EMMANUEL CALVET

Engineer & PhD Student

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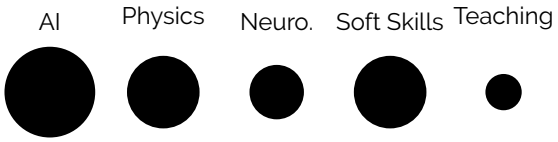
My scientific blog
My Linkedin
My github

WHO AM I?

I am a passionate technophile who has been enamoured with quantum science since the beginning of my studies. I am finishing my PhD, specializing in artificial intelligence at the intersection of neurosciences and quantum physics. My expertise covers programming models of AI, data science, machine learning and quantum programming. I take a positive, realistic approach to my work and strive to use value sensitive design to develop innovative technology that has the potential to bring about a brighter future.



TECHNICAL SKILLS

2023 – 20XX

System architect — **Numana**

I have been hired part-time to develop one of Quebec's very first quantum communication test benches. My role is to deploy the quantum encryption machinery into an open network, allowing the industry to test, at a lower cost and in real conditions, the solutions that respond to the quantum threat.

`Quantum Cryptography / Telecom / QKD / QRNG`

2017 – 20XX

PhD — **NECOTIS and IQ**

My research focuses on reservoir computing and its potential for enhancing the performance of neural networks. To this end, my first objective was to explore the physics of phase transition and its effect on these systems. Our results are now in the process of being published, and in the next phase of the project, we will be generalizing our insights to a quantum ISING system developed during my last internship.

`Python / C++ / SNN / Reservoir`

2021 – 2022 (6 months)

Quantum programmer (internship) — **IBM-q hub**

This internship took place in the IBM-quantum hub at the University of Sherbrooke. First, I conducted a comprehensive benchmarking of multiple quantum AI algorithms. Subsequently, I developed a model of ISING spins in a quantum computer. It was a precious experience in which I learned a lot and gained insight into the world of quantum computing.

`Python / Qsikit / Pennylane / Reservoir`

2016 – 2017 (1 year)

Research Professional — **IQ, Institut Quantique**

Under the supervision of Bertrand Reulet and Jean Rouat at the University of Sherbrooke, I conducted a feasibility study to create a Ph.D. position to bridge the disciplines of physics and computational neuroscience.

`Matlab / ANN / Hopfield / ISING / Bayes`

2015-2016 (10 months)

Python developer (internship) — **NECOTIS, Neurosciences Computationnelles et Traitement Intelligent des Signaux**

I collaborated with a Ph.D. student and neurophysiologists at UdeM to devise a spiking neural network-based Python model of the visual cortex.

`Python / Brian2 / Nest / Mamouth`

EDUCATION

2019 – 2022

Training Program — **QsciTech**

This program provided engineers and physicists with a unique opportunity to gain an understanding of quantum technology from an entrepreneurial perspective. Through practical projects and immersive learning, participants acquired both technical and soft skills, culminating in an internship in the quantum industry.

2021
(4 days)

Summer school — **QsciTech (online)**

This summer school focused on providing a hands-on introduction to quantum programming using the Qiskit library using IBM-quantum. We also had discussions about gender equality in the field and a workshop on storytelling.

2019
(4 days)

Summer school — **QsciTech (Jouvence)**

This summer school offered a wide selection of talks featuring speakers from D-Wave and other local quantum industries. I had the opportunity to join workshops covering topics such as quantum computing in Julia, team building and leadership development.

2014 – 2016

Master's Degree — **University of Sherbrooke**

I filed my expertise and understanding in the domain of information science, taking key courses such as artificial intelligence, computational neurosciences, advanced signal processing, and data coding/decoding.

2010 – 2016

Engineer — **ISEN, Institut Supérieur d'Électronique et du Numérique**

I have acquired a fundamental knowledge of computing and electronics, enabling me to undertake technical projects such as building a magnetometer or programming for efficient delivery services.

SOFT SKILLS

2022 – 2023

Research Auxilary — **AED, Accélérateur Entreprenarial Desjardins**

I participated in a qualitative research project led by the AED. The goal was to promote networking between the fields of academia and the quantum industry. Tasks included conducting insightful interviews with influential figures within these sectors, performing meticulous data analysis, and authoring comprehensive analysis reports.

2017 – 20XX

Group meeting organizer — **NECOTIS**

I have significant experience in organizing and leading research group meetings. I have managed and conducted various activities, including article exchanges, code reviews, technical tutorials, ethical debates, and results presentations.

2021 – 20XX

Panellist — **QsciTech**

I had the opportunity to be a panellist at a summer school, offering a 30-minute presentation on Principal Component Analysis (PCA), a topic within the field of data science.

2020

Copy correction — **University of Sherbrooke**

I have marked and graded exams from an undergraduate course in signal processing.

