Fabien Pesquerel

Postdoctoral researcher

Reinforcement Learning
&
Machine Learning

Inria

30 March 1994

28 rue Dorel
Châteaugiron
35 410
France

+33 6 07 53 57 10

https://fabienpesquerel.github.io

fabien.pesquerel@gmail.com

French nationality

Languages

French ●●●●●

English ●●●●●

Hard Skills

- Python
- Linux
- Git
- Machine Learning & Statistics
- Scientific computing:
  NumPy, SciPy, sklearn, PyTorch…

Soft Skills

- Scientific communication
- Problem solving
- Autonomy

Research Experience

2024–today — **Postdoctoral Researcher** — INRIA, PIRAT\'); team

Research in sequential learning, reinforcement learning and machine learning with application to automated pentesting and network intrusion detection. Challenges that are important to, but not unique to, cybersecurity are interpretability, model audit, concept drift and adversarial learning. I focus on theoretical and algorithmic study of Machine Learning algorithms that can adapt in this adversarial setting, and optimally update strategies.

2020–2023 — **PhD student** — INRIA, SCOOL team

Research in sequential learning leading to the writing of my *thesis manuscript*. Theoretical and algorithmic study of Bandit and Reinforcement Learning problems. The aim of this research is to answer the following problem: ***In an uncertain situation and given a goal to achieve, what is the best decision to make?*** Once a decision has been made, the question arises as to how the newly acquired information can be used to make the next decision, and so on.

Spring-Summer 2019 — **Research Intern** — EPFL (Switzerland), Computer Vision Laboratory

Studying and researching methods to generate 3D models from a sketch or photograph. Development of cost functions using differential geometry, development of a differentiable point cloud renderer and neural networks architectures to generate 3D models. One-hour presentation at the international seminar of the EPFL's computer vision laboratory.

Spring-Summer 2018 — **Research Intern** — Hubert Curien Laboratory, Data Intelligence Team

Study and research about metric learning and classification methods for unbalanced data. Application to fraud detection in partnership with Tracfin. Studying the topology of the functional space of neural networks and development of a classification method using topological data analysis.

Summer 2016 — **Research Intern** — Orsay Universiy, LPTMS

Studying the algebraic Bethe ansatz at the Theoretical Physics and Statistical Models Laboratory (LPTMS). Bethe's ansatz can be used to compute properties emerging from the interaction of a large number of quantum particles. The study of these emergent properties is useful for understanding magnets, superconductivity, quantum chemistry, semiconductors…

Education

2019 – 2020 — **Master's degree (MVA) & ENS diploma in Computer Science and Mathematics** — ENS

Master's degree *Mathematics, Vision, Learning* (MVA) and ENS diploma in Computer Science and Mathematics. Specializing in the mathematics and algorithms of decision making under uncertainty.

2017 – 2019 — **Bachelor's degree in Computer Science & First year of Master (MPRI)** — ENS

Courses in Machine Learning, artificial computer vision, algorithms, Deep Learning, convex optimisation, data bases… Courses in theoretical neuroscience, cognitive psychology and digital humanities.

2015 – 2017 — **Bachelor's degree in Theoretical Physics** — ENS

Courses in quantum physics, special relativity, statistical physics and fluid mechanics. Validation of mathematics courses such as topology, algebra, statistics, measure theory and stochastic processes. Validation of courses in debating (in English) and American poetry (in English).

2015 — **Admission to ENS de Paris via the competitive entrance exam**

Fabien Pesquerel

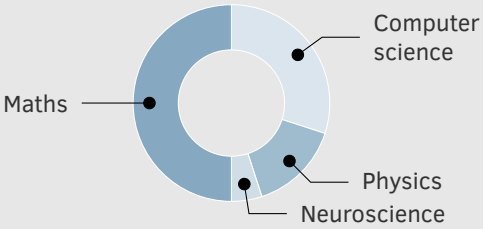
Postdoctoral researcher

Reinforcement Learning
&
Machine Learning

Inria

About

I am interested in the problem of **sequential learning** in which an agent interacts with an environment in order to achieve a goal. The agent must **adapt to the information** obtained from its observations. The sequential processing of information make this problem a difficult and interesting one, in particular when applied to machine translation.
I am as motivated by the **mathematical and computational aspects of the problem** (*What is an optimal strategy/decision?*) than I am by the **modelling** aspects (*How can we model a human decision-making?*).
These interests explain my scientific profile, which I summarise in the diagram below:



Networks

My LinkedIn profile

My GitHub profile

My Google Scholar profile

Scientific Publications

2023 **Information per unit of interaction in stochastic sequential decision making**
Fabien Pesquerel
PhD manuscript, pdf

2023 **Fast Asymptotically Optimal Algorithms for Non-Parametric Stochastic Bandits**
Dorian Baudry, Fabien Pesquerel, Rémy Degenne, Odalric-Ambrym Maillard
Conference on Neural Information Processing Systems, pdf

2023 **Logarithmic regret in communicating MDPs: Leveraging known dynamics with bandits**
Fabien Pesquerel, Hassan Saber, Mohammad Sadegh Talebi, Odalric-Ambrym Maillard
Asian Conference on Machine Learning, pdf

2022 **IMED-RL: Regret optimal learning of ergodic Markov decision processes**
Fabien Pesquerel, Odalric-Ambrym Maillard
Conference on Neural Information Processing Systems, pdf

2021 **Stochastic bandits with groups of similar arms**
Fabien Pesquerel, Hassan Saber, Odalric-Ambrym Maillard
Conference on Neural Information Processing Systems, pdf

Teaching Experience

2024 **Neural Networks** CentraleSupélec
Introductory class to Operating Systems.

2024 **Neural Networks** CentraleSupélec
Introductory classes to Neural Networks.

2023 **Neural Networks** Lille University School of Medicine
Introductory classes to Neural Networks. Teaching to physicians and other health professionals about Machine Learning and Artificial Neural Networks.

2020 – 2022 **Reinforcement Learning** Polytechnique, CentraleSupélec
Teacher assistant for graduate level courses in Bandits and Reinforcement Learning. Preparing and teaching practical sessions.

2021 – 2022 **Decision Making under Uncertainty** Lille University
Teacher assistant for a graduate level course in sequential decision making under uncertainty. Preparing and teaching practical sessions.

2016 – 2018 **Oral Examinator** Louis le Grand
Oral examination in mathematics and physics of second year students in *classes préparatoires aux grandes écoles*.

2015 – 2016 **Teacher Assistant** Marie Laurencin High School
Teaching courses in mathematics and physics to help students prepare for *classes préparatoires aux grandes écoles*.

Fabien Pesquerel

Postdoctoral researcher

Reinforcement Learning
&
Machine Learning

Inria

Extra-curricular activities

Rock climbing (for instance), **Gymnastics** (as in this picture) & **Calisthenics** (see here). Two of the images were segmented using a neural network.
I have a blog, analy**sthenics**, that is dedicated to that hobby. For instance, I computed a formula to rank calisthenics athletes across weight classes (it was even used!).

3D computer modelling, often tea party scenes, as with these donuts, or *low-poly* landscapes, such as this stream in a valley. Other forms of procedural art such as style transfer from a famous Japanese woodblock print to transform an image into an other one (harbour of Dives-sur-Mer, Normandy). Neural networks and mathematics can also be used to make procedural art, like this image or this one (the code is on github).

Cooking is an activity that I love! It is always a pleasure to cook some yule log (Christmas cake) or chocolate cake to enjoy with family and friends. To eat with my *café* (and its home-made *crème Chantilly*), I like to bake some amaretti or even a strawberry tartlet.