

## EDUCATION

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Sep. 2019 – Jul. 2023 **M.Sc. equivalent** specialization in applied mathematics MINES PARISTECH

The cycle ingénieur civil of Mines ParisTech is one of the most prestigious<sup>1</sup> curriculums in France. Students enter after taking nationwide exams ranking them across scientific and literary disciplines.

Major subjects include Mathematics, Physics and Computer Science. Specific modules chosen include Stochastic, Integral and Differential Calculus, Optimization, Intro to Data Science, Deep Learning for Image Analysis, Advanced Data Science, Signals Processing, Operations Research, Databases & Networking, ...

Sep. 2017 – Jul. 2019 **B.Sc. equivalent** Physics (major) and Mathematics LYCÉE PRIVÉ SAINTE-GENEVIÈVE

Two year multidisciplinary, intense and competitive curriculum in preparation for nationwide exams ranking France's top students<sup>2</sup>.

Major subjects include Mathematics, Physics, Chemistry and Computer Science.

## RESEARCH & WORK EXPERIENCE

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Mar. 2021 – Aug. 2021 **Visiting Research Intern (current)** HARVARD UNIVERSITY

Full-time research position (Jia Liu Group) on using deep learning tools, such as coupled adversarial autoencoders, to improve multi-modal analysis of neuronal cell types. The ultimate objective is to build robust characterizations of these cell types and their stereotypical interactions to better understand the brain's computations. Another current project of mine focuses on proving the stability of novel 'soft' mesh electrode brain machine interfaces and using them to study brain aging.

Jul. 2020 – Aug. 2020 **Summer Research Intern** NATIONAL PHYSICAL LABORATORY (NPL)

Research was conducted on applying various deep learning methods such as Convolutional Neural Networks (CNNs) in order to detect different types of cardiovascular disease such as Myocardial Infarction or Atrial Fibrillation by using raw electrocardiogram signals as the input. Significant improvements on in-house methods were achieved by adapting the braindecode (primarily written in pytorch) library initially written for electroencephalography analysis.

Nov. 2019 **Data Analyst Intern** PRÜFTECHNIK GROUP | CRC LABORATORY MINES PARISTECH

Built a predictive maintenance framework for a wind-farm. A total of five years worth of accelerometer data coming from 5 wind turbines was processed and used to train both 'traditional' machine learning algorithms (SVM, Random Forest) on feature engineered data and deep learning methods (CNNs, Autoencoders) trained on spectrogram images or wavelet features. All of this in python and keras using GPU clusters provided by CRC laboratory. The final pipeline evaluated on held-out test datasets showed potential cost savings on the order of hundreds of thousands of euros.

## PROJECTS, SKILLS & ACTIVITIES

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**Projects<sup>3</sup>** include:

- Developed a mobile application linking small store owners with nearby customers. Front-end was written using React Native and back-end in Python with the help of Flask and other relevant libraries.
- Using style transfer powered by machine learning to create a Virtual Reality (VR) application with Unity plunging the user into the immersive worlds of Van Gogh, Monet, Kirchner and many others...
- Worked with E-Cube to improve the valuation accuracy of Natural Gas (NG) storage facilities. Three complementary python modules can (1) webscrape relevant data, (2) generate scenarios of spot and forward prices of NG markets and (3) solve the optimization problem of optimal buying/selling strategy.

**Technical skills:** Advanced knowledge of Python and its scientific libraries/deep learning frameworks (pandas, scipy, sklearn, tensorflow, keras, pytorch, ...) along with flask. Knowledge of HTML, CSS/Sass, JS and React Native, PostgreSQL, Git,  $\LaTeX$  and C#.

**Linguistic skills:** French (native), English (native - TOEFL 119/120), Spanish (advanced), Chinese (beginner).

**Activities:** Tennis team of Mines ParisTech, Ski, Philosophy, Reading and Writing

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<sup>1</sup>Generally ranked #2 or #3 Grande Ecole d'Ingénieur in France

<sup>2</sup>Ranked #1 Classes Préparatoires aux Grandes Ecoles in France

<sup>3</sup>For a complete overview of the different projects: [sebastianpartarrieu.github.io](https://sebastianpartarrieu.github.io) and <https://github.com/SebastianPartarrieu>