# Javier I. Medina Murúa

Expected graduation date: May 2021
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## Projects / work experience

**Quantitative analysis intern – Finance & strategic planning division** *06-07/2019*
Softtek

Built a prediction model for financial time series data. Mostly implemented in the Python programming language, using methods from machine learning, statistics and signal processing. A friendly interface to analyse data and make predictions was also included, using Tkinter.

**Engineering intern – modelling/research assistant** *08–11/2018*
STAL advanced materials

Prediction model for import sales of a special product. The model clustered imports that had similar characteristics, and the goal was to identify and predict transactions for business intelligence. Most day-to-day work was about data analysis and reports, using null hypothesis testing, and estimating the parameters of the distribution of import sales. Also helped researching academic articles about industrial-scale cost-efficient coating deposition.

**Heuristic optimisation for unsupervised learning** *08/2018 – 08/2019*
Tecnológico de Monterrey

Research project on heuristic optimisation. *Overview:* Proposal of a feature generation approach to clustering to optimise cluster quality. Using genetic programming to generate features, hidden patterns can be detected. A Bayesian non-parametric analysis of the proposal was performed to give insight into the cases where the nonlinear transformation found by the genetic program improved the learning results.

**Time series forecasting using rules ensemble** *04/2018 – 08/2019*
Tecnológico de Monterrey

Project on time-series analysis that started with a professor. *Broad overview:* Forecasting model in MATLAB based on using the distribution of a pattern recognized by an ensemble of simple rules. An investigation to find out what influences test-set performance; for example, data preprocessing, rule syntax, type of ensemble, distribution model, objective function, etc.

**Model representations in deep learning** *06–09/2020*
University of Essex

Dissertation project. An exploration into the function classes that a neural network can represent. Preliminary results were obtained, demonstrating the class of functions computable by a NN with ReLU activations and outlining potential alternative representations of this function class with more computational efficiency. An overview of the use of nonlinear operators in neural networks is also presented.

## Skills

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|---|---|
| *Languages* | Spanish (mother tongue), English, German, Portuguese |
| *Programming languages* | MATLAB, Python, R, LaTeX, VBA. |
| *Certificates* | Deep learning specialization from deeplearning.ai (5 courses). |
| *Personal* | Flexible perspective, creativity, patience, attention to detail, empathy. |

## Education

**M.Sc. in Mathematics** *October 2019 – September 2020*
University of Essex, England

Master's degree modules: statistical methods, Bayesian computational statistics, nonlinear programming, stochastic processes, combinatorial optimization, partial differential equations, graph theory, research methods, and a dissertation. Part of a double-degree program available to honors students at Tecnológico de Monterrey.

**B.Sc. Engineering Physics** *August 2016 – May 2021*
Tecnológico de Monterrey, Mexico

Strong background in physical science. Honors program. Some topics I am particularly interested in: quantum & wave mechanics, electronics, optics, semiconductors, statistical mechanics, numerical analysis, and partial differential equations. Currently in $9^{\text{th}}$ semester.

**Minor in Intelligent Systems** *January – December 2018*
Tecnológico de Monterrey, Mexico

Coursework on various sub-areas of artificial intelligence. Topics include: multiagent systems, deep learning, genetic algorithms, advanced optimization methods, Markov models and Markov decision processes. Six modules: 1. machine learning, 2. multiagent systems, 3. computational intelligence, and 4. intelligent systems. 5. and 6. accredited with two research projects.