

Imen AYADI

University Paris-Saclay, Centralesupelec, L2S, France

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Education

Tunisian baccalaureate diploma in Math specialization

Sfax, TUNISIA

HIGHER SECONDARY CERTIFICATE

June 2014

- Ranked 1st at the national level, 19.76/20
- Got a grant of excellence from the Tunisian government to pursue university education

Lycée Louis-Le-Grand

Paris, FRANCE

PREPARATORY CLASSES WITH A MAJOR IN MATH AND PHYSICS (MPSI, MP*)

2014-2017

CentraleSupélec (Centralian Cursus)

Paris, FRANCE

ENGINEERING DEGREE

2017-2021

- Selected in the Research track (track of excellence) for first and second years
- Graduated with a specialization in "Applied Mathematics for Data Science" and in the stream "Careers in Research", with the highest honor*

ENS Paris-Saclay

Paris, FRANCE

MASTER DEGREE

2020-2021

- M2 MVA (Mathematics, Vision & Learning), with the highest honor*

* Main courses: Deep Learning, Reinforcement Learning, computer vision, advanced statistics, optimization, kernel methods, image denoising, speech and language processing, stochastic differential equations, harmonic analysis.

Technical Skills

Programming, Python (Pytorch, Tensorflow, Keras), MatLab, R, VBA

Web Development, HTML, CSS, PHP

Computer-aided design Software, AutoCAD

Database, SQL, MongoDB, Neo4j

Languages

Arabic, mother tongue

French, bilingual

English, proficient C1 (Toefl score in 2019 : 100/120)

Spanish, intermediate B1

Research Experience

CEREMADE (Université Paris-Dauphine)

Paris, FRANCE

CAESURA INTERNSHIP

September 2019 - February 2020

- Study of the methods of optimization in Deep Learning

L2S Lab (Université Paris-Saclay)

Paris, FRANCE

FINAL-YEAR INTERNSHIP

May 2021 - October 2021

- Robust Geometric Classification of SSVEP-EEG signals

L2S Lab (Université Paris-Saclay)

Paris, FRANCE

PHD

November 2021 - Now

- Robust Geometric Learning for electroencephalography

Teaching Experience

Private Tutoring

- Mathematics and Physics tutor for high-school students
- Mathematics tutor for undergraduate students

Paris, FRANCE

September 2019 - June 2020

Tutoring in Engineering Schools**

- Computer labs on Matlab for first-year engineering students in Polytech Paris-Saclay
- Tutorials on Probabilities for first-year engineering students in Polytech Paris-Saclay
- Tutorials on Statistics and Machine Learning for first-year engineering students in CentraleSupélec
- Tutorials on Optimization for second-year engineering students in CentraleSupélec

Paris, FRANCE

February 2023 - June 2024

** tutoring along with pedagogic training courses as part of "Teaching in Higher Education" label of the University of Paris-Saclay

Publications & Presentations

Conference papers:

- I. Ayadi and G. Turinici, "Stochastic Runge-Kutta methods and adaptive SGD-G2 stochastic gradient descent," 2020 25th International Conference on Pattern Recognition (ICPR), 2021, pp. 8220-8227, doi: 10.1109/ICPR48806.2021.9412831.
- I. Ayadi, F. Bouchard and F. Pascal, "Elliptical Wishart Distribution: Maximum Likelihood Estimator from Information Geometry," ICASSP 2023 - 2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Rhodes Island, Greece, 2023, pp. 1-5, doi: 10.1109/ICASSP49357.2023.10096222.
- I. Ayadi, F. Bouchard and F. Pascal, " t -WDA: A novel Discriminant Analysis applied to EEG classification," EUSIPCO 2023 - 2023 IEEE European Signal Processing Conference(EUSIPCO), Helsinki, Finland, 2023.
- I. Ayadi, F. Bouchard and F. Pascal, "Distribution matricielle t -Wishart: géométrie d'information, estimation et application pour la classification de signaux EEG," GRETSI 2023 - Colloque Sur Le Traitement Du Signal et Des Images, GRETSI - Groupe de Recherche en Traitement du Signal et des Images, Grenoble, 2023, pp. 777-780.

Journal papers:

- I. Ayadi, F. Bouchard and F. Pascal, "On Elliptical and Inverse Elliptical Wishart distributions," arXiv preprint arXiv:2404.17468 (2024). [*manuscript submitted in IEEE Transactions on Information Theory, waiting for decision*)
- I. Ayadi, F. Bouchard and F. Pascal, "Elliptical Wishart distributions: information geometry, maximum likelihood estimator, performance analysis and statistical learning." Signal Processing (2025): 109981.

Talks:

- Demonstration on *Photovoltaic Panels* in the stand "un Chercheur, une Manip" of Palais De La Découverte on October, 26th 2018 as a scientific vulgarization activity of the Research track of CentraleSupélec
- Short talk about *Robust Geometric Classification of EEG signals* in the 3rd Statistical Learning for Signal and Image Processing Workshop **SLSIP** (October 2021) in Germany
- Pitch about *Robust Geometric Classification of EEG signals* in the 1st UDOPIA Doctoral Student Day in December 2021
- Presentation about *Variable importance with Permutation Approach and Conditional Sampling Approach* in the Artificial Intelligence for Signal and Image Processing **AI4SIP** Program at the Pascal institute, in July 2022
- Oral presentation of conference paper in the **ICASSP** conference in June 2023
- Oral presentation of conference paper in the **GRETSI** conference in August 2023
- Oral presentation of conference paper in the **EUSIPCO** conference in September 2023
- Talk about *Robust geometric classification of EEG signals* on the **PhD day** of L2S in September 2023 (Award of best talk in the AI session)

Projects

Graduate & Undergraduate:

- Study of different approaches to out-of-distribution generalization (as the third-year project), available on <https://github.com/IA3005/Out-of-distributions-generalization.git>:
 - Invariant risk minimization, domain adaptation, and adversarial information factorization as different methods to find an invariant representation in a framework of causal inference
- Discretization of stochastic differential equations driven by a Lévy process (project of the Research track in CentraleSupélec).

Academian Service

Peer Reviewing:

- Reviewing a regular manuscript for the IEEE Transactions on Information Theory journal
- Reviewing a regular manuscript for AIMS Mathematics journal