

Lionel Riou-Durand

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Nationality: French

Date of birth: 28/11/1991

Current position

I am a postdoctoral fellow at the University of Warwick within Statistics since September 2019. I am working in the [CoSinES](#) project (Computational Statistical Inference for Engineering and Security), whose principal investigator is [Gareth Roberts](#). My current research focuses on numerical approximations for statistical models, especially based on sampling algorithms and Monte Carlo methods. I am particularly interested in measuring their efficiency and assessing their robustness. One of my main motivation is to provide quantitative guaranties for these sampling based approximations, in order to give user-friendly methodological advices for their software implementation and tuning. My research is connected to several fields interacting with statistics and machine learning such as: stochastic processes, Bayesian inference, optimal transport, optimization.

Education and Grants



2016 - 2019

Ph.D. in applied Mathematics, Université Paris-Saclay.

“Theoretical contributions to Monte Carlo methods, and applications to Statistics”.

Supervisors: [Nicolas Chopin](#) and [Arnak Dalalyan](#).

Funding: 3-year doctoral fellowship, French Ministry of Research.



2015 - 2016

M.Sc. in Machine Learning and Computer Vision ([MVA](#)), ENS Paris-Saclay.

Funding: 1-year master fellowship, [Fondation Mathématique Jacques Hadamard](#) (Sophie Germain Master Fellowships Program).



2014 - 2016

M.Sc.Eng. in Statistics and Economics, ENSAE ParisTech.

Specialisation: Data Science and Machine Learning

Master Thesis (2016): “Bayesian inference for un-normalized models and application to random networks”. Supervisor: [Nicolas Chopin](#). Funding: CREST.

Research Internship (June-August 2015) at the University College of Dublin, Ireland:

“Variations of the Metropolis-Hastings algorithm involving sub-posteriors”.

Supervisor: [Florian Maire](#). Funding: Mobility Grant, Université Paris-Saclay.



2013 - 2014

1st year of M.Sc. program in Statistics and Econometrics, Université Rennes 1.

2009 - 2013

B.Sc. in Mathematics and Economics, Université Rennes 1.

Teaching

I have been teaching the tutorials of several courses of Master and Bachelor programs:



2019 - 2021 (80h)

M.Sc. program, 1st year:

Monte Carlo Methods

(course held by [Ritabrata Dutta](#)).

B.Sc. program, 3rd year and 2nd year:

Probability Theory

(course held by [Paul Chleboun](#)).

Mathematical Statistics

(course held by [Jon Warren](#)).



2016 - 2019 (192h)

M.Sc.Eng. program, 1st year:

Mathematical Statistics

(courses held by [Nicolas Chopin](#)).

Monte Carlo Methods

Introduction to Stochastic Processes

Introduction to Machine Learning

(courses held by [Pierre Alquier](#)).

Probability Theory

(course held by [Cristina Butucea](#)).

B.Sc.Eng. program, 3rd year:

Introduction to Statistics & Econometrics

(course held by [Marco Cuturi](#)).



2015 - 2016 (30h)

Bachelor 'Economic Science and Business Administration' program, 2nd year:

Introduction to Statistics

(course held by [Pauline Chauvin](#)).

Research

I have been involved in several research projects that have led to the following main outputs:

Preprints:

- 2022 – L. Riou-Durand, P. Sountsov, J. Vogrinc, C.C. Margossian, S. Power, [Adaptive Tuning for Metropolis Adjusted Langevin Trajectories](#). arXiv:2210.12200. (submitted to AISTATS)
- 2022 – C.C. Margossian, M.D. Hoffman, P. Sountsov, L. Riou-Durand, A. Vehtari, A. Gelman, [Nested \$\widehat{R}^2\$: Assessing the convergence of Markov chain Monte Carlo when running many short chains](#). arXiv:2110.13017. (submitted to JMLR)
- 2022 – L. Riou-Durand, J. Vogrinc, [Metropolis Adjusted Langevin Trajectories: a robust alternative to Hamiltonian Monte Carlo](#). arXiv:2202.13230. (submitted to AoS)

Publications:

- 2022 – A. Dalalyan, A. Karagulyan, L. Riou-Durand, [Bounding the error of discretized Langevin algorithms for non-strongly log-concave targets](#). *JMLR* 23 (235), 1-38.
- 2020 – A. Dalalyan, L. Riou-Durand, [On sampling from a log-concave density using kinetic Langevin diffusions](#). *Bernoulli*, 26 (3):1956-1988.
- 2018 – L. Riou-Durand, N. Chopin, [Noise contrastive estimation: Asymptotic properties, formal comparison with MC-MLE](#). *Electronic Journal of Statistics*, 12 (2):3473-3518.

