

GASPARD GOUPY

PHD CANDIDATE · NEUROMORPHIC COMPUTING · MACHINE LEARNING

gaspard.goupy@protonmail.com | linkedin.com/in/gaspard-goupy | github.com/ggoupy | ggoupy.github.io

RESEARCH INTERESTS

Advancing energy-efficient machine learning for edge AI to lower computational costs and environmental impact.

SKILLS

Topics: Spiking Neural Networks, Neuromorphic Computing, Computer Vision, Deep Learning, Reinforcement Learning

Technologies: NumPy, CuPy, PyTorch, Tensorflow, Scikit-Learn, PostgreSQL, Unity, Git, Docker, Linux

Programming: Python, C, C++, C#, Java, JavaScript, SQL

EDUCATION

Ph.D in Computer Science

University of Lille

Expected Sept 2025

Lille, France

- Published at a top-tier AI conference (NeurIPS); Reviewed for a leading AI journal (IEEE TNNLS)
- Led 2 master's research projects at the University of Cluj-Napoca (Romania); Supervised a research intern

M.S. in Computer Science, spec. A.I.

University Claude Bernard Lyon 1

2022

Lyon, France

- Ranks: 10/121 (1st year); 4/31 (2nd year)
- Relevant courses: Machine learning, Reinforcement learning, Bio-inspired computing, IoT, Multi-agent systems

B.S. in Computer Science

University Claude Bernard Lyon 1

2020

Lyon, France

- One-year exchange at Tecnológico de Monterrey (2nd best university in Mexico), 2019

EXPERIENCE

Graduate Researcher

University of Lille

Oct 2022 – Present

Lille, France

- Improved significantly the learning capacity of spiking classification layers trained with supervised STDP by introducing new winner-takes-all competition and homeostasis mechanisms tailored for classification
- Designed a supervised STDP rule outperforming the state of the art by ensuring better control over the firing times
- Developed feedback methods for supervised training of deep Spiking Neural Networks (SNNs), exploring alternatives to backpropagation with a focus on compatibility with on-chip training on neuromorphic hardware

Research Intern

Interdisciplinary Institute for Technological Innovation

Mar 2022 – Sept 2022

Sherbrooke, Canada

- First-authored a scientific paper on a novel hardware-friendly unsupervised learning rule in convolutional SNNs, outperforming the state of the art on a speech recognition task
- Designed a low-power acoustic anomaly detection system by implementing convolutional SNNs trained using unsupervised learning to enable constant monitoring of machines with IoT devices

Full-Stack Developer Intern

University Jean Moulin Lyon 3

July 2020 – Sept 2020

Lyon, France

- Automated equipment loaning processes by developing a web application for the university intranet
- Implemented a RESTful API with .NET and a client-side UI with Angular

PROJECTS

SpikeNN · github.com/ggoupy/SpikeNN

2024

- SNN framework for classification, implemented in NumPy and Numba for optimized CPU-based processing
- Features event-based processing, first-spike coding, IF/LIF spiking neurons, and STDP-based supervised learning rules

AutoMiam · github.com/ggoupy/AutoMiam

2022

- Smart IoT pet-feeder system with Arduino, using deep learning (fine-tuned Siamese network) for dog identification and automated food intake regulation, supported by a Python server and Node.js apps

DofusAISim · github.com/ggoupy/DofusAISim

2021

- Simulation of a tactical RPG game with Unity, focusing on multi-agent systems and AI behaviors with decision trees and reinforcement Q-learning

PUBLICATIONS

List of publications available on [Google Scholar](#)

- **G Goupy**, P Tirilly, and IM Bilasco. Neuronal Competition Groups with Supervised STDP for Spike-Based Classification. *Advances in Neural Information Processing Systems (NeurIPS)*, 38, 2024. DOI not available yet
CORE Rank: **A***
- **G Goupy**, P Tirilly, and IM Bilasco. Paired Competing Neurons Improving STDP Supervised Local Learning in Spiking Neural Networks. *Frontiers in Neuroscience*, 18, 2023. doi.org/10.3389/fnins.2024.1401690
Impact Factor: **3.6**
- **G Goupy**, A Juneau-Fecteau, N Garg, I Balafrej, F Alibart, L Frechette, D Drouin, and Y Beilliard. Unsupervised and Efficient Learning in Sparsely Activated Convolutional Spiking Neural Networks Enabled by Voltage-Dependent Synaptic Plasticity. *Neuromorphic Computing and Engineering*, 3, 2023. doi.org/10.1088/2634-4386/acad98
Impact Factor: **5.8**

CERTIFICATIONS

Course “ Linear Algebra for Machine Learning and Data Science ”, DeepLearning.AI	2023
Scientific mediator , University of Lille	2023
Course “ Sharing knowledge with Wikipedia ”, University of Lille	2023
Course “ Latex, advanced level ”, University of Lille	2023
Course “ Effective reading of scientific papers ”, University of Lille	2022
Course “ Computational Neuroscience ”, University of Washington	2022
Specialization “ Deep Learning ”, DeepLearning.AI	2021

EXTRACURRICULAR

Science Communication: Popularized scientific research for diverse audiences at the University of Lille
Open Neuromorphic: Member of a collaborative community for neuromorphic computing enthusiasts
Self-hosting: I maintain home servers on mini PCs, notably for multimedia streaming and automation
Wikipedia contributor: I created and edited articles in areas of my expertise ([profile](#))
Coffee: I drink specialty coffee and have an interest in the science of coffee brewing
Hiking: I enjoy multi-day hikes with an emphasis on survival and bushcraft
Music: I play piano, mostly classical pieces and Ghibli music