Meyer Scetbon

Curriculum Vitae

Microsoft Research
MSR, Cambridge
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https://meyerscetbon.github.io

Research Interests

I have a keen interest in foundation models and world models, specifically focusing on how foundation models can articulate their comprehension of the world and optimize for decision-making.

Education

2019–2023 **Ph.D. in Applied Mathematics**, *Center for Research in Economics and Statistics, Paris*

- Best Thesis Award in *Mathematics*, Institut Polytechnique de Paris.
- Dissertation Topic: *Advances in Optimal Transport: Low-Rank Structures and Applications in Machine Learning*
- Advisor: Marco Cuturi.

2017–2018 **M.Sc. in Machine Learning**, *École Normale Supérieure Paris-Saclay, Paris*

- Major in Mathematics, Vision and Learning. Highest honors.

2015–2019 **École Normale Supérieure Paris-Saclay**, Paris

- Admitted in Mathematics.

Work Experiences

May 2023 – **Researcher at Microsoft Research**, *Cambridge*

- Foundation causal modeling on tabular datasets to optimize decision-making.
- World modeling for counterfactual video generation on agent-centric scenarios.

Summer 2022 **Research internship at Meta AI**, *Paris*
Understanding the effect on robustness of early-stopping strategies in gradient descent. Under the supervision of Elvis Dohmatob.

Autumn 2021 **Visit at the Simons Institute, University of California**, *Berkeley*
Enrolled in the program on *Geometric Methods in Optimization and Sampling*. Invited by Peter Bartlett.

Autumn 2019 **Visit at the University of Washington**, *Seattle*
Deriving the spectral analysis of dot-product kernels for all regimes of eigendecay. Invited by Zaid Harchaoui.

Spring 2019 **Research internship at Technion**, *Haifa*
Designing a deep architecture with the exact K-SVD computational path trained to denoise images. Under the supervision of Michael Elad.

Winter 2019 **Research internship at the University of Washington**, *Seattle*
Constructing an harmonic decomposition of convolutional networks on the sphere.
Under the supervision of Zaid Harchaoui.

Spring 2018 **Research internship at the French Institute for Research in Computer Science and Automation (Inria)**, *Paris*
Designing an improved kernel-based two-sample test using the ℓ_1 geometry.
Under the supervision of Gaël Varoquaux.

Papers

A Fixed-Point Approach for Causal Generative Modeling, Meyer Scetbon, Joel Jennings, Agrin Himlkin, Cheng Zhang, Chao Ma, in *International Conference on Machine Learning (**ICML**),* 2024.

Precise Accuracy / Robustness Tradeoffs in Regression: Case of General Norms, Elvis Dohmatob, Meyer Scetbon, in *International Conference on Machine Learning (**ICML**),* 2024.

Deep End-to-end Causal Inference, Tomas Geffner et al., in *Transactions on Machine Learning Research (**TMLR**),* 2024.

Unbalanced Low-rank Optimal Transport Solvers, Meyer Scetbon*, Michal Klein*, Giovanni Palla, Marco Cuturi, in *Advances in Neural Information Processing Systems* 37 *(**NeurIPS**),* 2023

Robust Linear Regression: Gradient-descent, Early-stopping, and Beyond, Meyer Scetbon, Elvis Dohmatob, in *International Conference on Artificial Intelligence and Statistics (**AISTATS**),* 2023

Low-rank Optimal Transport: Approximation, Statistics and Debiasing, Meyer Scetbon, Marco Cuturi, in *Advances in Neural Information Processing Systems* 36 *(**NeurIPS**),* 2022

Linear-Time Gromov Wasserstein Distances using Low Rank Couplings and Costs, Meyer Scetbon, Gabriel Peyré, Marco Cuturi, in *International Conference on Machine Learning (**ICML**),* 2022.

An lp-based Kernel Conditional Independence Test, Meyer Scetbon*, Laurent Meunier*, Yaniv Romano, in *International Conference on Machine Learning (**ICML**),* 2022.

Triangular Flows for Generative Modeling: Statistical Consistency, Smoothness Classes, and Fast Rates, Nicholas J. Irons, Meyer Scetbon, Soumik Pal, Zaid Harchaoui, in *Proceedings of the* 25^{th} *International Conference on Artificial Intelligence and Statistics (**AISTATS**),* 2022.

