Michael Arbel | Machine Learning Researcher

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Academic positions

Researcher at Inria — **Grenoble, France**
Member of the Thoth team — *Since 2022*

Starting Research Fellow at Inria — **Grenoble, France**
Working with Julien Mairal on bilevel optimization — *2021-2022*

Education

PhD in Machine Learning, University College London — **London, UK**
Under the supervision of Arthur Gretton, No revisions — *2016-2021*
Dissertation: Regularization and Optimization of Generative Adversarial Networks.

M.S. in applied mathematics at École Normale Supérieure — **Cachan, France**
Machine learning and computer vision (MVA), High honors — *2014-2015*
Master's thesis at École Normale Supérieure de Paris under the supervision of Stéphane Mallat,
Subject: Wavelet analysis of long-range dependencies in simple grammars.

B.S. & M.S. in applied mathematics at École Polytechnique — **Palaiseau, France**
Minor in physics, GPA: 3.93/4 — *2011-2014*
Master thesis at Princeton University, under the supervision of René Carmona,
Subject: Mean field games with a dependence on the distribution of the control.

Industrial positions

Research Engineer at Prophesee — **Paris, France**
Computer Vision for neuromorphic cameras — *2015-2016*

Grants and scholarships

2024-2028: Research grant from ANR for project BONSAI, **374K euros**.

2021-2022: Starting research grant from INRIA, **10K euros**.

2016-2021: Scholarship from Gatsby Computational Neuroscience Unit for the PhD program. 22K pounds/year

2011-2014: Scholarship from the Eiffel Excellence Scholarship program. 14K euros/year.

Honors and Awards

2024: Spotlight presentation at NeurIPS 2024. 10% of submitted papers.

2022: Long Oral presentation at AISTATS 2022. Top 4% of accepted papers.

2021: Long Oral presentation at ICML 2021. Top 14% of accepted papers.

2020: Spotlight presentation at ICLR 2020. 2% of submitted papers.

2018: Best Poster Award at MSR AI Summer School 2018 for paper [5]. Cambridge.

2014: Award of the Financial Risk Chair of Polytechnique for the Master's thesis.

Services to the Community

Editorial Activities

ICLR 2023 and NeurIPS 2023
Area chair — *2023*

Member of JMLR editorial board of reviewers.
Editorial board *2020-present*

NeurIPS (2018-2021), ICLR (2019-2021), ICML (2021).
Reviewer *2018-2021*

Organization of scientific events

UCL **London, UK**
DeepMind/CSML Seminars *2017-2019*
Weekly research seminars in Machine Learning with invited speakers from the UK and Europe. Annual budget: 5K pounds.

Teaching graduate courses

ENS Paris-Saclay **Saclay, France**
Kernel methods for statistical learning *2022-present*

Universié Grenoble Alpes **Grenoble, France**
Advanced kernel learning *2022-present*

Universié Grenoble Alpes **Grenoble, France**
Intelligent systems *2023-2024*

Software

MLXP: Main author of the package MLXP for automatically launching/tracking/querying several machine learning experiments. MIT License.

GEBM: Pytorch implementation of Generalized EBMs. BSD 3-Clause License

OT-sync: Pytorch implementation of the Measure synchronization on quaternion manifolds. BSD 3-Clause License

KWNG: Pytorch implementation of the optimizer. BSD 3-Clause License

MMDflow: Pytorch implementation of the noise-injection algorithm. BSD 3-Clause License

SMMD-GAN: Tensoflow implementation of scaled MMD-GAN. BSD 3-Clause License

Selected Invited Talks

Invited talks at conferences and workshops

2023: Bayes Comp. Levi, Finland.

2023: Conference in Mathematics and Image Analysis. Berlin, Germany.

2022: Learning and Optimization in Luminy workshop. Luminy, France.

2022: ELISE Theory Workshop on Machine Learning Fundamentals. EURECOM, Sophia Antipolis, France.

2020: Workshop on Functional Inference and Machine Intelligence, EURECOM.

