Université de Paris
Paris, France
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Webpage : https://marwanebourdim.github.io| Interactive CV

Marwane Bourdim

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

Education

Master's degree in Mathematics, Statistics and Machine Learning, *2021-2022*
Université Paris-Cité, Paris, France
Ranked 1st, with Distinction

Master's degree in Mathematical Modeling *2020-2021*
Sorbonne Université, Paris, France

Bachelor's degree in Pure Mathematics *2018-2019*
Université Paris-Cité, Paris, France

Classes Préparatoires aux Grandes Écoles, MPSI-MP *2016-2018*
Lycée Jacques Decour, Paris, France

Interests

Statistical Learning, Stochastic processes, Data Science, Probabilistic modeling
Linguistics, NLP, Computer vision, Personnalised medecine, Genomics, Data Ethics

Research Internships

Cellular deconvolution algorithms for nanopore bulk methylation data,
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 model of methylation reads** and **developed a supervised cellular deconvolution method** based on iteratively reweighted least squares applied to a binomial model, to estimate the proportions of different cell types in a bulk sample from a matrix of methylation profiles

- **Developed an unsupervised cellular deconvolution method** based on a weighted **bounded simplex-structured matrix factorization** (a modification of non-negative matrix factorization), to jointly estimate the proportions of the cell types in a reference matrix and the proportion of cell types for which we don't have a methylation profile

- **Implemented both algorithms in Python** in a 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 agent-based models** that had been used for cellular proliferation to the spread of COVID-19 in France. made use of Markov Processes and Master equations.

- **Implemented in Python** the Gillespie algorithm for several variations of SIR compartment stochastic models.

Work experience

Mathematics Teacher,
Institution : École alsacienne *February 2022 - June 2022*

I had four classes to teach, two 4èmes (Year 8) and two 2ndes (Year 10). This gave me the opportunity to improve my communication skills (especially public speaking) through a very rewarding experience.

Computer Skills

Languages: C++, Python, R, LaTeX
Packages and libraries: Pytorch, Pandas, TensorFlow

Languages

French (native), English (fluent)

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.

Oral presentations

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

Extra Interests

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