Deep K-SVD Denoising, Meyer Scetbon, Michael Elad, Peyman Milanfar, in *IEEE Transactions on Image Processing (**TIP**),* 2021.

Low-Rank Sinkhorn Factorization, Meyer Scetbon, Marco Cuturi, Gabriel Peyré, in *Proceedings of the* 38^{th} *International Conference on Machine Learning (**ICML**),* 2021.

Mixed Nash Equilibria in the Adversarial Examples Game, Laurent Meunier*, Meyer Scetbon*, Rafael Pinot, Jamal Atif, Yann Chevaleyre, in *Proceedings of the* 38^{th} *International Conference on Machine Learning (**ICML**),* 2021.

A Spectral Analysis of Dot-product Kernels, Meyer Scetbon, Zaid Harchaoui, in *Proceedings of the* 24^{th} *International Conference on Artificial Intelligence and Statistics (**AISTATS**),* 2021.

Equitable and Optimal Transport with Multiple Agents, Meyer Scetbon*, Laurent Meunier*, Jamal Atif, Marco Cuturi, in *Proceedings of the* 24^{th} *International Conference on Artificial Intelligence and Statistics (**AISTATS**),* 2021.

Linear Time Sinkhorn Divergences using Positive Features, Meyer Scetbon, Marco Cuturi, in *Advances in Neural Information Processing Systems* 33 *(**NeurIPS**),* 2020.

Harmonic Decompositions of Convolutional Networks , Meyer Scetbon, Zaid Harchaoui, in *Proceedings of the* 37^{th} *International Conference on Machine Learning (**ICML**),* 2020.

Comparing distributions: l1 geometry improves kernel two-sample testing, Meyer Scetbon, Gaël Varoquaux, **Spotlight** in *Advances in Neural Information Processing Systems* 32 *(**NeurIPS**),* 2019.

Software

2023 **Causica**, Contributor, `https://github.com/microsoft/causica`

2022 **Optimal Transport Tools (OTT)**, Contributor, `https://github.com/ott-jax/ott`

2021 **lp conditional independence test**, Main contributor, `https://github.com/meyerscetbon/lp-ci-test`

2021 **LinearGromov**, Main contributor, `https://github.com/meyerscetbon/LinearGromov`

2021 **LOT**, Main contributor, `https://github.com/meyerscetbon/LOT`

2021 **EOT**, Main contributor, `https://github.com/meyerscetbon/EOT`

2020 **LinearSinkhorn**, Main contributor, `https://github.com/meyerscetbon/LinearSinkhorn`

2020 **Deep KSVD**, Main contributor, `https://github.com/meyerscetbon/Deep-K-SVD`

2019 **l1 two sample test**, Main contributor, `https://github.com/meyerscetbon/l1_two_sample_test`

Teaching Assistant

Spring 2021 **Optimal Transport: theory, computations, statistics and ML**, *ENSAE*, Paris

Introduction to the theory of optimal transport and its various recent tools developed for applications in machine learning. 40 students.

2020–2021 **Optimization**, *ENSAE*, Paris
Presentation of the processes for formalising an optimization problem and its useful techniques for econometrics, statistics and machine learning. 25 students.

2020–2021 **Probability Theory**, *ENSAE*, Paris
Introduction to the fundamental concepts in the probability calculus. Conditional and convergence laws are studied in detail. 25 students.

Automn 2020 **Introduction to stochastic processes**, *ENSAE*, Paris
This course is an introduction to discrete-time martingales and Markov chains and their applications in statistics. 25 students.

Academic service

Conference Reviewer Neural Information Processing Systems (NeurIPS) 2020-2023 (**Outstanding Reviewer**, **Top Reviewer**), International Conference on Machine Learning (ICML) 2021-2024, International Conference on Artificial Intelligence and Statistics (AISTATS) 2021-2024 (**Top Reviewer**).

Journal Reviewer Journal of Machine Learning Research, Society for Industrial and Applied Mathematics, Bernoulli Journal, IEEE Transactions on Pattern Analysis and Machine Intelligence, Journal of Computational and Graphical Statistics.

Languages and Skills

- **Language**
  French (mother tongue), English (fluent).
- **Computer skills**
  Python, MATLAB, R.