

# Pierre ALQUIER

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France

## INTERETS DE RECHERCHE

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Analyse des données statistiques, Théorie des probabilités et statistiques

## FORMATION

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- |      |  |
|------|--|
| 2013 | Habilitation à diriger des recherches, Université Pierre et Marie Curie (UPMC), France<br><i>Contributions to Statistical Learning in Sparse Models</i>                      |
| 2006 | PhD (mathematical statistics), Université Pierre et Marie Curie (UPMC), France<br><i>Transductive and Inductive Adaptive Inference for Density and Regression Estimation</i> |
| 2003 | MSc in Probability Theory and Statistics, Université Pierre et Marie Curie (UPMC), France  |
| 2003 | Diplôme de statisticien-économiste, L'École nationale de la statistique et de l'administration économique (ENSAE), France  |

## EXPERIENCE PROFESSIONNELLE

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### Positions académiques principales

2023 - Présent      Professeur, ESSEC Business School, Singapour

### Autres affiliations académiques

- |             |   |
|-------------|---|
| 2019 - 2022 | Chargé de recherches, RIKEN, Japon  |
| 2014 - 2019 | Professeur, L'École nationale de la statistique et de l'administration économique (ENSAE), France |
| 2012 - 2014 | Lecturer, University College of Dublin, Irlande   |
| 2007 - 2012 | Maître de Conférences, Université Paris Diderot (Paris VII), France                               |
| 2006 - 2007 | A.T.E.R., Université Paris-Dauphine, PSL, France  |

## BOURSES, PRIX ET DISTINCTIONS

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### Prix et Distinctions

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| 2019 | Best Paper Award, Asian Conference on Machine Learning, Japon |
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## Articles

- LEGRAMANTI, S., ALQUIER, P. et DURANTE, D. (2025). Concentration and robustness of discrepancy-based ABC via Rademacher complexity. *Annals of Statistics*.
- ALQUIER, P. et GERBER, M. (2024). Universal Robust Regression via Maximum Mean Discrepancy. *Biometrika*, 111(1), pp. 71-92.
- NAKAKITA, S., ALQUIER, P. et IMAIZUMI, M. (2024). Dimension-free bounds for sums of dependend matrices and operators with heavy-tailed distribution. *The Electronic Journal of Statistics*, 18(1), pp. 1130-1159.
- ALQUIER, P., CHERIEF-ABDELLATIF, B.E., DERUMIGNY, A. et FERMANIAN, J.D. (2023). Estimation of Copulas via Maximum Mean Discrepancy. *Journal of the American Statistical Association*, 118(543), pp. 1997-2012.
- FAN, X., ALQUIER, P. et DOUKHAN, P. (2022). Deviation inequalities for stochastic approximation by averaging. *Stochastic Processes and their Applications*, 152, pp. 452-485.
- ALQUIER, P., MARIE, N. et ROSIER, A. (2022). Tight risk bound for high dimensional time series completion. *The Electronic Journal of Statistics*, 16(1), pp. 3001-3035.
- CHERIEF-ABDELLATIF, B.E. et ALQUIER, P. (2022). Finite sample properties of parametric MMD estimation: Robustness to misspecification and dependence. *Bernoulli: A Journal of Mathematical Statistics and Probability*, 28(1), pp. 181-213.
- MEUNIER, D. et ALQUIER, P. (2021). Meta-Strategy for Learning Tuning Parameters with Guarantees. *Entropy*, 23(10).
- CAREL, L. et ALQUIER, P. (2021). Simultaneous dimension reduction and clustering via the NMF-EM algorithm. *Advances in Data Analysis and Classification*, 15(1), pp. 231-260.
- ALQUIER, P. et RIDGWAY, J. (2020). Concentration of tempered posteriors and of their variational approximations. *Annals of Statistics*, 48(3), pp. 1475-1497.
- ALQUIER, P., BERTIN, K., DOUKHAN, P. et GARNIER, R. (2020). High-dimensional VAR with low-rank transition. *Statistics and Computing*, 30(4), pp. 1139-1153.
- ALQUIER, P., COTTET, V. et LECUE, G. (2019). Estimation bounds and sharp oracle inequalities of regularized procedures with Lipschitz loss functions. *Annals of Statistics*, 47(4), pp. 2117-2144.
- ALQUIER, P. et MARIE, N. (2019). Matrix factorization for multivariate time series analysis. *The Electronic Journal of Statistics*, 13(2), pp. 4346-4366.
- ALQUIER, P., DOUKHAN, P. et FAN, X. (2019). Exponential inequalities for nonstationary Markov chains. *Dependence Modeling*, 7(1), pp. 150-168.
- MAIRE, F., FRIEL, N. et ALQUIER, P. (2019). Informed sub-sampling MCMC: approximate Bayesian inference for large datasets. *Statistics and Computing*, 29(3), pp. 449-482.
- CHERIEF-ABDELLATIF, B.E. et ALQUIER, P. (2018). Consistency of variational Bayes inference for estimation and model selection in mixtures. *The Electronic Journal of Statistics*, 12(2), pp. 2995-3035.
- ALQUIER, P. et GUEDJ, B. (2018). Simpler PAC-Bayesian bounds for hostile data. *Machine Learning*, 107(5), pp. 887-902.
- COTTET, V. et ALQUIER, P. (2018). 1-Bit matrix completion: PAC-Bayesian analysis of a variational approximation. *Machine Learning*, 107(3), pp. 579-603.

