Lénaïc Chizat

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`https://lchizat.github.io/`

Academic positions

Since Sept. 2021 Professor Assistant Tenure Track, Head of the DOLA (Dynamics Of Learning Algorithms) chair, Institute of Mathematics, EPFL, Switzerland

2019-2021 CNRS researcher "Chargé de Recherches", Laboratoire de Mathématiques d'Orsay, Université Paris-Saclay, France

2018 Post-doctoral researcher, INRIA and École Normale Supérieure, Paris, France. Advisor: Francis Bach

Education

2017 Ph.D. in Applied Mathematics, PSL Research University, France (prepared at Université Paris-Dauphine)
Thesis: "Unbalanced Optimal Transport: Models, Numerical Methods, Applications"
Advisors: Gabriel Peyré and François-Xavier Vialard

2014 M.S. in Applied Mathematics, École Normale Supérieure, Cachan, France

2013 Master's degree in "Science and Executive Engineering", École des Mines de Paris, France

Publications in journals or conferences with peer review

– L Chizat, S Zhang, M Heitz, G Schiebinger, Trajectory Inference via Mean-field Langevin in Path Space, *Neural Information Processing Systems (NeurIPS)*, 2022.

– F. Bach, L. Chizat, Gradient Descent on Infinitely Wide Neural Networks: Global Convergence and Generalization. *Proceedings of the ICM*, 2022.

– L. Chizat, Convergence Rates of Gradient Methods for Convex Optimization in the Space of Measures. *Open Journal of Mathematical Optimization*, 3, 1-19, 2022.

– L. Chizat, Mean-Field Langevin Dynamics: Exponential Convergence and Annealing. *Transactions on Machine Learning Research*, 2022.

– L. Chizat. Sparse Optimization on Measures with Over-parameterized Gradient Descent. *Mathematical Programming*, 2021. [**Best paper award, SIAM Activity Group on Imaging Science, 2022**]

– A. Thibault, L. Chizat, C. Dossal, N. Papadakis. Overrelaxed Sinkhorn-Knopp Algorithm for Regularized Optimal Transport. *Algorithms*, 14(5), 143, 2021.

– L. Chizat, F. Bach. Implicit Bias of Gradient Descent for Wide Two-layer Neural Networks Trained with the Logistic Loss. *Conference on Learning Theory (COLT)*, 2020.

– L. Chizat, P Roussillon, F Léger, FX Vialard, G Peyré. Faster Wasserstein Distance Estimation with the Sinkhorn Divergence. *Neural Information Processing Systems (NeurIPS)*, 2020.

– K. Nadjahi, A. Durmus, L. Chizat, S. Kolouri, S. Shahrampour, U. Şimşekli. Statistical and Topological Properties of Sliced Probability Divergences. *Neural Information Processing Systems (NeurIPS)*, 2020.

– L. Chizat, E. Oyallon, F. Bach. On Lazy Training in Differentiable Programming. *Neural Information Processing Systems (NeurIPS)*, 2019.

– A. Genevay, L. Chizat, F. Bach, M. Cuturi, G. Peyré. Sample Complexity of Sinkhorn divergences. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, PMLR 89:1574-1583, 2019.

– L. Chizat, S. Di Marino. A Tumor Growth Model of Hele-Shaw Type as a Gradient Flow. *ESAIM: Control, Optimisation and Calculus of Variations*, 2019.

– L. Chizat, F. Bach. On the Global Convergence of Gradient Descent for Over-parameterized Models using Optimal Transport. *Neural Information Processing Systems (NeurIPS)*, 3036-3046, 2018.

– L. Chizat, G. Peyré, B. Schmitzer, F-X. Vialard. Unbalanced Optimal Transport: Dynamic and Kantorovich Formulations. *Journal of Functional Analysis*, 274(11):3090-3123, 2018.

– L. Chizat, G. Peyré, B. Schmitzer, F-X. Vialard. Scaling Algorithms for Unbalanced Optimal Transport Problems. *Mathematics of Computation*, 87(314):2563-2609, 2018.

– L. Chizat, G. Peyré, B. Schmitzer, F-X. Vialard. An Interpolating Distance Between Optimal Transport and Fisher–Rao Metrics, *Foundations of Computational Mathematics*, 18(1):1-44, 2018.

– G. Peyré, L. Chizat , F-X. Vialard, J. Solomon. Quantum Entropic Regularization of Matrix-valued Optimal Transport. *European Journal of Applied Mathematics*, 1-24, 2017.

– L. Chizat. Unbalanced Optimal Transport: Models, Numerical Methods, Applications. PhD thesis, PSL Research University, 2017.

Technical reports (submitted for publication)

- L. Chizat, Doubly Regularized Entropic Wasserstein Barycenters, *Submitted*, 2023.

- L. Chizat, M. Colombo, X. Fernández-Real, A. Figalli, Infinite-width limit of deep linear neural networks, *Submitted*, 2022.

- G. Wang, L. Chizat, An Exponentially Converging Particle Method for the Mixed Nash Equilibrium of Continuous Games, *Submitted*, 2022.

- G. Carlier, L. Chizat, M. Laborde, Lipschitz Continuity of the Schrödinger Map in Entropic Optimal Transport, *Submitted*, 2022.

- K. Hajjar, L. Chizat, C. Giraud, Training Integrable Parameterizations of Deep Neural Networks in the Infinite-Width Limit, *Submitted*, 2021.

Service

- **Area Chair** NeurIPS, ICML, MSML.

- **Reviews** for journals (Journal of Differential Equations, the Annals of Statistics, Mathematical Programming, Journal of Machine Learning Research, etc) and conferences (NeurIPS, COLT, ICML, etc).

Teaching

- Topics in Mathematics of Machine Learning, EPFL, Fall 2022.

- Analyse 1, EPFL, Fall 2021 & Fall 2022.

- Introduction to Optimal Transport, M2 Optimisation Orsay (with L. Nenna), Spring 2019 and 2020.

- Statistical Learning Theory, M2 ICFP ENS Paris (with F. Bach), Spring 2019 and 2020.

Last updated: March 2023