Michael Arbel

Curriculum Vitae

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Education

2016-2021 **Gatsby Computational Neuroscience Unit, PhD**, Machine Learning, UK.
Regularization and Optimization for Implicit Generative Models. Supervisor: Arthur Gretton.

2014-2015 **École Normale Supérieure de Cachan, MSc**, *MVA*, Machine Learning and Computer Vision, France.
Convex optimization, Graphical models, Kernel methods, Reinforcement Learning, Object Recognition and Computer Vision. High honors.

2011-2014 **École Polytechnique, B.A. and MSc**, *Mathematics and Physics*, France.
Major: Mathematics (Complex Analysis, Measure theory, Distributions and Dynamical systems, Probabilities, Statistics, Learning theory). Minor: Physics (Quantum, Relativity, Statistical physics). GPA: 3.93/4.

Work Experience

2021-Now **Starting Research Fellow**, *THOTH Team*, INRIA Grenoble Rhône-Alpes.
Unsupervised Representation learning, Optimization and Sampling.

2015-2016 **Computer Vision Engineer**, *Prophesee*.
Real-time multi-target tracking algorithms for neuromorphic event-based cameras. Auto-calibration algorithm for event-based stereo cameras using structure from motion.

2015 **Graduate Student Researcher**, *Data Team DI*, ENS Paris.
Recurrent networks for long-range dependencies in simple grammars using wavelets. Supervisor: Stéphane Mallat.

2014 **Graduate Student Researcher**, *ORFE*, Princeton University.
Mean field games with a dependence on the distribution of the control: an Existence and Uniqueness result. Supervisor: René Carmona.

Publications

2020 [1] **Michael Arbel**, Liang Zhou, Arthur Gretton. KALE: When Energy-Based Learning Meets Adversarial Training. *Under review* .

2020 [2] Tolga Birdal, **Michael Arbel**, Umut Simsekli, Leonidas Guibas. Synchronizing Probability Measures on Rotations via Optimal Transport. *CVPR 2020*.

2019 [3] **Michael Arbel**, Arthur Gretton, Wuchen Li, Guido Montufar. Kernelized Wasserstein Natural Gradient. *ICLR 2020*.

2019 [4] **Michael Arbel**, Anna Korba, Adil Salim, Arthur Gretton. Maximum Mean Discrepancy Gradient Flow. *NeurIPS 2019*.

2018 [5] **Michael Arbel***, Dougal J. Sutherland*, Mikołaj Bińkowski, Arthur Gretton. On gradient regularizers for MMD GANs. *NeurIPS 2018*. *equal contribution.

2018 [6] Mikołaj Bińkowski, Dougal J. Sutherland, **Michael Arbel**, Arthur Gretton. Demystifying MMD GANs. *ICLR 2018*.

2018 [7] Dougal J. Sutherland, Heiko Strathmann, **Michael Arbel**, Arthur Gretton. Efficient and principled score estimation. *AISTATS 2018*.

2018 [8] **Michael Arbel**, Arthur Gretton. Kernel Conditional Exponential Family. *AISTATS 2018*.

Invited Talks

2020 Kernelized Wasserstein Natural Gradient. Workshop on Functional Inference and Machine Intelligence, EURECOM (Sophia Antipolis, France).

2020 Wasserstein Natural Gradient: a kernel perspective. Department of Statistics, University of Oxford (Oxford, UK).

2019 Kernelized Wasserstein Natural Gradient. The Alan Turing Institute (London, UK)..

2019 Maximum Mean Discrepancy Gradient flow. Amazon Research Days (Berlin, Germany).

2019 MMD Gradient flow. Workshop on Recent developments in kernel methods, 2019, UCL (London, UK).

2019 Kernel Distances for Deep Generative Models. Deep Learning Theory Kickoff Meeting 2019, MPI (Leipzig, Germany).

2018 On Gradient Regularizers for MMD-GANs. Cambridge-Tübingen workshop 2018 (Tenerife, Spain).

2018 Gradient Regularizers for MMD-GANs. Google Developer Group Reading and Thames Valley (Reading, UK).

Software

2019 Pytorch implementation of the Measure synchronization on quaternion manifolds based on paper [2]. BSD 3-Clause License

2019 KWNG: Pytorch implementation of the optimizer based on paper [3]. BSD 3-Clause License

2019 MMDflow: Pytorch implementation of the noise-injection algorithm based on paper [4]. BSD 3-Clause License

2018 SMMD-GAN: Tensoflow implementation of the noise-injection algorithm based on paper [5]. BSD 3-Clause License

2018 KCEF: Python implementation the conditional density estimator based on paper [8]. BSD 3-Clause License

Other Research Experience

2018-present **Reviewer (international conference)**, *NeurIPS (2018, 2019), ICLR (2019,2020)*.

2018-present **Reviewer (international journals)**, *JMLR*..

2017-present **Organizing DeepMind/CSML Research Seminars**, *UCL*.
Weekly research seminars in Machine Learning jointly organized with UCL Computer Science and Statistics departments.

2017-present **Member of the Machine Learning Journal Club**, *UCL*.
Weekly held journal club on various topics in Machine Learning and Statistics.

2017 **Teaching Assistant**, *UCL*.
- Probabilistic and Unsupervised Learning
- Advanced Topics in Machine Learning

Honors and Awards

2020 Spotlight presentation at ICLR 2020 for paper [3]. 2% of submitter papers.

2018	Best Poster Award at MSR AI Summer School 2018 for paper [5]. Cambridge.
2016-present	Fully Funded PhD Scholarship. Awarded by the Gatsby Computational Neuroscience Unit.
2014	Award of the Financial Risk Chair of École Polytechnique for research on Mean Field Games.
2011–2014	Fully Funded Masters Scholarship. Awarded by the French Government Eiffel Excellence Scholarship.
2011–2014	Fully Funded Undergraduate Scholarship. Awarded by the French Government Eiffel Excellence Scholarship.
2009	Member of the Moroccan team at the International Mathematical Olympiads, Germany.

Languages

Natural	English (fluent), French (native), Arabic (native).
Programming	Python, C++, Pytorch and Tensorflow.