

Etienne Boursier

Researcher, INRIA Saclay

Work Experience

Research

- 2023–now **Researcher**, INRIA, Saclay, France
Member of the CELESTE team, located in *Institut Mathématique d'Orsay*.
- 2021–2023 **Postdoc**, EPFL, Lausanne, Switzerland
Theory of Machine Learning Lab; working on theory of neural networks and meta-learning.
Supervisor: Nicolas Flammarion.
- 2018–2021 **PhD student**, École Normale Supérieure Paris-Saclay, Cachan, France
PhD title: “Statistical Learning in a strategical environment”.
Supervisor: Vianney Perchet.
- 2018 **Master Thesis**, École Normale Supérieure Paris-Saclay, Cachan, France
Multiplayer bandits.
- 2017 **Research internship**, UCSD, San Diego, California, USA
Approximate query answering databases.

Teaching

- 2023–now **Professeur attaché**, Université Paris Saclay, Orsay, France
Sequential Learning (Master 2 level)
- 2018–2021 **Teaching assistant**, École Normale Supérieure Paris-Saclay, Cachan, France
Integration and probability Theories.
Introduction to Statistics.
Numerical Analysis of ODE.

Miscellaneous

- 2024–now **Organization of Statistics seminar**, Laboratoire Mathématique d'Orsay, France
- 2023–now **Member of Scientific Committee**, INRIA Saclay, France

Education

- 2017–2018 **Master 2 (MVA)**, École Normale Supérieure Paris-Saclay, Cachan, France
Research oriented master in Computer Vision and Machine Learning.
- 2014–2018 **Ingénieur Polytechnicien Program**, École Polytechnique, Palaiseau, France
Top ranking engineering French school.
Majoring in Mathematics and Computer Science (Data Science track).

Awards

- 2022 **PGMO PhD award (Programme Gaspard Monge pour l'Optimisation)**
Prize awarding every year 1k€ to two French PhD theses for contributing to Optimization or Operations Research (one applied & one theoretical).

PhD Supervision

- 2024- **Victor Turmel**, *Fair and Strategy-proof Online Learning*
Joint supervision with G. Stoltz (*Laboratoire Mathématique d'Orsay*)
- 2023- **Antoine Scheid**, *Multi-agent multi-armed bandits*
Joint supervision with A. Durmus (*École Polytechnique*) and M. Jordan (*INRIA*)
- 2023- **Aymeric Capitaine**, *Incentives in Decentralized Learning*
Joint supervision with A. Durmus (*École Polytechnique*) and M. Jordan (*INRIA*)

Publications

Journals

- [BouFla25a] **Early alignment in two-layer networks training is a two-edged sword** by E. Boursier and N. Flammarion, in *Journal of Machine Learning Research*.
- [BouPer24] **A Survey on Multiplayer Bandits** by E. Boursier and V. Perchet, in *Journal of Machine Learning Research*.
- [BouPer22] **Utility/Privacy Trade-off as Regularized Optimal Transport** by E. Boursier and V. Perchet, in *Mathematical Programming*
Accepted in peer reviewed proceedings of conferences
- [BSD25] **A Theoretical Framework for Grokking: Interpolation followed by Riemannian Norm Minimisation** by E. Boursier, S. Pesme and R-A. Dragomir, in *Neural Information Processing Systems*.
- [C+25a] **Prediction-Aware Learning in Multi-Agent Systems** by A. Capitaine, E. Boursier, E. Moulines, M. Jordan and A. Durmus, in *International Conference on Machine Learning*.
- [BouFla25b] **Simplicity bias and optimization threshold in two-layer ReLU networks** by E. Boursier and N. Flammarion, in *International Conference on Machine Learning*.
- [C+24] **Unravelling in Collaborative Learning** by A. Capitaine, E. Boursier, A. Scheid, E. Moulines, M. Jordan, EM. El Mhamdi and A. Durmus, in *Neural Information Processing Systems*.
- [S+24a] **Learning to Mitigate Externalities: the Coase Theorem with Hindsight Rationality** by A. Scheid, A. Capitaine, E. Boursier, E. Moulines, M. Jordan and A. Durmus, in *Neural Information Processing Systems*.
- [S+24b] **Incentivized Learning in Principal-Agent Bandit Games** by A. Scheid, D. Tiapkin, E. Boursier, A. Capitaine, EM. El Mhamdi, E. Moulines, M. Jordan and A. Durmus, in *International Conference on Machine Learning*.
- [BVMB24] **Approximate information maximization for bandit games** by A. Barbier-Chebbah, C.L. Vestergaard, J-B. Masson and E. Boursier, in *International Conference on Artificial Intelligence and Statistics*.