- MAI, T.T. et ALQUIER, P. (2017). Pseudo-Bayesian quantum tomography with rank-adaptation. *Journal of Statistical Planning and Inference*, 184, pp. 62-76.
- ALQUIER, P. et GUEDJ, B. (2017). An oracle inequality for quasi-Bayesian nonnegative matrix factorization. *Mathematical Methods of Statistics*, 26(1), pp. 55-67.
- ALQUIER, P., RIDGWAY, J. et CHOPIN, N. (2016). On the Properties of Variational Approximations of Gibbs Posteriors. *Journal of Machine Learning Research*, 17(239), pp. 1-41.
- ALQUIER, P., FRIEL, N., EVERITT, R. et BOLAND, A. (2016). Noisy Monte Carlo: convergence of Markov chains with approximate transition kernels. *Statistics and Computing*, 26(1-2), pp. 29-47.
- MAI, T.T. et ALQUIER, P. (2015). A Bayesian approach for noisy matrix completion: Optimal rate under general sampling distribution. *The Electronic Journal of Statistics*, 9(1), pp. 823-841.
- ALQUIER, P., LI, X. et WINTENBERGER, O. (2013). Prediction of time series by statistical learning: general losses and fast rates. *Dependence Modeling*, 1, pp. 65-93.
- ALQUIER, P., BUTUCEA, C., HEBIRI, M., MEZIANI, K. et MORIMAE, T. (2013). Rank-penalized estimation of a quantum system. *Physical Review A*, 88(3).
- ALQUIER, P., MEZIANI, K. et PEYRÉ, G. (2013). Adaptive estimation of the density matrix in quantum homodyne tomography with noisy data. *Inverse Problems*, 29(7), pp. 075017.
- ALQUIER, P. et BIAU, G. (2013). Sparse Single-Index Model. *Journal of Machine Learning Research*, 14, pp. 243-280.
- GUEDJ, B. et ALQUIER, P. (2013). PAC-Bayesian estimation and prediction in sparse additive models. *The Electronic Journal of Statistics*, 7, pp. 264-291.
- ALQUIER, P. et WINTENBERGER, O. (2012). Model selection for weakly dependent time series forecasting. *Bernoulli: A Journal of Mathematical Statistics and Probability*, 18(3), pp. 883-913.
- ALQUIER, P. et HEBIRI, M. (2012). Transductive versions of the LASSO and the Dantzig Selector. *Journal of Statistical Planning and Inference*, 142(9), pp. 2485-2500.
- ALQUIER, P. et HEBIRI, M. (2011). Generalization of constraints for high dimensional regression problems. *Statistics & Probability Letters*, 81(12), pp. 1760-1765.
- ALQUIER, P. et DOUKHAN, P. (2011). Sparsity considerations for dependent variables. *The Electronic Journal of Statistics*, 5, pp. 750-774.
- ALQUIER, P. et LOUNICI, K. (2011). PAC-Bayesian bounds for sparse regression estimation with exponential weights. *The Electronic Journal of Statistics*, 5, pp. 127-145.
- ALQUIER, P. (2008). PAC-Bayesian bounds for randomized empirical risk minimizers. *Mathematical Methods of Statistics*, 17(4), pp. 279-304.
- ALQUIER, P. (2008). LASSO, Iterative Feature Selection and the Correlation Selector: Oracle inequalities and numerical performances. *The Electronic Journal of Statistics*, 2, pp. 1129-1152.
- ALQUIER, P. (2008). Density estimation with quadratic loss: a confidence intervals method. *ESAIM: Probability and Statistics*, 12, pp. 438-463.
- ALQUIER, P. (2008). Iterative feature selection in least square regression estimation. *Annales de l'Institut Henri Poincaré-Probabilités et Statistiques*, 44(1), pp. 47-88.

### Ouvrages et édition d'ouvrages

- ALQUIER, P. (2024). *User-friendly Introduction to PAC-Bayes Bounds*. Boston - Delft: now publishers.

ALQUIER, P. [Ed] (2022). *Approximate Bayesian Inference*. MDPI.

ALQUIER, P., GAUTIER, E. et STOLTZ, G. [Eds] (2011). *Inverse Problems and High-Dimensional Estimation*. Springer Berlin Heidelberg.

### Actes d'une conférence

SAKHI, O., ALQUIER, P. et CHOPIN, N. (2023). PAC-Bayesian Offline Contextual Bandits With Guarantees. Dans: *40th International Conference on Machine Learning (ICML)*. Hawaii: Proceedings of Machine Learning Research, pp. 29777-29799.

MAI, T.T. et ALQUIER, P. (2022). Understanding the Population Structure Correction Regression. Dans: *4th International Conference on Statistics: Theory and Applications (ICSTA'22)*. Prague: Avestia Publishing.

