

# de Frutos José Manuel

COMPUTER SCIENTIST · MATHEMATICIAN

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## Experience

### Carlos III University

RESEARCHER DL MODEL APPLIED TO FILTERING METHODS

Madrid, Spain

March 2023 - Today

- Development of Bayesian filtering methods using Deep Learning methods
- Particle Filter, Bayesian filtering, deep learning, generative model, transformers
- Published at AIStats 2024; under revision at Pattern Recognition; in preparation for NeurIPS
- pyTorch, Jax, Python, Julia

### Devo inc

R&D SOFTWARE ENGINEER: "INTERACTIVE SEARCHES" TEAM FOR LOGS MANAGEMENT.

Madrid, Spain

January 2020 - March 2023

- Performed and improve handling of queries: JS (ES6, Nodejs, Webpack), Java8 (Spring Boot). Increase in the processing speed of queries up to x100.
- Implemented new mathematical operations for logs management: JS (ES6, Nodejs, Jest, Mocha), Sql.
- Create data pipelines capable of handling petabytes of data: Python3
- Solved more than 100 incidents, platform documentation : Jira, Confluence, git, CI/CD.
- Design of a SQL-like language for data extraction using ANTLR

### Cadiz University

GRADUATED RESEARCHER

Cadiz, Spain

June 2019 - September 2019

- Monteiro-Baaz operator and its deduction in multivalued logics.

### Institut de Robotica i Informatica Industrial (CSIC-UPC)

GRADUATED RESEARCHER

Madrid, Spain

November 2018 - May 2019

- Implemented of new symmetry detection algorithms for robotics, up to 10 times faster: C/C++, Matlab.

### European Organization for Nuclear Research (CERN)

SUMMER INTERN

Geneva, Switzerland

July 2018 - August 2018

- I was one of 42 selected from more than 2000 applicants.
- Study and implementation of how to convert puppet bolt into a server application, in order to achieve persistence of connections: Ruby, Python.
- Study and learn how a Large Scale Computing Infrastructure works, up to 40.000 Linux servers: Puppet (Mcollective, Puppet Bolt), Ansible.

### Instituto of Mathematical Sciences (ICMAT)

GRADUATED RESEARCHER

Madrid, Spain

June 2018 - September 2018

- Developed of fluid dynamics algorithms, improvement of already existing algorithms for the calculation of speeds and temperatures, improvement obtained up to x100: Python3 (Dedalus, PyMPI).
- Followed courses on: Quantum information theory and Computer assisted proofs in analysis, 50 hours.

### European Southern Observatory (ESO)

DATA ENGINEER INTERN

Paranal, Chile

July 2017 - July 2018

- Installed Datalab for Observatory Logs, Ability to store more than 1 petabytes per day: Elasticsearch, Cassandra, Elassandra, Kairosdb.
- Servers orchestration: Puppet.
- Installed and managed Data Analytic tools, ELK: Jupyter, Grafana, Kibana.
- Set up security architecture: Reverse-Proxy (Nginx), OpenScap, OpenVAS, Seccubus, Dagda.
- Coded anomaly detection algorithms for the detection of instrumental failures of the observatory: Python3 (Pandas, TensorFlow, astropy).
- Performed Data ingestion, extraction and load (ETL), Boosted by 1000x: Python3, Bash.
- Data Visualization: Python3 (Matplotlib, Bokeh, Plotly).
- Advice on the new Hardware acquisition, a budget of 40K Euros

## Education

### Autonomous University of Madrid

MASTER DEGREE IN MATHEMATICS AND APPLICATIONS

Madrid, Spain

September 2018 - July 2020

- Stochastic processes, Advanced statistics, Numerical methods, Advanced PDEs, Geometry.
- Master's thesis on the mathematical foundations of image segmentation.
- Got the University Scholarship "AYUDAS PARA MATRÍCULA DE ESTUDIOS DE MÁSTER-UAM 2018". Got one of the two Scholarship available for mathematics.
- Grade: 8.71/10

## Autonomous University of Madrid

DOUBLE DEGREE MATHEMATICS AND COMPUTER SCIENCE ENGINEER.

Madrid, Spain

September 2012 - June 2018

- Foundations of mathematics: PDEs, Numerical Methods, Statistics, Artificial intelligence, Algorithm analysis.
- Internacional exchange program September 2015 - June 2016, Ecole Polytechnique Paris.
- Programming languages: C/C++, Java, Javascript, Php, Sql, R, Python
- Grade in mathematics: 7.71/10, grade in computer science: 8.31/10.0

## Skills

**Languages** Spanish (Native), French (Native), English (Toefl C1 - 101/120)

## Conferences

### EMS Summer School: Mathematical Modelling, Numerical Analysis, and Scientific Computing

PRESENTED POSTER; RECEIVED A FULL SCHOLARSHIP TO ATTEND THE SCHOOL

Kácov, Czech Republic

15/06/2025-21/06/2025

### Summer School on Bayesian Filtering

Edinburgh, Scotland

06/05/2024-10/05/2024

### Nordic Probabilistic Machine Learning (ProBIA) Summer School

PRESENTED POSTER

Copenhagen, Denmark

01/06/2024-07/06/2024

### Hamburg School of Data Science 2020

PRESENTED PERSONAL DATA SCIENCE PROJECT

Hamburg, Germany

12/02/2020

## Publications

- José Manuel de Frutos, Manuel A. Vázquez, Pablo Olmos, and Joaquín Míguez. Robust training of implicit generative models for multivariate and heavy-tailed distributions with an invariant statistical loss. *arXiv preprint arXiv:2410.22381*, 2024.
- José Manuel de Frutos, Pablo Olmos, Manuel A. Vázquez, and Joaquín Míguez. Training implicit generative models via an invariant statistical loss. *Proceedings of the International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2024, pp. 2026-2034. PMLR.
- José Manuel de Frutos Porras and Simon Traylen. Parallel Task Execution. *Zenodo*, December 5, 2018. DOI: 10.5281/zenodo.1971291.

## Extracurricular Activity

### Julia open source projects developer. Work on projects Stats and JuliaCore

JULIALANG

Madrid, Spain

June 2020 - Today

### Basketball coach for people with disabilities

CLUB BALONCESTO ESTUDIANTES

Madrid, Spain

January 2023 - Present