2019: Amazon Research Days (Berlin, Germany).

2019: Workshop on Recent developments in kernel methods, 2019, UCL (London, UK).

2019: Deep Learning Theory Kickoff Meeting 2019, MPI (Leipzig, Germany).

2018: Cambridge-Tübingen workshop 2018 (Tenerife, Spain).

Seminars

2021: NYU Center for Data Science. (NY, USA) Remote.

2021: Instituto Superior Técnico, Lisbon, Portugal (Remote).

2020: The Alan Turing Institute (London, UK).

2020: Department of Statistics, University of Oxford (Oxford, UK).

2019: The Alan Turing Institute (London, UK).

2018: Google Developer Group Reading and Thames Valley (Reading, UK).

Publications

[1] J. Marrie, M. Arbel, D. Larlus, and J. Mairal. "Supplementary Material for "SLACK: Stable Learning of Augmentations with Cold-start and KL regularization"". In: ().

[2] M. Arbel, D. Salinas, and F. Hutter. "EquiTabPFN: A Target-Permutation Equivariant Prior Fitted Networks". In: *arXiv preprint arXiv:2502.06684* (2025).

[3] F. E. Khoury, E. Pauwels, S. Vaiter, and M. Arbel. "Learning Theory for Kernel Bilevel Optimization". In: *arXiv preprint arXiv:2502.08457* (2025).

[4] M. Arbel and A. Zouaoui. "MLXP: A framework for conducting replicable experiments in Python". In: *Proceedings of the 2nd ACM Conference on Reproducibility and Replicability*. 2024, pp. 134–144.

[5] J. Marrie, M. Arbel, J. Mairal, and D. Larlus. *DATA AUGMENTATION FOR TRAINING NEURAL NETWORKS*. US Patent App. 18/634,466. Nov. 2024.

[6] J. Marrie, M. Arbel, J. Mairal, and D. Larlus. "On Good Practices for Task-Specific Distillation of Large Pretrained Visual Models". In: *Transactions on Machine Learning Research Journal* (2024).

[7] J. Marrie, R. Ménégaux, M. Arbel, D. Larlus, and J. Mairal. "LUDVIG: Learning-free uplifting of 2d visual features to Gaussian splatting scenes". In: *arXiv preprint arXiv:2410.14462* (2024).

[8] I. Petrulionyte, J. Mairal, and M. Arbel. "Functional Bilevel Optimization for Machine Learning". In: *Advances in Neural Information Processing Systems (NeurIPS) 2024* (2024).

[9] M. Arbel, R. Menegaux, and P. Wolinski. "Rethinking Gauss-Newton for learning over-parameterized models". In: *Advances in Neural Information Processing Systems (NeurIPS) 2023*. 2023.

[10] J. Marrie, M. Arbel, D. Larlus, and J. Mairal. "SLACK: Stable Learning of Augmentations with Cold-start and KL regularization". In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*. 2023, pp. 24306–24314.

[11] K. Pitas, M. Arbel, and J. Arbel. "Improving Deep Ensembles without Communication". In: *Workshop on Advancing Neural Network Training (WANT@ NeurIPS 2023)*. 2023.

[12] M. Arbel and J. Mairal. "Amortized implicit differentiation for stochastic bilevel optimization". In: *International Conference on Learning Representations (ICLR) 2022*. 2022.

[13] M. Arbel and J. Mairal. "Non-Convex Bilevel Games with Critical Point Selection Maps". In: *Advances in Neural Information Processing Systems (NeurIPS) 2022* (2022).

[14] Y. Eitan, N. Cavaglione, M. Arbel, and S. Cohen. "Fair synthetic data does not necessarily lead to fair models". In: *NeurIPS 2022 Workshop on Synthetic Data for Empowering ML Research*. 2022.

[15] P. Glaser, M. Arbel, S. Hromadka, A. Doucet, and A. Gretton. "Maximum Likelihood Learning of Unnormalized Models for Simulation-Based Inference". In: *arXiv preprint arXiv:2210.14756* (2022).

