Mathurin Massias

PhD in Machine Learning

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Research experience

Jan 2020 – present	Università di Genova (Genova, Italy): Post-doctoral researcher, supervised by L. Rosasco and S. Villa Statistical learning and optimisation, studying the implicit regularization properties of primal-dual algorithms for structured noisy inverse problems
Sep. 2016 – Dec. 2019 (3 years)	INRIA (Université Paris-Saclay, France): PhD, supervised by A. Gramfort and J. Salmon "*High dimensional sparse regression with heteroscedastic noise*", obtained Summa cum laude Keywords: convex and non-convex optimisation, inverse problems, sparsity, high dimension Publications: [1, 2, 3, 4, 5, 6, 7]
Feb. 2019 – May 2019 (3 months)	U. of Tokyo/RIKEN (Japan), Deep Learning Theory team: intern, supervised by T. Suzuki Work on gradient Langevin dynamics for non-convex regression in RKHS Keywords: stochastic differential equations Publications: [8]

Education

Sep. 2014 – Apr. 2015	**ENS Cachan** (Cachan, France): MSc in Machine Learning (MVA) Summa cum laude (average grade: 16.8/20)
Sep. 2011 – Apr. 2015	**Ecole Centrale Paris** (Paris, France): Engineering degree Major in Applied Mathematics and Data Science Average grade: 16.3/20
Jan. 2013 – May 2013	**Indian Institute of Science** (Bengalore, India): Exchange semester Pure Mathematics Department

Teaching

2019 – 2020 (42 h)	X/HEC "Datascience for business" Master: Teacher for the *Python for datascience* class
2017 – 2019 (2 × 40 h)	Université Paris-Saclay "Datascience" Master: Teaching assistant and partial lecturer for the *Optimization for datascience* class
2016 – 2017 (56 h)	Télécom Paris: Teaching assistant for: Analysis and Probabilities (MDI 113/114, Bachelor, 10 h) Machine Learning and Data Mining (MDI 343, Executive Master, 20 h) Linear Models (SD 204, Master, 10 h) Practical Machine Learning (SD 207, Master, 10 h) Tools and applications for signals and images (SI 101, Bachelor, 6 h)

Publications

Proceedings of international conferences

[1] **M. Massias***, Q. Bertrand*, A. Gramfort, and J. Salmon. Support recovery and sup-norm convergence rates for sparse pivotal estimation. In *AISTATS*, 2020.

[2] P. Ablin, T. Moreau, **M. Massias**, and A. Gramfort. Learning step sizes for unfolded sparse coding. In *NeurIPS*, 2019.

[3] Q. Bertrand*, **M. Massias***, A. Gramfort, and J. Salmon. Concomitant Lasso with repetitions: beyond averaging multiple realizations of heteroscedastic noise. In *NeurIPS*, 2019.

[4] **M. Massias**, A. Gramfort, and J. Salmon. Celer: a fast solver for the Lasso with dual extrapolation. In *ICML*, 2018.

[5] **M. Massias**, O. Fercoq, A. Gramfort, and J. Salmon. Heteroscedastic multitask concomitant Lasso for sparse multimodal regression. In *AISTATS*, 2018.

[6] **M. Massias**, J. Salmon, and A. Gramfort. Gap safe screening rules for faster complex-valued multi-task group Lasso. In *SPARS*, 2017.

Preprints

[7] **M. Massias**, S. Vaiter, A. Gramfort, and J. Salmon. Dual extrapolation for sparse Generalized Linear Models, *under review for JMLR*. 2019.

[8] B. Muzellec, K. Sato, **M. Massias**, and T. Suzuki. Dimension-free convergence rates for gradient Langevin dynamics in RKHS. 2020.

Open source software

Summary on my GitHub page: https://github.com/mathurinm

- celer (python implementation of fast algorithms to solve sparse Generalized Linearized Models): lead developer
- blitz (algorithms for sparse regression): maintainer after original author left academia
- benchopt (automatic benchmarking of optimization packages on standard ML tasks): core developer
- scikit-learn (machine learning in python): contributor
- MNE-python (magneto and electro-encephalographic processing in python): contributor

Community service

I was a reviewer for NeurIPS 2019 (top 400 reviewer), 2018 (top 800), ICML 2020, 2019, AISTATS 2020, SPARS 2019, ACML 2019, 2018, and for SIAM Journal on Optimization, IEEE Transactions on Signal Processing, Signal Processing.

Grants and awards

- 2019: Best PhD prize of Télécom Paris (rank amongst 3 best PhD graduated in 2019 to be determined)
- 2018: 1500 € from the GdR ISIS to fund a 1 month visit to the University of Washington (Seattle, USA)
- 2018: 1000 € from the STIC doctoral school to fund SPARS 2017 conference and summer school attendance
- 2017: Best presentation award at JDSE conference (Orsay, France)

Selected invited talks

- LCSL seminar, University of Genova, 01/2020: *"Support recovery and sup-norm convergence rates for sparse pivotal estimation"*.
- SIERRA team seminar, Inria (Paris), 12/2019: *"The smoothed multivariate square-root Lasso: optimizational and statistical handling of correlated noise"*.
- IMAG Probability and Statistics seminar, Université de Montpellier (Montpellier, France), 09/2019: *"Concomitant Lasso with repetitions: smoothing the nuclear norm to handle non homoscedastic noise"*.
- Data-Driven Biomedical Science team seminar, Riken AIP (Nagoya), 04/2019: *"Exploiting regularity in sparse Generalized Linear Models solvers"*.
- MOKAPLAN team seminar, Inria (Paris), 12/2018: *"Dual extrapolation for sparse Generalized Linear models"*.
- MILO team seminar, EPFL (Lausanne), 12/2018: *"Celer: a fast solver for the Lasso with duality improvements"*.
- University of Washington (Seattle), 05/2018: *"Solving of Lasso-type problems using aggressive Gap safe screening rules"*.
- CMStats (London), 12/2017: *"From safe screening rules to working sets for faster Lasso-type solvers"*.