

# Paul Bertin

## PhD student in Machine Learning

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📍 Montréal, CANADA

### EDUCATION

SEPTEMBER 2019 – PRESENT

#### PhD in Machine Learning Mila, Université de Montréal

*Interests* : Gene Expression Data, Causality, Bayesian Deep Learning  
Supervised by **Yoshua Bengio**

SEPTEMBER 2017 – AUGUST 2018

#### Mathématiques Vision Apprentissage Ecole Normale Supérieure Paris-Saclay

*Majors* : Probability, Optimization  
*Minors* : Differential Geometry, Topology

SEPTEMBER 2014 – AUGUST 2018

#### Master of Science Ecole polytechnique

*Majors* : Applied Mathematics, Computer Science  
*Minors* : Physics, Biology

SEPTEMBER 2012 – JUNE 2014

#### Preparatory courses Lycée Louis Le Grand

*Majors* : Mathematics, Physics  
*Minors* : Engineering Science, English

### COMMUNICATION SKILLS

FRENCH Native speaker  
ENGLISH Proficient  
SPANISH Advanced  
JAPANESE Beginner

### SOFTWARE SKILLS

GOOD LEVEL Python, Java, Tensorflow, PyTorch  
INTERMEDIATE C++, git, HTML, Linux,  $\text{\LaTeX}$

### EXPERIENCE

SEPTEMBER 2018 – JUNE 2019

#### Research Intern

##### Montréal Institute for Learning Algorithms, Montréal

Development of a web based system for diagnosing chest X-ray images.  
Analysis of Gene Interaction Graphs as prior knowledge for ML models.  
Supervised by **Joseph Paul Cohen**.

APRIL 2018 – AUGUST 2018

#### Research Intern

##### Aramis Team, Inria, Paris

Tackled the analysis of graphs embedded into 3D space in order to study the variability and plasticity of vessel networks in the adult mouse brain.  
Supervised by **Stanley Durrleman**

APRIL 2017 – AUGUST 2017

#### Deep Learning Research Intern

##### National Institute of Informatics, Tokyo

Deep Learning for Medical Image Analysis (design and implementation). Classified cancerous and healthy cells in histopathology images.  
Supervised by **Benjamin Renoust**

JUNE 2016 – AUGUST 2016

#### Development Intern

##### Option, Santiago de Chile

Mobile app development.

AUGUST 2015

#### Volunteer

##### X-Microfinance, Guatemala

Traveled to Guatemala with a group of students to grant microcredits to farmers and entrepreneurs with limited resources.

NOVEMBER 2014 – MARCH 2015

#### Navy Officer on the Supply Ship "La Somme"

##### Marine Nationale, Brest, France

Part of the engine department. Trained to be security coordinator during fire simulations onboard.

## PROJECTS

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2019  
**Graph-based selection of genes**  
Is graph-based feature selection of genes better than random?

2018  
**X-Ray Disease Prediction System**  
**Chester** : a web based (but locally run) prototype system for diagnosing chest X-ray images.

2018  
**Dynamics of glass-forming liquids**  
Data challenge : prediction of the dynamics of particles in glass-forming liquids.

2017  
**Deep Multi Armed Bandit**  
Apply Bayesian Deep Learning methods to deal with the Exploration-Exploitation dilemma in the Multi Armed Bandit problem.

2017  
**Style Transfer**  
Review and implement various approaches for Style Transfer in images (neural algorithm and unsupervised method).

2017  
**Restricted Boltzmann Machines**  
Review of various algorithms to train Restricted Boltzmann Machines.  
*K-step Contrastive Divergence and Persistent Contrastive Divergence algorithms.*

2016  
**Self driving car on TORCS**  
Designed and implemented a genetic algorithm which learned to drive a simulated car.  
A population of neural networks evolved (by dying and reproducing) until accurately driving along the road.

2014  
**Swarm-bots**  
Brought out emergent phenomena in a swarm of simulated robots. Designed a distributed policy to efficiently explore an unknown space with a swarm of robots.  
Implemented a protocol so that two real robots pull objects in a cooperative manner.

## COURSES

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2018 **The curse of dimensionality**  
COLLEGE DE FRANCE  
Stéphane Mallat

2018 **Geometry and Shape Spaces**  
ENS CACHAN  
A. Trounev, J. Glaunes

2018 **Longitudinal Data Analysis**  
ENS CACHAN  
Stanley Durrleman

2018 **Kernel Methods for machine learning**  
ENS CACHAN  
J. Mairal, J.-P. Vert

2017 **Reinforcement Learning**  
ENS CACHAN  
Alessandro Lazaric

2017 **Topological Data Analysis**  
POLYTECHNIQUE  
Steve Oudot

2017 **Sparsity and Compressed Sensing**  
ENS ULM  
Gabriel Peyré

2017 **Probabilistic Graphical Models**  
ENS CACHAN  
F. Bach and G. Obozinski

2017 **Complex Systems**  
POLYTECHNIQUE  
J.P. Bouchaud and Kirone Mallick

2016 **Machine Learning**  
POLYTECHNIQUE  
Michalis Vazirgiannis

2016 **Operations Research**  
POLYTECHNIQUE  
Stéphane Gaubert

2016 **Randomization in Computer Science**  
POLYTECHNIQUE  
Benjamin Doerr

2016 **Neurobiology**  
POLYTECHNIQUE  
Nicolas David and Alice Meunier

2016 **Statistical Physics**  
POLYTECHNIQUE  
Gilles Montambaux