Packages

I am also involved in making sampling algorithms available to the user. I am author of the R Package: malt – implementation of Metropolis Adjusted Langevin Trajectories – [[R-universe](#), [Github](#)].

Skills

Languages: French (native), English (fluent), Spanish (basic).

Softwares: R, SAS, Mathematica.

Other research activities

I am a former organizer of the [PDMP seminar/reading group](#) at the University of Warwick (2021-2022).

I am a former organizer of the PhD seminar at ENSAE (2016-2017).

I have also been in charge of referee reports for several scientific journals and conferences, among which: AoS, JRSSB, JASA, JMLR, Biometrika, JCGS, EJS, COLT.

Research presentations

Invitations to seminars and international conferences:

- MCQMC 2022, Special Sessions, Linz (Austria), 19 July 2022 (in person).
- University of Bonn, Oberseminar Stochastics, Bonn (Germany), 7 July 2022 (in person).
- ISBA 2022, Invited Sessions, Montréal (Canada), 30 June 2022 (in person).
- Université de Montréal, BAYSM 2022, Montréal (Canada), 23 June 2022 (in person).
- University of Cambridge, CCIMI Seminar Series, Cambridge (UK), 11 May 2022 (in person).
- National University of Singapore, Statistics Seminar Series, Singapore, 11 May 2022 (online).
- University of British Columbia, Statistics Seminar Series, Vancouver (Canada), 3 May 2022 (online).
- Boston University, Statistics and Probability Seminar, Boston (USA), 14 April 2022 (in person).
- Harvard University, Bayesian Working Group, Boston (USA), 13 April 2022 (online).
- Columbia University, Statistics Seminar Series, New-York (USA), 11 April 2022 (in person).
- New-York University, Complexity of Sampling Seminar, New-York (USA), 8 April 2022 (in person).
- Flatiron Institute, Bayesian Seminar, New-York (USA), 8 April 2022 (in person).
- INRIA Paris, Conférence ANR QuAMProcs, Paris (France), 9 March 2022 (in person).
- Institut Henri Poincaré, Séminaire Parisien de Statistique, Paris (France), 7 March 2022 (in person).
- University of Oxford, CSML Seminar Series, Oxford (UK), 18 February 2022 (in person).
- University of Florida, Statistics Seminar Series, Gainesville (USA), 17 February 2022 (online).
- Lancaster University, CSML Seminar Series, Oxford (UK), 17 February 2022 (online).
- RIKEN AIP, Approximate Bayesian Inference Seminar, Tokyo (Japan), 17 February 2022 (online).
- Imperial College London, Statistics Seminars (UK), 11 February 2022 (online).
- University of Bristol, Statistics Seminars (UK), 4 February 2022 (online).
- University of Warwick, Young Researchers Meetings Seminars (UK), 25 January 2022 (in person).
- Université de Nantes, Séminaire Maths Appliquées, Nantes (France), 11 January 2022 (in person).
- ENSAI, Séminaire de Statistique de l'IRMAR, Bruz (France), 7 January 2022 (in person).
- CIRM, Meetings in Mathematical Statistics, Luminy (France), 17 December 2021 (in person).
- University of Warwick, ACII Seminars, Coventry (UK), 10 December 2021 (in person).
- Alan Turing Institute, DCE Seminar Series, Londres (UK), 16 September 2020 (online).
- University of Warwick, ACII Seminars, Coventry (UK), 25 October 2019 (in person).
- University of Warwick, YRM Seminars, Coventry (UK), 22 October 2019 (in person).

- Sorbonne Université, YRM MathStatistics, Paris (France), 25 September 2018 (in person).
- ENSAE, Séminaire de Stats/ML/Econométrie, Palaiseau (France), October 2016 (in person).

Posters in international conferences:

- ISBA 2022, Montréal (Canada), 30 July 2022.
- Bayes Comp 2020, University of Florida, Gainesville (USA), 10 January 2020.
- Structural Inference in High-Dimensional Models 2, HSE, St. Petersburg (Russia), 30 August 2019.

Volunteering

2014-2015: Mathematics course (Association TREMPLIN) at Paul Valéry High School (Paris) Grade 12.

2013-2014: Individual tutoring in statistics and probability to students in B.Sc. programs (Economics & management, Mathematics & economics, Mathematics).