** and **storage capacity**.

Analytical Travel Assignment (2023) — *Ascendion Science Fair (2nd Place)*

We developed a predictive AI model to assign shipments to different couriers based on a 2.1 MB labeled dataset which included type of product, destination, type of courier, among others. We tested 7 AI models using Scikit-learn and TensorFlow in Python.

Tourist Travel Plan Optimization (2023) — *School Project*

We created a mixed-integer programming mathematical model in GAMS to maximize touristic satisfaction through different metrics while subjected to time, money, distance, and schedule constraints using street and travel data from Mexico City.