- [RBV24] **Constant or logarithmic regret in asynchronous multiplayer bandits** by H. Richard, E. Boursier and V. Perchet, in *International Conference on Artificial Intelligence and Statistics*.
- [YBF24] **First-order ANIL provably learns representations despite overparametrisation** by O. Yuksel, E. Boursier and N. Flammarion, in *International Conference on Learning Representations*.
- [BouFla23] **Penalising the biases in norm regularisation enforces sparsity** by E. Boursier and N. Flammarion, in *Neural Information Processing Systems*.
- [BPF22] **Gradient flow dynamics of shallow ReLU networks for square loss and orthogonal inputs** by E. Boursier, L. Pillaud-Vivien and N. Flammarion, in *Neural Information Processing Systems*
- [BKF22] **Trace norm regularization for multi-task learning with scarce data** by E. Boursier, M. Konobeev and N. Flammarion, in *Conference on Learning Theory*
- [BPS22] **Social Learning in Non-Stationary Environments** by E. Boursier, V. Perchet and M. Scarsini, in *Conference on Algorithmic Learning Theory*
- [SBP21] **Decentralized Learning in Online Queuing Systems** by F. Sentenac*, E. Boursier* and V. Perchet, in *Neural Information Processing Systems* (spotlight)
- [BPS21] **Making the most of your day: online learning for optimal allocation of time** by E. Boursier, V. Perchet and M. Scarsini, in *Neural Information Processing Systems*
- [PBPV20] **Statistical Efficiency of Thompson Sampling for Combinatorial Semi-Bandits** by P. Perrault, E. Boursier, V. Perchet and M. Valko, in *Neural Information Processing Systems*
- [BouPer20a] **Selfish Robustness and Equilibria in Multi-Player Bandits** by E. Boursier and V. Perchet, in *Conference on Learning Theory*
- [BouPer20b] **Utility/Privacy Trade-off through the lens of Optimal Transport** by E. Boursier and V. Perchet, in *International Conference on Artificial Intelligence and Statistics*
- [BKMP20] **A Practical Algorithm for Multiplayer Bandits when Arm Means Vary Among Players** by E. Boursier, E. Kaufmann, A. Mehrabian and V. Perchet, in *International Conference on Artificial Intelligence and Statistics*
- [BouPer19] **SIC - MMAB: Synchronisation Involves Communication in Multiplayer Multi-Armed Bandits** by E. Boursier and V. Perchet, in *Neural Information Processing Systems* (spotlight)
- [Preprints](#)
- [BBEL25] **Benignity of loss landscape with weight decay requires both large over-parametrization and initialization** by E. Boursier, M. Bowditch, M. Englert and R. Lazic, May 2025.
- [C+25b] **Online Decision-Focused Learning** by A. Capitaine, M. Haddouche, E. Moulines, M. Jordan, E. Boursier and A. Durmus, May 2025.
- [S+25] **Learning Contracts in Hierarchical Multi-Agent Systems** by A. Scheid, E. Boursier, A. Durmus, E. Moulines and M. Jordan, January 2025.
- [S+24c] **Optimal Design for Reward Modeling in RLHF** by A. Scheid, E. Boursier, A. Durmus, M. Jordan, P. Menard, E. Moulines and M. Valko, October 2024.

Communications

International Conferences and Events

- 2024 **Early alignment in two-layer networks training is a two-edged sword**, *Italian Meeting on Probability and Mathematical Statistics, Deep Learning Theory session*, Rome, Italy
- 2024 **Early alignment in two-layer networks training is a two-edged sword**, *Math Machine Learning seminar*, MPI MIS + UCLA, online
- 2024 **Early alignment in two-layer networks training is a two-edged sword**, *DIMAP seminar*, Warwick University, United Kingdom
- 2024 **Early alignment in two-layer networks training is a two-edged sword**, *Symposium on Sparsity and Singular Structures, Mathematics of Deep Learning track*, RWTH Aachen, Germany
- 2023 **Training overparameterised networks: the early alignment phenomenon and its consequences**, *Connections between Stochastic Calculus, Statistical Physics, and Optimization*, Tübingen, Germany
- 2022 **Trace norm regularization for multi-task learning with scarce data**, *Conference on Learning Theory*, London, United Kingdom
- 2020 **Selfish Robustness and Equilibria in Multi-Player Bandits**, *Conference on Learning Theory (online)*
- 2020 **Utility/Privacy Trade-off through the lens of Optimal Transport**, *International Conference on Artificial Intelligence and Statistics (online)*
- 2020 **A Practical Algorithm for Multiplayer Bandits when Arm Means Vary Among Players**, *International Conference on Artificial Intelligence and Statistics (online)*
- 2019 **SIC-MMAB: Synchronisation involves communication in Multiplayer bandits**, *Neural Information Processing Systems (spotlight)*, Vancouver, Canada

French Conferences and Workshops

- 2025 **A Theoretical Framework for Grokking: Interpolation Followed by Riemannian Norm Minimisation**, *PGM0days*, Palaiseau, France
- 2024 **(early) Training dynamics of Two-Layer Neural Networks**, *IHES & Huawei joint workshop on Artificial Intelligence*, IHES, Bures-sur-Yvette, France
- 2023 **Multiplayer bandits, overview and perspectives**, *From matchings to markets*, Luminy, France
- 2023 **Gradient flow dynamics of shallow ReLU networks for square loss and orthogonal inputs**, *Analytical Approaches for Neural Network Dynamics*, IHP, Paris, France
- 2022 **Gradient flow dynamics of shallow ReLU networks for square loss and orthogonal inputs**, *Learning and Optimization in Luminy*, Luminy, France
- 2022 **Gradient flow dynamics of shallow ReLU networks for square loss and orthogonal inputs**, *Summer Research Institute*, EPFL, Lausanne, Switzerland
- 2022 **Social Learning in Non-Stationary Environments**, *Conference on Algorithmic Learning Theory*, Paris, France

2019 **Private Learning through the Lens of Optimal Transport**, *StatMathAppli*, Fréjus, France

Reviewer

- Journals Journal of Machine Learning Research; Transactions on Machine Learning Research; Journal of Computational and Applied Mathematics; Operations Research Letters; Management Science
- Conferences Neural Information Processing Systems; International Conference on Machine Learning; Conference on Learning Theory; International Conference on Learning Representations; IEEE International Symposium on Information Theory; Conference on Economics and Computation; Conference on Uncertainty in Artificial Intelligence