2019

Video capsule **University of Sherbrooke**

I created, registered, and completed a 6-minute video capsule for a computational neuroscience course.

2018

Exam supervisor **University of Sherbrooke**

I have been responsible for supervising various exams, ensuring that everyone follows the instructions.

2017

Conference **9e journée scientifique CNS**

Presentation talk of my research project at a conference of about 200 people.

2012
part time

Tutoring **ISM, Institut Sainte Marie**

Together with my colleagues, we developed tutoring sessions to assist teenagers with educational struggles. We offered weekly support for their homework and study material.

LANGUAGES

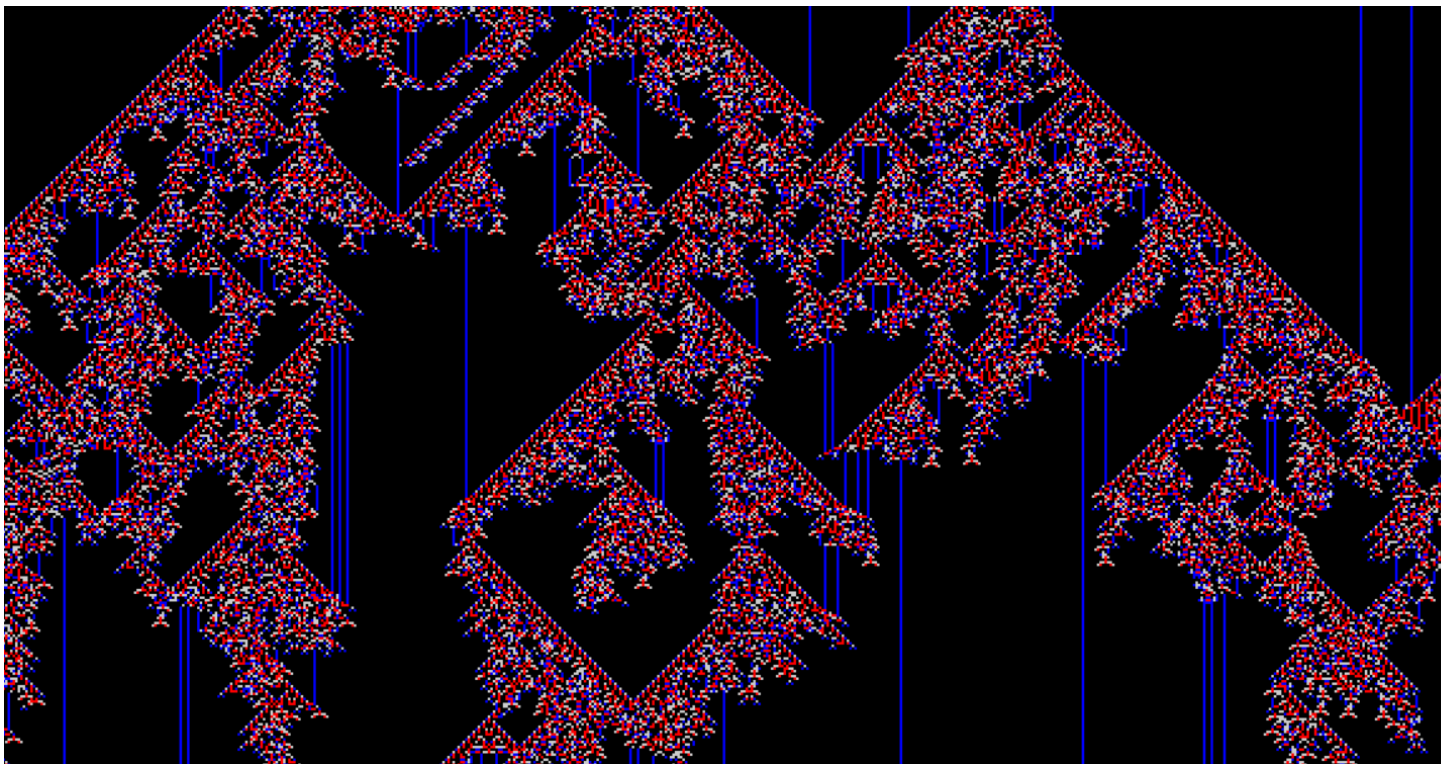
French - native
English - proficient

HOBBIES

- Learning Audio-video recording and making.
- Project of podcast and e-learning videos.
- Lyricist, rapper.

PHILOSOPHY

"Science sans conscience n'est que ruine de l'âme" - François Rabelais.



This cellular automaton is at the edge of chaos, a unique dynamical state found in many physical systems, including the brain. This dynamical regime has been shown to be closely related to the computational power of neural networks, and also produce very nice fractal patterns such as this one.