

Antoine Barrier | Postdoc

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👤 Actual Position

Postdoc

La Tronche, France

Grenoble Institute of Neurosciences (Université Grenoble Alpes)

09/2023–08/2025

Research work in MRI image reconstruction. Use of artificial intelligence techniques with new MRI sequences (MR Fingerprinting). In collaboration with Thomas Christen.

🎓 Studies & PhD

PhD candidate in Mathematics

Lyon & Orsay, France

UMPA (ÉNS Lyon) & LMO (Université Paris-Saclay)

09/2020–08/2023

Study of the problem of best arm identification (with a fixed confidence and a fixed budget) in bandits problems. Thesis entitled *Contributions to a Theory of Pure Exploration in Sequential Statistics*, supervised by Aurélien Garivier and Gilles Stoltz and defended on July 20, 2023

École Normale Supérieure Paris-Saclay

Cachan, France

MSc – *Mathématiques, Vision et Apprentissage (MVA)*, with highest honors

09/2019–08/2020

17,30/20 – Courses: Deep Learning, Reinforcement Learning, Statistical Learning, Probabilistic Graphical Models, Convex Optimization, Numerical Images, Medical Images

MSc – *Agrégation de Mathématiques*

09/2018–06/2019

Ranked 18 – French teaching competitive examination – Probabilities and Statistics option

Master 1 – *Applied Mathematics*, with highest honors

09/2017–07/2018

Joint M.S. program with ÉNS Paris-Saclay, École Polytechnique and Université Paris-Sud

Ranked 5/38 – 17,05/20 – Main courses: probabilities, statistical learning, networks, optimization, analysis

BSc – *Fundamental Mathematics*, with highest honors

09/2016–06/2017

Ranked 4/30 – 16,98/20 – Main courses: measure theory, probabilities, differential calculus, Fourier analysis, algebra

Lycée Champollion

Grenoble, France

Preparatory Program, “Classe Préparatoire aux Grandes Écoles, MPSI/MP*”

09/2014–06/2016

Intensive two-year program preparing for the competitive entrance exams to French top schools for scientific studies

📄 Publications



Preprints

- 📄 Dynamic Learning Rate for Deep Reinforcement Learning: A Bandit Approach
- 👤 Henrique Donâncio · A.B. · Leah F. South · Florence Forbes
- 🌐 October 2024

Articles in Proceedings of International Conferences

- [C4] 📄 MARVEL: MR Fingerprinting with Additional micRoVascular Estimates using bidirectional LSTMs
👤 A.B. · Thomas Coudert · Aurélien Delphin · Benjamin Lemasson · Thomas Christen
🌐 MICCAI · October 2024 · 🔄 poster 🔄 code
- [C3] 📄 Contrast-free Blood Volume Microvascular Properties and Relaxometry Mapping using bSSFP MR Fingerprinting
👤 Thomas Coudert · Aurélien Delphin · Loïc Legris · A.B. · Jan Warnking · David Chechin · Laurent Lamalle · Peter Mazurkewitz · Peter Koken · Emmanuel L. Barbier · Mariya Doneva · Thomas Christen
🌐 ISMRM · May 2024
- [C2] 📄 On Best-Arm Identification with a Fixed Budget in Non-Parametric Multi-Armed Bandits
👤 A.B. · Aurélien Garivier · Gilles Stoltz
🌐 ALT · February 2023 · 🔄 slides
- [C1] 📄 A Non-Asymptotic Approach to Best-Arm Identification for Gaussian Bandits
👤 A.B. · Aurélien Garivier · Tomáš Kocák
🌐 AISTATS · March 2022 · 🔄 poster

Articles in International Journals.....

- [J1]  Relaxometry and Contrast-Free Cerebral Microvascular Quantification using Balanced Steady-State Free Precession MR Fingerprinting
 Thomas Coudert · Aurélien Delphin · **A.B.** · Loïc Legris · Jan M. Warnking · Laurent Lamalle · Mariya Doneva · Benjamin Lemasson · Emmanuel L. Barbier · Thomas Christen
 **MRM: Magnetic Resonance in Medicine** · January 2025

PhD Dissertation.....

-  Contributions to a Theory of Pure Exploration in Sequential Statistics
 **École Normale Supérieure de Lyon** · July 2023 ·  slides

Teaching Activities

Interrogator (~90h)

Lycée Champollion

Math interrogations to CPGE (intensive two-year program for scientific studies) students

Grenoble, France

09/2024–06/2025

Teaching Assistant (86h)

Université Grenoble Alpes

Teaching to undergraduate students. See details on my webpage

Grenoble, France

09/2023–05/2024

Teaching Assistant (64h/year)

École Normale Supérieure de Lyon

Teaching to mathematic students of ÉNS Lyon. See details on my webpage

Lyon, France

09/2020–06/2023

Author of Annals

H&K annals

2021–...

