

Adeline Fermanian

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Education

2018-2021 **PhD in statistics**, Sorbonne Université, Paris, France
Funded by DIM MathInnov. Title: *Learning time-dependent data with the signature transform*. Supervised by Gérard Biau (Professor, Sorbonne Université), and Benoît Cadre (Professor, Université Rennes 2).

2017-2018 **Master of science in statistics**, ETH, Zürich, Switzerland

2014-2016 **Engineering degree**, CentraleSupelec, Châtenay-Malabry, France

2012-2014 **Intensive 2-year university level preparation in maths and physics**, Lycée Henri IV, Paris, France

Experience

Vocational

2022 - Present **Machine learning researcher**, Califrais, Paris, France
Leads research activities of the company Califrais inside the Labcom LOPF (Large-scale Optimization of Product Flows). The goal is to create machine learning algorithms and develop environmentally friendly and socially responsible technology to optimize fresh produce logistics flows on a massive scale.

2021 - 2022 **Postdoctoral researcher**, Center for Computational Biology (CBIO) - Mines ParisTech, Paris, France
Funded by the PRAIRIE Institute. Topic: *High-dimensional inference in genomic data* Supervised by Chloé-Agathe Azencott (Associate Professor, Mines ParisTech, Institut Curie and INSERM)

2018 **Master thesis**, LPSM - Sorbonne Université, Paris, France
Topic: *The signature method in machine learning*. Supervised by Gérard Biau (Professor, Sorbonne Université), Benoît Cadre (Professor, Université Rennes 2), and Peter Bühlmann (Professor, ETH Zürich)

2017 **Graduate researcher**, Inria - Wolfgang Pauli Institute, Vienna, Austria
Topic: *Deterministic and stochastic models of division of bacteria*. Supervised by Marie Doumic (Research Scientist, INRIA).

2016-2017 **Data Scientist**, Multiposting group - SAP, Paris, France
Development of machine learning algorithms for salary prediction using a database of millions of job ads.

Miscellaneous

2022 **Scientific Consultant**, BNP Paribas, Paris, France
Scientific consulting with the Research and Development team at BNP Paribas to develop market simulators combining generative adversarial networks and signatures.

Computer skills

Languages Python (Pytorch, scikit-learn, pandas, django), R.

Language skills

French	Mother tongue	English	Fluent (C1, TOEFL IBT : 106/120)
German	Intermediate (B1-B2)	Spanish	Elementary (A2)

Publications

Published articles

2023 **Learning the Dynamics of Sparsely Observed Interacting Systems**, *Bleistein, L., Fermanian, A., Jannot, A.S., Guilloux, A.*, Proceedings of the 40th International Conference on Machine Learning (ICML 2023)

2023 **New Directions in the Applications of Rough Path Theory**, *Fermanian, A., Lyons, T., Morrill, J., Salvi, C.*, IEEE BITS the Information Theory Magazine

2022 **Functional linear regression with truncated signatures**, *Fermanian, A.*, Journal of Multivariate Analysis, Vol. 192, 105031

2021 **Framing RNN as a kernel method: A neural ODE approach**, *Fermanian, A., Marion, P., Vert, J.P., Biau, G.*, Conference on Neural Information Processing Systems (NeurIPS 2021), oral presentation

2021 **Embedding and learning with signatures**, *Fermanian, A.*, Computational Statistics & Data Analysis, Vol. 157, 107148

Conference proceedings and miscellaneous

2020 **Learning with signatures**, *Biau, G. and Fermanian, A.*, Functional and High-Dimensional Statistics and Related Fields, pp. 19-26, Springer, Cham.

Preprints

2023 **FLASH: a Fast joint model for Longitudinal And Survival data in High dimension**, *Nguyen, V. T., Fermanian, A., Guilloux, A., Barbieri, A., Zohar, S., Jannot, A.-S., Bussy, S.*, Arxiv:2309.03714

2023 **The insertion method to invert the signature of a path**, *Fermanian, A., Chang, J., Lyons, T., Biau, G.*, Arxiv:2304.01862

2022 **Scaling ResNets in the Large-depth Regime**, *Marion P., Fermanian, A., Biau G., Vert, J.P.*, Arxiv:2206.06929

2020 **A Generalised Signature Method for Time Series**, *Morrill, J., Fermanian, A., Kidger, P., Lyons, T.*, Arxiv:2006.00873

Teaching experience

As lecturer

2023 **Large-Scale Machine Learning**, *Mines ParisTech*, Paris, France
One introductory session and one session on Natural Language Processing (master level)

