

Mathurin MASSIAS

Machine Learning researcher

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EXPERIENCE

- NOV. 2021 – PRESENT INRIA (ENS Lyon, France): Tenured researcher (*chargé de recherche*). OCKHAM Team.
Efficient and frugal machine learning
Publications: [4, 5, 6, 15, 16]
- SEP. 2024 – PRESENT ECOLE POLYTECHNIQUE (Paris, France): Part-time lecturer (64 h).
Classes: Python for datascience, Statistical modelling
- JAN. 2020 – OCT. 2021 UNIVERSITÀ DI GENOVA (Genova, Italy): Post-doctoral researcher with L. Rosasco and S. Villa.
(2 YEARS) Statistical learning and optimisation, designing new implicit regularization methods machine learning and inverse problems
Publications: [1, 2, 7, 8]
- SEP. 2016 – DEC. 2019 INRIA (Université Paris-Saclay, France): PhD, supervised by A. Gramfort and J. Salmon.
(3 YEARS) “*High dimensional sparse regression with heteroscedastic noise: application to neural source localization*”, obtained Summa cum laude.
Keywords: optimisation, neuro-imaging, inverse problems, sparsity, high dimension
Publications: [3, 9, 10, 11, 12, 13]
- FEB. 2019 – MAY 2019 U. of Tokyo/RIKEN (Japan), Deep Learning Theory team: intern, supervised by T. Suzuki.
(3 MONTHS) Work on gradient Langevin dynamics for non-convex regression in RKHS
Keywords: stochastic differential equations
Publications: [14]

EDUCATION

- SEP. 2014 – APR. 2015 **ENS Cachan** (Cachan, France): MSc in Machine Learning (MVA)
- SEP. 2011 – APR. 2015 **Ecole Centrale Paris** (Paris, France): Major in Applied Mathematics and Data Science

PUBLICATIONS

Journal publications

- [1] C. Molinari, M. Massias, L. Rosasco, and S. Villa. Iterative regularization for low-complexity regularizers. *Numerische Mathematik*, 2023.
- [2] Q. Bertrand, Q. Klopfenstein, M. Massias, M. Blondel, S. Vaiteer, A. Gramfort, and J. Salmon. Implicit differentiation for fast hyperparameter selection in non-smooth convex learning. *Journal of Machine Learning Research*, 2022.
- [3] M. Massias, S. Vaiteer, A. Gramfort, and J. Salmon. Dual extrapolation for sparse Generalized Linear Models. *Journal of Machine Learning Research*, 21(234):1–33, 2020.

Proceedings of international conferences

- [4] J. Larsson, Q. Klopfenstein, M. Massias, and J. Wallin. Coordinate descent for SLOPE. In *AISTATS*, 2023.
- [5] T. Moreau, M. Massias, A. Gramfort, P. Ablin, P.-A. Bannier, B. Charlier, M. Dagr  ou, T. Dupr   la Tour, G. Durif, C. Dantas, Q. Klopfenstein, et al. Benchopt: reproducible, efficient and collaborative optimization benchmarks. In *NeurIPS*, 2022.
- [6] Q. Bertrand, Q. Klopfenstein, P.-A. Bannier, G. Gidel, and M. Massias. Beyond l1: faster and better sparse models with skglm. In *NeurIPS*, 2022.
- [7] C. Molinari, M. Massias, L. Rosasco, and S. Villa. Iterative regularization for convex regularizers. In *AISTATS*, 2021.
- [8] Q. Bertrand and M. Massias. Anderson acceleration of coordinate descent. In *AISTATS*, 2021.
- [9] M. Massias*, Q. Bertrand*, A. Gramfort, and J. Salmon. Support recovery and sup-norm convergence rates for sparse pivotal estimation. In *AISTATS*, 2020.

