

# DARIO SHARIATIAN

dario.shariatian@inria.fr ♦ www.github.com/darioShar

Paris, France

I am interested in designing efficient ml algorithms, and building innovative, ambitious systems as a result. Currently, I focus on modern generative methods using stochastic processes, like diffusion models.

## EDUCATION

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- PhD**, Inria, Sierra lab, *Paris, France* *October 2023 - now*  
*Supervised by Umut Simsekli, Alain Durmus*
  - Deep generative models, developing novel approaches similar to diffusion
- MSc in Mathematics - Part C**, University of Oxford (Distinction), *UK* *2022 - 2023*
  - Main focus on ML, Deep Learning, Statistics
  - Various broadening courses, e.g., networks, differential geometry, algebraic topology...
- BSc/MSc in Applied Mathematics**, École Polytechnique, (Top 20%), *France* *2019 - 2022*
  - Minor in CS, pure mathematics, theoretical physics, and humanities
- Preparatory Program MPSI/MP\***, Lycée Saint-Louis, (Top 5%), *Paris, France* *2019 - 2022*  
Classical french 2 years preparation for Grandes Écoles
  - Advanced maths, physics, CS, humanities

## WORK EXPERIENCE

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- Quantitative Research Intern**, Squarepoint Capital, *London, UK* *March-August 2022*  
*Supervised by Dr. Asgeir Birkisson*  
Quantitative hedge fund focused on a collaborative approach
  - Developed predictive mathematical models for equities, mid-frequency
  - Developed and presented a novel spectral graph approach to various teams and management
- Firmware Engineer Intern**, Ledger, *Paris, France* *June-September 2021*  
*Supervised by Mr. Raphael Geslain*  
World leader in cryptocurrency hardware wallets
  - Wrote emulator for flagship Ledger Nano X, to streamline debugging and accelerate development
  - Gained expertise in ARM SE architecture, QEMU emulation and secure OS principles
- R&D Intern**, Gendarmerie Elite Unit (GIGN), *Versailles, France* *November-April 2020*
  - Selected to lead a team in developing innovative projects to support elite military unit
  - Developed and implemented projects like audio noise reduction and object detection
  - Collaborated with field agents, technical teams, and French institutions to optimize projects outcomes

## SKILLS

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<b>Programming</b>	Python, C/C++, q/KDB, Java, Ocaml, SQL
<b>API, Tools, Softwares</b>	PyTorch, Anaconda/Jupyter, Qt, git, gdb, OpenGL, qemu
<b>Languages</b>	English ( <i>fluent</i> ), French ( <i>native</i> ), Spanish ( <i>notions</i> ), Persian ( <i>notions</i> )

## VARIOUS

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- **Music** Guitar, bass, drums. I enjoy playing funk/rock, with my band or during jam sessions
- **Sports** Volley-ball, ski, kung-fu, surf, sky-diving
- **Community Involvement** Rehabilitation of Chateau de Guédelon, in France

## PUBLICATIONS

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### Piecewise Deterministic Generative Models

*Neurips 2024*

Bertazzi, A., Durmus, A.O., **Shariatian, D.**, Simsekli, U., & Moulines, É

We introduce a novel class of generative models based on piecewise deterministic Markov processes (PDMPs), which combine deterministic motion with random jumps at random times

### Denoising Lévy Probabilistic Models (DLPM)

*preprint, 2024*

**Shariatian, D.**, Simsekli, U., & Durmus, A.O.

We introduce a novel framework to use heavy-tailed noise in the denoising diffusion paradigm

## VARIOUS ACADEMIC EXPERIENCE

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**Reviewer:** ICML24, NEURIPS24, AAAI25, TMLR, ICLR25

**Teaching Assistant:** MAA106 Numerical Analysis, École Polytechnique

*March-June 2024*

**Oral Examiner:** MSc Data Science for Business/Finance, X-HEC

*2024, 2025*

**Oral Presentations:**

Denoising Lévy Probabilistic Models, Inria, Sierra, *Paris*,

*February 2024*

Denoising Lévy Probabilistic Models, Alan Turing Institute, *London*,

*July 2024*

## PRE-PHD RESEARCH / SELECTED PROJECT WORK

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### An Alternative to the Log-Likelihood

*December-April 2023*

Department of Statistics, University of Oxford (Master thesis), *supervised by Dr. Gonzalo Mena*

- Studied an alternative to log-likelihood for parameter estimation inspired by entropic optimal transport (Sinkhorn EM), in the non-asymptotic regime

### Discrete Morse Theory for Relative/Persistent Cosheaf Homology

*March 2023*

Department of Mathematics, University of Oxford, *Supervised by Dr. Vidit Nanda*

- Explored discrete Morse theory to accelerate homology computations in various contexts

### Can Neural ODEs Offer Free Robustness?

*November-December 2022*

Department of Mathematics, University of Oxford, *Supervised by Dr. Jared Tanner*

- Studied robustness and expressivity of neural ODEs vs neural SDEs, examined as regularization

### Spectral graph theory for stock market graphs

*May - August 2022*

Squarepoint Capital, London, *Supervised by Dr. Asgeir Birkisson*

- Used tools from spectral graph theory to determine behaviors and best practices for quant strategies

### Risk Analysis and Portfolio Management on Financial Markets

*2021*

Center for Applied Mathematics, École Polytechnique, *Supervised by Prof. Grégoire Loeper*

- Applied Derman & Kani's "Volatility Smile and Implied Tree" for risk analysis; focused on stochastic calculus, approximation schemes like binomial/trinomial trees, and Black-Scholes formulas

### Monte-Carlo Methods for Simulation Challenge

*2021*

Center for Applied Mathematics, École Polytechnique, *Supervised by Prof. Emmanuel Gobet*

- Provided efficient benchmarks on control functions for systems under random perturbations

### On-Board Computer (OBC) for Nano-Satellite, IONSAT project

*2020 - 2021*

Space Center of École Polytechnique

- Led team designing OBC architecture with FPGA. Collaborated with CNES on multi-core systems
- Project presented at Dubai IAC 2021

### Elliptic Curves on Finite Fields and Algorithms

*2018 - 2019*

Lycée Saint-Louis

- Studied elliptic curves over finite fields for cryptography (e.g., Schoof's algorithm)
- Developed fast C++ library with GMP implementing these results