Université de Paris
Paris, France
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Marwane Bourdim

Master's in Mathematics, Université de Paris and Sorbonne Université

Education

Master's degree in Statistics and Machine Learning, *2021-2022*
Université Paris-Cité, Paris, France
Ranked 1^{st} (1/21), with first class honours
Relevant modules : *High-dimensional statistics, Classification, Stochastic algorithms, Deterministic Optimisation, Nonparametric statistics, Brownian motion and stochastic calculus, Computer vision for biomedical image analysis...*

Master's degree in Mathematical Modeling *2020-2021*
Sorbonne Université, Paris, France
High upper second class honours,
Relevant modules : *Functional Analysis, Partial differential equations, Markov processes in discrete state spaces, Bayesian Networks applied to medicine, Agent-based models for cellular proliferation...*

Bachelor's degree in Pure Mathematics *2018-2019*
Université Paris-Cité, Paris, France
Relevant modules : *Abstract algebra, Probability, Advanced calculus, Complex analysis, Set theory, Topology...*

Classes Préparatoires aux Grandes Écoles, MPSI-MP *2016-2018*
Lycée Jacques Decour, Paris, France
Two years of intense preparation in mathematics, physics and computer science.

Interests

Statistical learning, Stochastic processes, Data science, Probabilistic modelling, Bioinformatics Algorithms, Bayesian statistics, Mathematical Finance, Natural Language Processing, Epistemology, Data Ethics

Research Internships

Methylation-based cellular deconvolution algorithms,
Institution : European Bioinformatics Institute (EMBL-EBI) in the Cancer Genomics group
Supervisor : Dr. Isidro Cortés-Ciriano *February 2022 - January 2023*

This internship has been made possible by the *French Embassy fellowship programme at EMBL-EBI*

- **Designed a probabilistic model of methylation reads** and **developed a supervised and an unsupervised cellular deconvolution methods** respectively based on a binomial model and iteratively reweighted least squares and a modified non-negative matrix factorization algorithm.

- **Implemented both algorithms in Python** in a user-friendly self-contained Command-Line Interface software.

Mathematical and computational modeling of the Covid-19 pandemic in France with a spatio-temporal stochastic framework,
Institution : French Institute for Research in Computer Science (INRIA) in the SIMBIOTX lab
Supervisors : Prof. Dirk Drasdo and Postdoc. Jules Dichamp *April 2021 - September 2021*

- **Applied and extended pre-existent Master equations agent-based models** that had been previously used for cellular proliferation to model the spread of COVID-19 in France.

- **Implemented in Python** simulations of several variations of the model using the Gillespie algorithm.

Personal Projects

Breast cancer survival prediction and data analysis,
December 2023

Performed statistical analysis and applied various machine learning models (logistic regression, random forest, gradient-boosted trees, neural networks) to the METABRIC dataset to predict breast cancer survival with clinical data and gene expression profile

Sentiment analysis webscraper,
October 2023

Designed and implemented in Python a sentiment analysis web scraper to extract and analyze Reddit user sentiments on any word. This project incorporates a variety of NLP techniques like Word2Vec, VADER, SVM, LSTM and Transformers...

Work experience

Mathematics Teacher,
Institution : École alsacienne *February 2023 - June 2023*

Thoughout my time teaching at the highly prestigious private school Ecole Alsacienne, I was responsible for teaching mathematics to year 8 and 10 (4èmes and 2ndes). Not only did I find the experience incredibly rewarding, but my time teaching helped me to develop my communication skills and fine tune my public speaking abilities.

Volunteering

Tutoring disadvantaged high school students,
September 2023 - January 2024

Volunteered to tutor struggling high school students at local high school.

Data visualisation mission for rainfall data,
September 2023

Contributed to some data visualisation missions for rainfall data through the Data for Good charity.

Fellowships

EMBL-EBI / Embassy of France in London Internships Programme *January 2022*
Competitive fellowship for paid internships at EMBL-EBI for computer-science, statistics and bioinformatics students who are working at the Masters level or equivalent at French universities or Grandes Écoles.

Workshops

Graduate School of Translational Bioinformatics Workshop *November 2022*
Presented my methylation cellular deconvolution algorithms at Université Paris-Cité.

Skills

Computing skills: Python, SQL, R, Bash, LaTeX, Numpy, Matplotlib, Scikit-Learn, Pandas, Pytorch
Languages: Native French and fluent English (8/9 IELTS Academic and lived in the UK for the better part of a year)

Extra Interests

Philosophy of science, History of economics, Political theory, Cinema, Drawing, Powerlifting...