[16] A. Matthews, M. Arbel, D. J. Rezende, and A. Doucet. "Continual repeated annealed flow transport Monte Carlo". In: *International Conference on Machine Learning*. PMLR. 2022, pp. 15196–15219.

[17] T. Moskovitz, M. Arbel, J. Parker-Holder, and A. Pacchiano. "Towards an Understanding of Default Policies in Multitask Policy Optimization". In: *International Conference on Artificial Intelligence and Statistics (AISTATS) 2022*. 2022.

[18] M. Arbel. "Methods for optimization and regularization of Generative Models". PhD thesis. UCL (University College London), 2021.

[19] M. Arbel, A. G. Matthews, and A. Doucet. "Annealed Flow Transport Monte Carlo". In: *International Conference on Machine Learning (ICML) 2021*. 2021.

[20] M. Arbel, L. Zhou, and A. Gretton. "Generalized Energy Based Models". In: *International Conference on Learning Representations (ICLR) 2021*. 2021.

[21] P. Glaser, M. Arbel, and A. Gretton. "KALE Flow: A Relaxed KL Gradient Flow for Probabilities with Disjoint Support". In: *Advances in Neural Information Processing Systems (NeurIPS) 2021* (2021).

[22] T. Moskovitz, M. Arbel, F. Huszar, and A. Gretton. "Efficient wasserstein natural gradients for reinforcement learning". In: *International Conference on Learning Representations (ICLR) 2021*. 2021.

[23] T. Moskovitz, J. Parker-Holder, A. Pacchiano, M. Arbel, and M. I. Jordan. "Tactical Optimism and Pessimism for Deep Reinforcement Learning". In: *Advances in Neural Information Processing Systems (NeurIPS) 2021* (2021).

[24] L. Thiry, M. Arbel, E. Belilovsky, and E. Oyallon. "The Unreasonable Effectiveness of Patches in Deep Convolutional Kernels Methods". In: *International Conference on Learning Representations (ICLR) 2021*. 2021.

[25] M. Arbel, A. Gretton, W. Li, and G. Montúfar. "Kernelized Wasserstein Natural Gradient". In: *International Conference on Learning Representations (ICLR) 2020*. 2020.

[26] T. Birdal, M. Arbel, U. Simsekli, and L. J. Guibas. "Synchronizing probability measures on rotations via optimal transport". In: *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2020*. 2020, pp. 1569–1579.

[27] S. Cohen, M. Arbel, and M. P. Deisenroth. "Estimating barycenters of measures in high dimensions". In: *arXiv preprint arXiv:2007.07105* (2020).

[28] A. Korba, A. Salim, M. Arbel, G. Luise, and A. Gretton. "A non-asymptotic analysis for Stein variational gradient descent". In: *Advances in Neural Information Processing Systems (NeurIPS) 2020* 33 (2020).

[29] M. Arbel, A. Korba, A. Salim, and A. Gretton. "Maximum mean discrepancy gradient flow". In: *Advances in Neural Information Processing Systems (NeurIPS) 2019* (2019).

[30] M. Arbel and A. Gretton. "Kernel conditional exponential family". In: *International Conference on Artificial Intelligence and Statistics (AISTATS) 2018*. 2018.

[31] M. Arbel, D. J. Sutherland, M. Bińkowski, and A. Gretton. "On gradient regularizers for MMD GANs". In: *Advances in Neural Information Processing Systems (NeurIPS) 2018* (2018).

[32] M. Bińkowski, D. J. Sutherland, M. Arbel, and A. Gretton. "Demystifying mmd gans". In: *International Conference on Learning Representations (ICLR) 2018*. 2018.

[33] D. J. Sutherland, H. Strathmann, M. Arbel, and A. Gretton. "Efficient and principled score estimation with Nystr\" om kernel exponential families". In: *International Conference on Artificial Intelligence and Statistics (AISTATS) 2018*. PMLR. 2018.