- [10] P. Ablin, T. Moreau, M. Massias, and A. Gramfort. Learning step sizes for unfolded sparse coding. In *NeurIPS*, 2019.
- [11] Q. Bertrand*, M. Massias*, A. Gramfort, and J. Salmon. Concomitant Lasso with repetitions: beyond averaging multiple realizations of heteroscedastic noise. In *NeurIPS*, 2019.
- [12] M. Massias, A. Gramfort, and J. Salmon. Celer: a fast solver for the Lasso with dual extrapolation. In *ICML*, 2018.
- [13] M. Massias, O. Fercoq, A. Gramfort, and J. Salmon. Heteroscedastic multitask concomitant Lasso for sparse multimodal regression. In *AISTATS*, 2018.
- [14] B. Muzellec, K. Sato, M. Massias, and T. Suzuki. Dimension-free convergence rates for gradient Langevin dynamics in RKHS. In *COLT*, 2022.

Preprints

- [15] A. Gagneux, M. Massias, and E. Soubies. Automated and unbiased coefficients clustering. 2024.
- [16] C. Pouliquen, M. Massias, and T. Vayer. Schur’s positive-definite network: deep learning in the SPD cone with structure. 2024.

TEACHING

- Since 2019 (42 h/year) | École Polytechnique & HEC : Python for Data Science.
- 2022 – 2024 (2 × 32 h) | ENS de Lyon: Optimization for huge scale machine & deep learning (M2).
- 2023 – 2024 (14 h) | ENS de Lyon: Nonlinear optimization (M1).
- Feb. 2023 (6 h) | OLISSIPO Winter school (Lisbon): Dimensionality reduction.
- Since 2022 (10 h/year) | CNRS Formation: Fondements et pratique du machine learning et du deep learning.
- Jul. 2022 (6 h) | Wrocław University of Science and Technology: Linear regression and convex optimization.
- Dec. 2021 (30 h) | EMINES Marrakech: Teacher for the one week *Data Science* class.
- Since 2020 (30 h/year) | École Polytechnique Executive Education: Teacher for the *Data Science Starter Program*.

STUDENTS AND ALUMNI

- Anne Gagneux, M2 intern and Phd Student. With Emmanuel Soubiès and Rémi Gribonval (2023 – 2026)
- Can Pouliquen, PhD Student. With Titouan Vayer and Paulo Gonçalves (2022 – 2025)
- Maël Chaumette, M2 intern, with Rémi Gribonval (Apr. 2024 – Oct. 2024)
- Wassim Mazouz, M1 intern, with Nelly Pustelnik (May. 2024 – Aug. 2024)
- Badr Moufad, research engineer (Apr. 2022 – Dec. 2023)

OPEN SOURCE PYTHON SOFTWARE

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

- celer and skglm (state-of-the-art algorithms to solve sparse problems): lead developer
- benchopt (automatic benchmarking of optimization packages on standard ML tasks): core developer
- scikit-learn (machine learning in python): contributor
- sparse-ho (hyperparameter tuning for sparse machine learning models): core developer

COMMUNITY SERVICE

- Co-organizer of *Learning and optimization in Lumigny (LOL)* at CIRM, 2024 and 2026 editions, 60 participants
- Co-organizer of *SMAI MODE days* in Lyon, 27-29 March 2024, 150 participants
- Co-organizer of *Dimensionality reduction day* at ENS Lyon, November 10th 2023, 50 participants
- Member of the SMAI-MODE committee (Optimization section of the French society for Applied and Industrial Mathematics) (2024–2027)
- Associate Editor and Managing Editor for *Computo*; Associate Editor for *TMLR*
- Conference reviewer for *NeurIPS* since 2018 (2018 Top 800 reviewers, 2019 Top 400, 2020 Top 10 %), *ICML* since 2019, *AISTATS* since 2020, *ICLR* since 2023 (best reviewer 2023) and others.

- Journal reviewer JMLR, TMLR, SIAM OPT, OJMO, IEEE TSP, Signal Processing and others.
- Member of PhD defense committees for Gilles Bareilles (Université Grenoble Alpes, 12/22), Florent Bascou (Université Montpellier, 09/22).
- Member of the 2023 PGM0 PhD prize committee.

PROJECTS, GRANTS AND AWARDS

- 2023-2027: Member of the ANR JCJC *EROSION* (PI: Emmanuel Soubiès)
- 2023-2025: 7000 € from GDR ISIS, *PROSSIMO* project
- 2021: 5000 € from ENS Lyon for starting researcher support
- 2019: Best PhD prize of Programme Gaspard Monge Optimisation (PGMO) and Best PhD prize of Télécom Paris
- 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)