2022 **Data Science**, *Mines ParisTech*, Paris, France
A course introducing data science to 1st year engineering students (undergraduate level)

2019-2022 **Return to graduate studies diploma for exiles**, *Sorbonne Université*, Paris, France
Refresher course on mathematics for continuing education at Sorbonne Université (high school level)

As teaching assistant

2020-2021 **Linear models**, *ISUP - Sorbonne Université*, Paris, France
Exercise classes introducing linear models to 2nd year actuarial students (graduate level)

2020-2021 **Inferential Statistics**, *ISUP - Sorbonne Université*, Paris, France
Exercises classes introducing first notions of statistics (tests, parametric estimation...) to 1st year actuarial students (graduate level)

2020-2021 **Mathematical Statistics**, *Sorbonne Université*, Paris, France
Computer labs in R to introduce basic notions of statistics to master students in applied mathematics (graduate level)

Supervision

April 2023-present **Co-supervision of the PhD of Van-Tuan Nguyen (Califrais, Université Paris Cité)**, with Agathe Guilloux (Professor, Inria-INSEAD HeKA Team). Topic: *Modeling and optimization of large scale constrained flows*

January 2023-present **Co-supervision of the PhD of Julie Cartier (Centre for Computational Biology (CBIO), Mines Paris, Institut Curie, PSL University)**, with Florian Massip (Assistant Professor, CBIO). Topic: *Transcriptomic analysis of nasal swab for the early detection of lung cancer*

May-September 2023 **Co-supervision of the master thesis of Sobihan Surendran (Master 2, Sorbonne Université)**, with Sylvain Le Corff (Professor, Sorbonne Université) and Antoine Godichon-Baggioni (Assistant Professor, Sorbonne Université). Topic: *Stochastic Optimization with Monte Carlo methods*

May-July 2021 **Co-supervision of the master thesis of Nathan Doumèche (Master 2, Ecole Normale Supérieure)**, with Gérard Biau (Professor, Sorbonne Université) and Pierre Marion (PhD student, Sorbonne Université). Topic: *Développement de Taylor signé et applications à l'apprentissage statistique*

June-July 2020 **Co-supervision of the master thesis of Linus Bleistein (Ecole Normale Supérieure)**, with Gérard Biau (Professor, Sorbonne Université) and Claire Boyer (Assistant Professor, Sorbonne Université). Topic: *SiGANtures: Generating Times Series Using Wasserstein-Generative Adversarial Nets and the Signature Transform*

Scientific activities

2018 - Present **Reviewer**: Stochastic Processes and their Applications, Journal of Multivariate Analysis, Comptes Rendus - Mathématique, Statistics & Probability Letters.

Scientific events organization

2022 **Co-organizer of a workshop on fairness at the AI Act Day**, *Datacraft and Impact AI*, Paris, France

2021 **Co-organizer of the NeurIPS@Paris meeting**, Sorbonne Université, Paris, France

2021 **Co-organizer of the GDR TRAG Young researchers meeting**, Institut Henri Poincaré, Paris, France

Seminars and reading groups organization

2020 - 2021 **Co-organizer of a Statistics and machine learning reading group**, Sorbonne Université, Paris, France

2019 - 2021 **Co-organizer of InfoMaths, a seminar about informatic tools for mathematicians.**, Sorbonne Université, Paris, France

2019 - 2020 **Co-organizer of the PhD students seminar**, LPSM, Sorbonne Université, Paris, France

2018 - 2019 **Co-organizer of a reading group on rough paths.**, LPSM, Sorbonne Université, Paris, France

Communications

International conferences and workshops

October 2022 **Learning and Optimization in Luminy workshop**, Centre International de Rencontres Mathématiques, Marseille, France

October 2022 **Non-Linear and High Dimensional Inference, Geometry and Statistics in Data Sciences thematic semester**, Institut Henri Poincaré, Paris, France

September 2022 **London-Paris Bachelier Workshop**, Institut Henri Poincaré, Paris, France

July 2022 **2nd Joint Congress of Mathematics AMS-EMS-SMF**, Statistical learning session, Grenoble, France

July 2022 **2022 SIAM Annual Meeting**, Signatures, Kernels, and Applications session, Pittsburgh, Pennsylvania, United States

June 2022 **IMS Annual Meeting in Probability and Statistics**, Rough path theory, signatures and applications session, London, United Kingdom

August 2021 **Journées MAS, Société de Mathématiques Appliquées et Industrielles (SMAI)**, Orléans, France

