

Kellian Cottart

Palaiseau, 91120, France | +33 6 16 27 23 75 | kellian.cottart@gmail.com

linkedin.com/in/kellian-cottart | github.com/kellian-cottart | kellian-cottart.github.io | [Google Scholar](#)

Full-Stack Machine Learning Researcher: Ph.D. from Université Paris-Saclay / CNRS (2026), M.Sc. from École Polytechnique. Specializing in hardware-efficient ML, low-precision/binary architectures, and custom GPU kernel development (Triton/Pallas). Experienced in scaled training and dataset pipelines across HPC clusters (Jean Zay via Slurm). I bridge algorithmic theory and extreme execution efficiency: deriving discrete Bayesian learning rules, writing custom autograd GPU kernels, and co-designing with physical neuromorphic devices. **First author at ICML 2026, second author in Nature Communications.**

Seeking a Machine Learning Research Scientist / Systems Research position, available from December 2026.

RESEARCH EXPERIENCE

Doctoral Researcher in Machine Learning (advisor: Prof. Damien Querlioz)

CNRS, Centre de Nanosciences et de Nanotechnologies (C2N), Palaiseau, France | 2023–2026

- **BiMU & Hardware Co-Design** (ICML 2026, first author). Developed Bayesian continual learning for 1-bit weights: derived discrete posterior rules where weight uncertainty prevents saturation. Co-authored physical substrate studies (Nano Letters 2025, APL 2026) pairing these rules with magneto-ionic artificial synapses for ultra-low-power neuromorphic edge hardware.
- **High-Performance GPU Kernel Engineering & HPC Scaling** (Triton / Pallas / JAX). Authored custom fused GPU kernels for non-standard Bayesian recurrences with hand-derived custom VJPs (verified against independent autograd oracles). Scaled multi-GPU training workloads and data pipelines on the **Jean Zay supercomputer** using **Slurm**, paired with Grain, Monte-Carlo predictive evaluation, and resumable checkpointing.
- **Binary Bayesian Transformers** (JAX/Equinox). Binarized QK=V cache updated via variational inference on 1-bit weights trained through Gumbel-softmax relation. Benchmarked performance trade-offs against dense float baselines on language modeling and computer vision datasets.
- **MESU** (Nature Communications 2025, second author). Formulated a Bayesian continual learning rule where synapse posterior variance dynamically scales learning and forgetting rates. Extended the mathematical theory, designed multi-task evaluations, and led the JAX implementation scaling across 200+ sequential tasks.

Research Intern, Physics-Informed Deep Learning

Dassault Systèmes (CATIA Composites R&D), Vélizy-Villacoublay, France | 2023

- Physics-informed neural network (PINN) surrogate for micromechanics simulations: refined statistical generation of training geometries (co-author, Journal of Composite Materials) and deployed surrogate models to predict nanoscale shear stress.

Infrastructure and Data Platform Intern

Adaltas, Paris, France | 2022

- Deployed bare-metal Kubernetes clusters from scratch and built proof-of-concept distributed data platform with Onyxia (INSEE open-source datalab) and S3 storage.

PUBLICATIONS

1. **K. Cottart**, et al. Active Continual Learning with Metaplastic Binary Bayesian Neural Networks. **International Conference on Machine Learning (ICML)**, 2026. [code]
2. D. Bonnet, **K. Cottart**, et al. Bayesian continual learning and forgetting in neural networks. **Nature Communications**, 2025. [code]
3. G. Bernard, **K. Cottart**, et al. Dynamic Control of Weight-Update Linearity in Magneto-Ionic Synapses. **Nano Letters**, 2025.
4. H. N. Mohanty, G. Bernard, M.-A. Syskaki, **K. Cottart**, et al. Differential magneto-ionic artificial synapse. **Applied Physics Letters** 128, 232404, 2026.
5. P.-Y. Mechin, A. Borrás, **K. Cottart**, V. Keryvin. A unified method to generate representative volume elements with tailored random fibre arrangements to estimate the shear and transverse behaviours of unidirectional continuous fibre composite plies. **Journal of Composite Materials**, 2023.

TALKS AND POSTERS

- Active Continual Learning with Metaplastic Binary Bayesian Neural Networks. Poster, **ICML 2026**, Seoul, South Korea.
- Bayesian Continual Learning and Forgetting in Neural Networks. Talk, **Neuromorphic Symposium**, Paris, France, September 2025.
- Bayesian Continual Learning and Forgetting in Neural Networks. Talk, **UQ4ML / COMETA Workshop** on Uncertainty Quantification for Machine Learning, CEA Paris-Saclay, France, September 2025.

EDUCATION

Ph.D. in Machine Learning and Neuromorphic Computing

Université Paris-Saclay, CNRS / C2N, Palaiseau, France | 2023–2026

- Thesis: *Bayesian Metaplasticity: Uncertainty as a Computational Principle for Resource-Constrained Learning*. Advisor: Prof. Damien Querlioz. Defence: 5 October 2026.

M.Sc. in Data Sciences (M2DS), École Polytechnique

Institut Polytechnique de Paris, Palaiseau, France | 2022–2023

- Coursework: reinforcement learning, optimisation for data science, Monte Carlo methods (MCMC to generative models), advanced deep learning, computer vision, data stream processing, big data frameworks.

Engineering Degree (M.Sc.) in Computer Science

École Centrale d'Électronique (ECE Paris), Paris, France | 2018–2023

- Software and data engineering major; Erasmus semester in London. Best research project of the research minor: low-cost scanning tunnelling microscope built from scratch.

SKILLS

- **Core Expertise:** Hardware-efficient ML, low-precision & 1-bit neural networks, quantization-aware training (QAT), Bayesian deep learning, variational inference, continual learning, transformer architectures, neuromorphic computing.
- **Frameworks & Systems:** JAX, Triton, Pallas, Equinox, Optax, PyTorch, Custom GPU kernels & autograd VJPs, Grain.
- **Infrastructure & HPC:** Slurm, Jean Zay supercomputer (GENCI/IDRIS), Kubernetes (bare-metal cluster deployment & operations), Linux, Git, CI/CD, SQL.
- **Programming:** Python, C, C++, CUDA.
- **Languages:** French (native), English (C1), Spanish (B2), Japanese (A1).

TEACHING EXPERIENCE

Teaching Assistant, C++ Programming (undergraduate)

IUT d'Orsay, Université Paris-Saclay, Gif-sur-Yvette, France | 2024–2025

- 96 hours of lab sessions and projects over two academic years.

Lecturer, Python Programming (master's level)

École Centrale d'Électronique (ECE Paris), Paris, France | 2023

- 24 hours: lectures, lab sessions and project.

INTERESTS

Music production (writing, mixing, mastering), 3D design (Fusion 360, Cinema 4D) and video editing, climbing and cycling, board games.