Writing and proofreading of annals of “Grandes Écoles” entrance exam subjects, published in books and on the website Doc Solus, for students of scientific preparatory classes.

Talks

- 06/2023 **Contributions to a Theory of Pure Exploration in Sequential Statistics**
Lyon, PhD defense
- 02/2023 **On Best-Arm Identification with a Fixed Budget in Non-Parametric Multi-Armed Bandits**
Singapour, Algorithmic Learning Theory
- 01/2023 **Bandit Problems – On the Different Objectives of Best Arm Identification**
Lyon, PhD students seminar
- 06/2022 **Bandit Problems – Best Arm Identification with a Fixed Budget**
Lyon, Journées de Statistique
- 05/2022 **Bandit Problems in Sequential Learning**
Lyon, Phd students in probability day
- 04/2022 **Bandit Problems – Best Arm Identification**
Porquerolles, Rencontres des Jeunes Statisticien(ne)s
- 12/2021 **Bandit Problems in Sequential Learning**
Lyon, Confer'ENS. Presentation of my thesis subject to ÉNS Lyon students
- 01/2018 **Random Walks**
Lycée Lakanal, Sceaux, GICS. Outreach to highschool students
- 03/2017 **What if we Voted Differently?**
Lycée Genevoix, Montrouge, GICS. Outreach to highschool students

Participation in scientific events

Participations.....

- 10/2024 **International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)**
Marrakech. Poster presentation

- 03/2024 **French Symposium on Artificial Intelligence in Biomedical Imaging (IABM)**
Grenoble. Poster presentation
- 02/2023 **International Conference on Algorithmic Learning Theory (ALT)**
Singapour
- 08/2022 **French Modeling, Randomness and Statistical Days (MAS)**
Rouen. Poster presentation
- 06/2022 **French Statistical Days (JdS)**
Lyon
- 05/2022 **Machine Learning**
CIRM, Marseille. Spring school (1 week) in Theoretical Computing. Poster presentation
- 04/2022 **French Young Statisticians' Meeting (RJS)**
Porquerolles
- 03/2022 **International Conference on Artificial Intelligence and Statistics (AISTATS)**
en distanciel. Poster presentation, video and reviewer
- 11/2021 **Morphological Impacts of Climate Change**
Lyon. Autumn school (1 week) of the French Institute of Mathematics for Planet Earth
- 06/2021 **French Machine Learning Conference (CAp)**
remote. Poster presentation
- 07/2019 **Random Walks and Complex Networks**
Laboratoire J.A. Dieudonné, Nice. Summer school (2 weeks)

Responsabilities

Co-responsible of the PhD students seminar
UMPA (ÉNS de Lyon) & ICJ (Université Lyon 1)

Lyon, France
09/2021–07/2023

Research Internships

HPC Ressource Management Using Reinforcement Learning **Bull (Atos), Échirolles, France**
Supervised by Pierre Seroul (senior data scientist) 04/2020 – 08/2020

- Main goal: develop a Reinforcement Learning agent for schedule jobs in a HPC cluster
- Fields: Machine Learning, Artificial Intelligence, Reinforcement Learning
- Modelization: RL formulation of the problem, agent design
- Programming: project development using a cluster simulator. Experiments to validate the proposed modelization (private repository)

Random Hyperbolic Graphs **Laboratoire J.A. Dieudonné (LJAD), Nice, France**
Supervised by Dieter Mitsche 04/2018 – 07/2018

- Main goal: find some properties of random hyperbolic graphs (studies of propagation models)
- Fields: discrete probabilities, graph theory
- Programming: generation of graphs, simulations of propagations · [↗](#) code

Bundle Adjustment with known positions **Centre Borelli, Cachan, France**
Supervised by Jean-Michel Morel and Carlo de Franchis 01/2017 – 06/2017

- Goal: develop a Bundle Adjustment method to improve the accuracy of 3D modelling algorithms in the satellite case
- Fields: constrained optimization, conditioning analysis, ill-posed problems
- Programming: numerical simulations on satellite images, comparison with current methods · [↗](#) code

Skills

Computer Skills

LaTeX: extensive knowledge **Python & Julia**: knowledge **W X P Office**: extensive knowledge
Tools: Terminal Linux · Jupyter Notebook · VSCode · GitHub · docker · ...

Languages

English: advanced (C1 – Cambridge Advanced Exam – 02/2020)

French: mother tongue

Spanish: scholar

Associations

 **GICS**: “Groupe pour l’Initiative et la Culture Scientifiques”. Talks about mathematics for high school students

 **Mieux Voter**: association promoting majority judgment. Founding Member

 **GBTT**: Grésivaudan Belledonne Table Tennis. Competitor, coach, umpire. Volunteer work for the club (organization of a regional tournament)