

Bertille FOLLAIN

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Education

- Sep 2021– Nov 2024 **Ph.D. in Applied Mathematics**, Ecole Normale Supérieure and INRIA Paris, Paris 12ème, France.
- **Supervision** Francis Bach, member of the Sierra project-team
 - **Current interest** Sparsity, feature learning, non-parametric learning
- Sep 2020– Jun 2021 **MASt in Mathematical Statistics**, Distinction, University of Cambridge, Cambridge, UK.
- **Essay** "*Statistical Properties of Stochastic Gradient Descent*," under the supervision of **Prof. Richard Samworth**
- Sep 2017– Aug 2021 **Diplôme d'ingénieur**, GPA: 3.96/4, Rank: 22/540, Ecole Polytechnique, Palaiseau, France.
- **Thesis** "*Partitioning of Data Structured in Graphs*", under the supervision of **Prof. Sébastien Gadat**
 - **Group Project** "*Spotting Match-fixing in Tennis through Statistics and Machine Learning*", under the supervision of **Prof. Eric Moulines**
 - **Project** "*Image In-painting with Convolutional Neural Networks*"
- Sep 2015– Jun 2017 **Classe Préparatoire aux Grandes Ecoles MPSI-MP***, Lycée Louis-le-Grand, Paris 5ème, France.
- **Thesis**: "*Spectral Clustering on non-convex 2D data. Theory and implementation*"
- Jul 2015 **Baccalauréat Scientifique Section Européenne**, Mention Très Bien, Félicitations du Jury, Lycée Guillaume-le-Conquérant, Lillebonne (Seine-Maritime), France.

Research & Work Experiences

- Sep 2023– Nov 2023 **ML Engineer**, DGEX Solutions, SNCF Réseau.
- Embedded the French railway network from a graph structure to a d-dimensional Euclidean space for use by a delay prediction system
 - Participated in the submission of an innovative project for the CORIFER 2023 call for proposals
- Mar 2020– Aug 2020 **Visiting Research Student**, Statistical Laboratory, University of Cambridge, under the supervision of Prof. Richard J. Samworth and Prof. Tengyao Wang.

- Developed a method and algorithm for the detection of multiple changepoints in high-dimensional data with heterogeneous missingness

Jun 2019– **R&D Intern**, CortAIx, Thales Digital, Montreal.

- Aug 20129 ◦ Chose and implemented an Explainable AI method for Reinforcement Learning (based on DQN) for the LunarLander environment and the company's simulator

Publications

- Bertille Follain and Francis Bach, "Enhanced Feature Learning via Regularisation: Integrating Neural Networks and Kernel Methods", 2024, preprint. Available from <https://arxiv.org/abs/2407.17280>
- Bertille Follain and Francis Bach, "Nonparametric Linear Feature Learning in Regression Through Regularisation", 2023, preprint. Available from <https://arxiv.org/abs/2307.12754>
- Bertille Follain, Tengyao Wang and Richard J. Samworth, "High-dimensional changepoint estimation with heterogeneous missingness", 2022, Journal of the Royal Statistical Society: Series B (Statistical Methodology), 84(3), 1023–1055. Available from <https://doi.org/10.1111/rssb.12540>

Awards & Prizes

- 2022 ICSDS Student Travel Awards, given by the Institute of Mathematical Statistics (800\$)
- Prix junior Maryam Mirzakhani in Applied Mathematics, 2021, given by Fondation Mathématique Jacques Hadamard (1000€)
- Senior Scholar, 2021, given by Trinity College (250£)
- Examination Prize, 2021, given by Trinity College, (240£)
- Research Internship Prize, 2020, given by Ecole Polytechnique
- Knox Studentship for French Students, 2020, given by Trinity College (20k£)

Talks

- Dec 2022 **International Conference on Statistics and Data Science, organised by the IMS in Florence**, "High-dimensional changepoint estimation with heterogeneous missingness".
- Nov 2022 **Junior Seminar AI & Digital Healthcare, Heka, INRIA**, "High-dimensional changepoint estimation with heterogeneous missingness".
- Oct 2022 **Seminar of the Centre for Statistics, University of Edinburgh**, "High-dimensional changepoint estimation with heterogeneous missingness".
- Jul 2022 **3-day meeting of statisticians in Paris, organised by the University of Luxembourg**, "High-dimensional changepoint estimation with heterogeneous missingness".
- May 2022 **International day of women mathematicians, Institut des Hautes Etudes scientifiques**, Presentation of the event.

- Feb 2022 **Dyogene's seminar, INRIA Paris**, "High-dimensional changepoint estimation with heterogeneous missingness".
- Jan 2022 **Pr. Samworth's group meeting, Statistical Lab, University of Cambridge**, "High-dimensional changepoint estimation with heterogeneous missingness".

Attendance at Winter/Summer Schools and Conferences

- Sep 2024 **Heidelberg Laureate Forum, Heidelberg.**
- Jun 2024 **Learning and Optimisation in Luminy, Marseille.**
- Jun-Jul 2023 **Climate Change AI Summer School, online.**
- Apr 2023 **12th International Conference on Climate Informatics, Cambridge UK.**
- Jan 2023 **Optimisation and Statistical Learning, Les Houches, France.**

Teaching Experiences

- Feb 2023–
May 2023 **Teaching Assistant**, Introduction to Machine Learning for Computer Science and Mathematics students in 1st year (L3), Ecole Normale Supérieure, Paris, France.
- Sep 2022–
Jan 2023 **Teaching Assistant**, Differential Equations and Probabilities for Engineering students in 1st year (L3), Ecole des Mines, Paris, France.
- Sep 2021–
Jan 2022 **Teaching Assistant**, Statistics and Probabilities for Economic students in 3rd year (L3), Sorbonne, Paris, France.
- Sep 2018–
Jun 2020 **Oral Examiner (Colleur)**, Mathematics for 1st year undergraduates, Lycée Fénelon, Paris 12ème, France.
- Sep 2017–
Mar 2018 **Support Professor**, Provided academic support to 95 undergraduates with issues in mathematics, Lycée d'Etat Jean Zay, Paris 16ème, France.

Other Experiences

- 2022-2023 **Femmes et Sciences program at PSL Research University**, participant.
- 2022 **Reviewer**, JMLR.
- Sep 2021–
Sep 2022 **GLUE, Environmental group of Inria Paris**, Founding Member, Co-organised a three events conference cycle with researchers from Institut Pierre-Simon Laplace (IPSL), co-organised Climate week at the Institute (Fresque du climat, Atelier 2tonnes, conferences)..
- Oct 2022 **Rendez-vous des Jeunes Mathématiciennes et informaticiennes**, Co-organiser of a two-day event at INRIA Paris showcasing mathematics and informatics to high-school girls, <https://filles-et-maths.fr/rjmi/>.

Skills

- **Programming**
Python (sklearn, numpy, pandas, pytorch...), R

- **Other**
LaTeX, Git

— Languages

- **French:** Native
- **English:** Fluent (TOEFL: 118/120)
- **Spanish:** Good notions, around B1/B2

— Other Interests

Sport Yoga, hiking, cyclo-tourism
Baking Pies, crèmes brulées and british cakes
Piano 14 years, particularly film scores
Permaculture Internship at "La ferme du Bec-Hellouin"