Swann BESSA
Mail : swann@meta.com
GitHub : https://github.com/swannbessa
Google Scholar : https://scholar.google.fr/citations?user=IJrVw5QAAAAJ

Objective : Application for a PhD / research internship

EDUCATION

MSc in Advanced Computer Science, University of Oxford, United Kingdom 2024 – 2025
- Relevant courses : *Geometric Deep Learning, Uncertainty in Deep Learning, Graph Representation Learning, Bayesian Probabilistic Programming, Computer Vision*

Cycle Ingénieur (MSc), Ecole Polytechnique, Palaiseau, France 2021 – 2024
- GPA : 3.97 (Applied Mathematics, Computer Science courses)
- **Nationwide ranking : 1/897 in the entrance exam ("Major")**
- Relevant courses : *Foundation of Machine Learning, Deep Learning, Natural Language Processing, Reinforcement Learning, Computational Learning Theory, Statistics, Optimization and Control, Monte Carlo methods*

Classe préparatoire, Lycée Stanislas, Paris, France 2019 – 2021
- Advanced program leading to nation-wide competitive exams to the Grandes Ecoles for scientific studies
- PSI track : Physics and Engineering Sciences

EXPERIENCE

Facebook AI Research & Ecole Nationale des Ponts et Chaussées, Paris, France Jun. 26 – Present
PhD Student
- Learned and adaptive partitioning for large-scale vector search

Facebook AI Research, Paris, France Sep. 25 – Mar. 26
Research Intern under the supervision of Dr. Matthijs Douze
- Cluster with Auctions for Nearest Neighbor Search

Polytechnique Montréal, Montréal, Canada Mar. 24 – Aug. 24
Research Intern at CORAIL Research Group under Prof. Quentin Cappart and Prof. Louis-Martin Rousseau
- Learning multipliers for Lagrangian Decomposition : a first general and efficient bounding framework in Constraint Programming
- **First co-author paper accepted at AAAI 2025**

Sanofi R&D, Vitry-sur-Seine, France Jun. 23 – Aug. 23
Intern in the Precision Oncology – Bioinformatics team
- Familiarised with standard methods for bulk RNA-seq data analysis and reference datasets for gene expression and mutations (TCGA, Human Cell Atlas)
- Benchmark on data analysis methods for inferring cell type membership

Police Forces, Mulhouse, France Dec. 21 – Mar. 22
Officer cadet in a Police Tactical Unit (part of Polytechnique's first-year curriculum)
- Oversaw interventions in one of France's high crime areas
- Analyzed the national crime database to track criminal activity

PUBLICATIONS

S. Bessa, P. Fernandez, G. Szilvasy, M. Douze and H. Jégou, "*Cluster with Auctions for Vector Search*", **NeurIPS 2026**

S. Bessa, D. Dabert, M. Bourgeat, Q. Cappart and L. Rousseau, "*Learning Valid Dual Bounds in Constraint Programming: Boosted Lagrangian Decomposition with Self-Supervised Learning*", **AAAI 2025**

RESEARCH WORK (reports available on GitHub)

Ecole Polytechnique, Palaiseau, France Dec. 23 – Mar. 24
Deep Reinforcement Learning Project : Training a Snake agent on small grids
- Trained an efficient Snake agent with limited information and computational power
- Model generalization on larger grids by reusing convolutional layers

Ecole Polytechnique, Palaiseau, France Sep. 23 – Dec. 23
Machine Learning Project : Algorithmic Fairness in the COMPAS case – Prof. Jean-Michel Loubes
- Review of the state-of-the-art on fairness in Machine Learning
- Training of a modified COMPAS algorithm that achieves better performance on fairness metrics while maintaining similar accuracy

National Institute for Research in Digital Science and Technology (INRIA), Saclay, France Feb. 23 – Apr. 23
NLP Project : Mining, Learning and Reasoning on Web Graphs – Prof. Pierre Bourhis
- Clustered articles about hate crimes in the US based on their titles and contents
- Leveraged Graphs clustering, NLP and Information Extraction methods

OUTSIDE ACTIVITIES

Lycée Stanislas, Paris, France — Sep. 22 – Jun. 23
Oral examiner in Mathematics - MPSI
- In charge of evaluating undergraduate students during weekly sessions

Polytechnique's Forum for Public Debating, Palaiseau, France — Apr. 22 – Apr. 23
Member
- Organized and hosted conferences with French scientists and politicians

EXTRA CURRICULAR ACTIVITIES

Sports
- *Karate : brown belt, 6 years of practice*
- *Cross-Training : 3 years of practice*