Pierre LAFORGUE

PhD in Machine Learning

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Research Experience

2020 - Present **University of Milan**, Postdoctoral researcher (Sup. N. Cesa-Bianchi)

RESEARCH TOPICS: Multitask Online Learning, Federated Learning and Privacy, Bandits

SUPERVISING: Co-supervising two PhD theses on nonstationary bandits (with N. Cesa-Bianchi) and sketching algorithms for operator-valued kernel machines (with F. d'Alché-Buc)

2016 - 2020 **Télécom Paris**, PhD in Machine Learning (Sup. F. d'Alché-Buc, S. Clémençon)

RESEARCH TOPICS: Kernel Methods, Robust Learning, Median-of-Means, Sample Bias Issues

DISSERTATION: *Deep Kernel Representation Learning for Complex Data and Reliability Issues*

Grants, awards Recipient of a research grant by the industrial chair *Good in Tech* (2020)
2nd Best Thesis of IP Paris's computer science department (2021)

Other Professional Experience

2021 - Present **Lecturer in machine learning**

- Some recent advances on multitask online learning (PhD course, 4th Greenedge PhD School 2023)
- Online learning with applications to digital markets (PhD course, Scuola Superiore di Pisa 2022)
- Online learning: theory & algorithms (PhD course, University of Milan 2021)

2016 - 2019 **Teaching assistant at Télécom Paris** (64 hrs / yr)

- Theoretical classes: statistics, linear models, advanced statistical learning
- Practical sessions and computer classes: applied machine learning, data mining
- Scientific advising: predictive maintenance, multi-dimensional time series visualization

Education

2015 - 2016 **ENS Cachan, Université Paris Dauphine**, master's degree MASH
Theoretical machine learning courses (joint with MVA's: statistical learning theory, kernel methods, convex optimization, graphical models) and applied ones (data marketing, privacy and fairness)

2013 - 2016 **ENSAE Paris**, master's degree in Statistical Learning
French engineering school (grande école) specialized in statistics and applied mathematics

2010 - 2013 **Lycée Henri IV (Paris)**, preparatory classes MPSI/MP
Undergraduate courses in mathematics and physics to prepare nationwide competitive exams

Skills & Languages

Mathematics : Multitask Online Learning, Federated Learning and Privacy, Bandit Algorithms, Kernel Methods
Computer : Python (numpy, pytorch) **Languages :** French (native), English (fluent), Italian (basics)

Research Activities

Reviewing NeurIPS, ICML, COLT, ICLR, AISTATS, JMLR, TMLR, Machine Learning Journal, ELLIS PhD Program

Recent talks First ELSA Workshop (Helsinki, Mar. 23), Learning and Optimization in Luminy (Marseille, Oct. 22), ELLIS@Milan AI workshop (Milan, Sep. 22), University College London, DELTA team (Online, Jul. 22)

Publications by Topics

Online Learning and Bandits

DOPE-FL: Decentralized Online and Private Federated Learning with Heterogeneous Data (Work in Progress).
J. Achdou, P. Laforgue, N. Cesa-Bianchi.

Multitask Learning with No Regret: from Improved Confidence Bounds to Active Learning (Preprint 2023).
PG. Sessa*, P. Laforgue*, N. Cesa-Bianchi, A. Krause.

Linear Bandits with Memory: from Rotting to Rising (Preprint 2023).
G. Clerici, P. Laforgue, N. Cesa-Bianchi.

Multitask Online Mirror Descent (TMLR 2022).
N. Cesa-Bianchi, P. Laforgue, A. Paudice, M. Pontil.

A Last Switch Dependent Analysis of Satiation and Seasonality in Bandits (AISTATS 2022).
P. Laforgue, G. Clerici, N. Cesa-Bianchi, R. Gilad-Bachrach.

Robust Learning and Median-of-Means

Generalization Bounds in the Presence of Outliers: a Median-of-Means Study (ICML 2021).
P. Laforgue, G. Staerman, S. Clémençon.

When OT meets MoM: Robust estimation of Wasserstein Distance (AISTATS 2021).
G. Staerman, P. Laforgue, P. Mozharovskyi, F. d'Alché-Buc.

On Medians-of-(Randomized)-Pairwise Means (ICML 2019).
P. Laforgue, S. Clémençon, P. Bertail.

Kernel Methods and Sketching

Sketch In, Sketch Out: Accelerating both Learning and Inference for Structured Prediction with Kernels (Preprint 2023).
T. El Ahmad, L. Brogat-Motte, P. Laforgue, F. d'Alché-Buc.

Fast Kernel Methods for Generic Lipschitz Losses via p-Sparsified Sketches (Preprint 2022).
T. El Ahmad, P. Laforgue, F. d'Alché-Buc.

Duality in RKHSs with Infinite Dimensional Outputs: Application to Robust Losses (ICML 2020).
P. Laforgue, A. Lambert, L. Brogat-Motte, F. d'Alché-Buc.

Autoencoding any Data through Kernel Autoencoders (AISTATS 2019).
P. Laforgue, S. Clémençon, F. d'Alché-Buc.

Statistical Learning and Sample Bias Issues

Fighting Selection Bias in Statistical Learning: Application to Visual Recognition from Biased Image Databases (Preprint 2022).
S. Clémençon, P. Laforgue, R. Vogel.

Statistical Learning from Biased Training Samples (Electronic Journal of Statistics, 2022).
S. Clémençon, P. Laforgue.