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, J. Mairal, and D. Larlus. "On Good Practices for Task-Specific Distillation of Large Pretrained Visual Models". In: *Transactions on Machine Learning Research Journal* (May 2024), pp. 1–24.

[2]   J. Marrie, R. Ménégaux, M. Arbel, D. Larlus, and J. Mairal. "LUDVIG: Learning-free uplifting of 2d visual features to Gaussian splatting scenes". working paper or preprint. 2024.

[3]   I. Petrulionyte, J. Mairal, and M. Arbel. "Functional Bilevel Optimization for Machine Learning". In: *NeurIPS 2024 - Thirty-Eighth Annual Conference on Neural Information Processing Systems*. Vancouver, Canada, Dec. 2024, pp. 1–50.

[4]   M. Arbel, R. Ménégaux, and P. Wolinski. "Rethinking Gauss-Newton for learning over-parameterized models". In: *NeurIPS 2023 - Thirty-seventh Conference on Neural Information Processing Systems*. La Nouvelle-Orléans, United States, Dec. 2023, pp. 1–24.

[5]   J. Marrie, M. Arbel, D. Larlus, and J. Mairal. "SLACK: Stable Learning of Augmentations with Cold-start and KL regularization". In: *CVPR 2023 - IEEE/CVF Conference onComputer Vision and Pattern Recognition*. IEEE. Vancouver, Canada: IEEE, June 2023, pp. 1–17. DOI: 10.1109/cvpr52729.2023.02328.

[6]   M. Arbel and J. Mairal. "Amortized implicit differentiation for stochastic bilevel optimization". In: *The Tenth International Conference on Learning Representations*. Online, France, Apr. 2022.

[7]   M. Arbel and J. Mairal. "Non-Convex Bilevel Games with Critical Point Selection Maps". In: *NeurIPS 2022 - 36th Conference on Neural Information Processing Systems*. Advances in Neural Information Processing Systems (NeurIPS) 2022. New Orleans, United States, Nov. 2022, pp. 1–34. DOI: 10.48550/arXiv.2207.04888.

[8]   P. Glaser, M. Arbel, A. Doucet, and A. Gretton. "Maximum Likelihood Learning of Energy-Based Models for Simulation-Based Inference". working paper or preprint. Nov. 2022. DOI: 10.48550/arXiv.2210.14756.

[9]   A. G. D. G. Matthews, M. Arbel, D. J. Rezende, and A. Doucet. "Continual Repeated Annealed Flow Transport Monte Carlo". In: *International Conference on Machine Learning 2022*. Baltimore, United States, 2022.

[10]   T. Moskovitz, M. Arbel, J. Parker-Holder, and A. Pacchiano. "Towards an Understanding of Default Policies in Multitask Policy Optimization". In: *25th International Conference on Artificial Intelligence and Statistics*. Volume 130: International Conference on Artificial Intelligence and Statistics. Online, France, Mar. 2022.

[11]   M. Arbel, A. G. D. G. Matthews, and A. Doucet. "Annealed Flow Transport Monte Carlo". In: *ICML 2021 - 38th International Conference on Machine Learning*. Vol. 28. Proceedings of the 30th International Conference on International Conference on Machine Learning. Online, France, July 2021, pp. 1–70. DOI: 10.48550/arXiv.2102.07501.

[12]   P. Glaser, M. Arbel, and A. Gretton. "KALE Flow: A Relaxed KL Gradient Flow for Probabilities with Disjoint Support". In: *NeurIPS 2021 - Thirty-Fifth Annual Conference on Neural Information Processing Systems*. Advances in Neural Information Processing Systems. Online, France, Dec. 2021, pp. 1–29. DOI: 10.48550/arXiv.2106.08929.

[13]   T. Moskovitz, J. Parker-Holder, A. Pacchiano, M. Arbel, and M. I. Jordan. "Tactical Optimism and Pessimism for Deep Reinforcement Learning". In: *NeurIPS 2021 - Thirty-fifth Annual Conference on Neural Information Processing Systems*. Advances in Neural Information Processing Systems. Online, France, Dec. 2021, pp. 1–15. DOI: 10.5555/3540261.3541245.

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