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

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 overparametrization 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**, *PGMOdays*, 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