July 2021 **Applications of Rough Paths: Computational Signatures and Data Science**, *The Institute for Computational and Experimental Research in Mathematics (ICERM)*, Providence, United States

March 2021 **Pathwise Stochastic Analysis and Applications**, *Centre International de Rencontres Mathématiques (CIRM)*, Marseille, France

December 2020 **Workshop New Directions in Rough Path Theory**, *Mathematical Research Institute of Oberwolfach*, Oberwolfach, Germany

September 2020 **Second Symposium on Machine Learning and Dynamical Systems**, *The Fields Institute for Research in Mathematical Sciences*, Toronto, Canada

August 2020 **Geometry of curves in time series and shape analysis**, *Max Planck Institute for Mathematics in the Sciences*, Leipzig, Germany

December 2019 **12th Oxford-Berlin Young Researchers Meeting on Applied Stochastic Analysis**, *University of Oxford*, Oxford, United Kingdom

October 2019 **Conférence du GDR TRAG 2019**, Nancy, France

June 2019 **51es Journées de Statistique**, Nancy, France
Seminars

September 2023 **Séminaire de Probabilités et Statistique**, *IMAG, Université de Montpellier*, Montpellier, France

October 2022 **Séminaire de Probabilités et Statistique du LAMA**, *Université Gustave Eiffel*, Champs-sur-Marne, France

September 2022 **HeKA Inria team group seminar**, *Inria*, Paris, France

August 2022 **Stochastic Algorithms and Nonparametric Statistics group seminar**, *Weierstrass Institute*, Berlin, Germany

June 2022 **Groupe de travail Probas-Stats du LPSM**, *Sorbonne Université*, Paris, France

April 2022 **Seminar of the Differential Equations and Numerical Analysis group (DNA)**, *NTNU*, Trondheim, Norway

January 2022 **Séminaire de Statistique, Optimisation et Probabilités**, *Institut de Mathématiques de Toulouse, Université Toulouse III - Paul Sabatier*, Toulouse, France

January 2022 **Séminaire Parisien de Statistique**, *Institut Henri Poincaré*, Paris, France

December 2021 **AI seminar**, *UCL Centre for Artificial Intelligence*, London, United Kingdom

October 2021 **Josef Teichmann's working group seminar**, *ETH Zürich*, Zürich, Switzerland

June 2021 **AIP seminar**, *RIKEN Center for Advanced Intelligence Project*, Tokyo, Japan

May 2021 **Séminaire MODAL'X**, *Université Paris Nanterre*, Paris, France

May 2021 **CRiSM (Center for Research in Statistical Methodology) seminar series**, *Department of Statistics, University of Warwick*, Warwick, United Kingdom

February 2021 **Séminaire du SAMM (Statistique, Analyse et Modélisation Multidisciplinaire)**, *Université Paris 1 Panthéon-Sorbonne*, Paris, France

January 2021 **Rough Path Interest Group**, *Alan Turing Institute*, London, United Kingdom

January 2021 **Séminaire de Probabilités et Statistique**, *Laboratoire J.A. Dieudonné*, Université Côte d'Azur, Nice, France

October 2020 **Algebraic and combinatorial perspectives in the mathematical sciences (ACPMS)**, *virtual*

June 2020 **Séminaire online du LPSM**, *Sorbonne Université*, Paris, France

April 2020 **DataSig Seminar Series**, *Alan Turing Institute*, London, United Kingdom

February 2020 **Seminar of the Institut Denis Poisson**, Université d'Orléans, Orléans, France

January 2020 **Post Graduate seminar of the Chair for Mathematics of Information Processing**, RWTH Aachen University, Aachen, Germany

May 2019 **PhD students seminar of the LPSM**, Sorbonne Université, Paris, France

April 2019 **Rencontre des Jeunes Statisticiens**, Porquerolles, France

Miscellaneous

September 2023 **Soirée CDO & HR - Minimiser son empreinte environnementale : quelles solutions Data/IA utiliser ?**, Datacraft, Paris, France

Personal interests and volunteer experience

2023 - Present Co-president of an association campaigning for gender equality in religion: coordination of around 50 volunteers, communication on social media, press relations, organization of events...

2015 **President of the artistic student association at Centrale Paris**: organized an artistic festival with 1000 participants, managed a 30-persons team.

2015 **Assistant head of a food distribution center for the association Août Secours Alimentaire**: supervised a food distribution center for people living in precarious conditions. Managed a team of 20 volunteers, including disabled workers.

2002-2012 Municipal Conservatory of Music in Paris 9: piano, solfeggio, and choral singing. Performed many concerts.