ALQUIER, P. (2021). Non-exponentially Weighted Aggregation: Regret Bounds for Unbounded Loss Functions. Dans: *38th International Conference on Machine Learning (ICML'21)*. Proceedings of Machine Learning Research.

DOAN, T., ABBANA BENNANI, M., MAZOURE, B., RABUSSEAU, G. et ALQUIER, P. (2021). A Theoretical Analysis of Catastrophic Forgetting through the NTK Overlap Matrix. Dans: *24th International Conference on Artificial Intelligence and Statistics (AISTat'21)*. Proceedings of Machine Learning Research.

CHERIEF-ABDELLATIF, B.E. et ALQUIER, P. (2020). MMD-Bayes: Robust Bayesian Estimation via Maximum Mean Discrepancy. Dans: *2nd Symposium on Advances in Approximate Bayesian Inference (AABI'19)*. Proceedings of Machine Learning Research.

CHERIEF-ABDELLATIF, B.E., ALQUIER, P. et KHAN, M.E. (2019). A Generalization Bound for Online Variational Inference. Dans: *11th Asian Conference on Machine Learning (ACML'19)*. Proceedings of Machine Learning Research.

ALQUIER, P., MAI, T.T. et PONTIL, M. (2017). Regret Bounds for Lifelong Learning. Dans: *20th International Conference on Artificial Intelligence and Statistics (AISTat'17)*. Proceedings of Machine Learning Research.

CAREL, L. et ALQUIER, P. (2017). Non-negative Matrix Factorization as a Pre-processing tool for Travelers Temporal Profiles Clustering. Dans: *25th European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN'17)*. i6doc.com.

RIDGWAY, J., ALQUIER, P., CHOPIN, N. et LIANG, F. (2014). PAC-Bayesian AUC Classification and Scoring. Dans: *28th Conference on Neural Information Processing Systems (NIPS'14)*. Curran Associates, Inc.

ALQUIER, P. (2013). Bayesian Methods for Low-Rank Matrix Estimation: Short Survey and Theoretical Study. Dans: *24th International Conference on Algorithmic Learning Theory (ALT'13)*. Singapore: Springer Berlin Heidelberg, pp. 309-323.

ALQUIER, P. et LI, X. (2012). Prediction of Quantiles by Statistical Learning and Application to GDP Forecasting. Dans: *15th International Conference on Discovery Science (DS'12)*. Lyon: Springer Berlin Heidelberg, pp. 22-36.

ALQUIER, P. (2010). An Algorithm for Iterative Selection of Blocks of Features. Dans: *21st International Conference on Algorithmic Learning Theory (ALT'10)*. Caberra: Springer Berlin Heidelberg, pp. 35-49.

### Conférences

ALQUIER, P., RIOU, C. et CHÉRIEF-ABDELLATIF, B.E. (2024). Rates of Convergence in Bayesian Meta-learning. Dans: 2024 IMS Asia-Pacific Rim Meeting. Melbourne.

WOLFER, G. et ALQUIER, P. (2024). Optimistic Estimation of Convergence in Markov Chains with the Average Mixing Time. Dans: International Conference on Scientific Computation and Differential Equations. Singapore.

ALQUIER, P. (2024). PAC-Bayes bounds: understanding the generalization of Bayesian learning algorithms. Dans: CNRS - ESSEC APAC Workshop. Singapore.

ALQUIER, P. (2024). PAC-Bayesian Bounds for Offline Contextual Bandits. Dans: Mini-Workshop on Learning Theory & Methodology at NTU. Singapore.

ALQUIER, P. (2024). Learning with PAC-Bayes bounds. Dans: Third RIKEN AIP & A\*STAR-CFAR Joint Workshop on Machine Learning and Artificial Intelligence. Singapore.

ALQUIER, P., RIOU, C. et CHÉRIEF-ABDELLATIF, B.E. (2023). Rates of convergence in Bayesian meta-learning. Dans: 6th International Conference on Econometrics and Statistics 2023. Tokyo.

ALQUIER, P. et CHÉRIEF-ABDELLATIF, B.E. (2023). Fast Rates in Meta-Learning with PAC-Bayes Bounds. Dans: 12th Workshop on High Dimensional Data Analysis 2023. Rabat.

### Invité dans une conférence académique

ALQUIER, P. et GERBER, M. (2024). Robust estimation and regression with MMD. Dans: The Mathematics of Data: Workshop on Optimization and Discrete Structures. Singapore.

ALQUIER, P. (2024). Introduction to PAC-Bayes bounds. Dans: Machine Learning Summer School in Okinawa 2024. Okinawa.

SAKHI, O., ALQUIER, P. et CHOPIN, N. (2024). PAC-Bayesian Offline Contextual Bandits With Guarantees. Dans: Closing Workshop of the ISBA Programme on Interpretable Inference via Principled BNP Approaches in Biomedical Research and Beyond. Singapore.

ALQUIER, P. (2024). PAC-Bayesian Bounds, with applications to Deep Learning and Offline Contextual Bandits. Dans: International Conference on Mathematical Theory of Deep Learning, Chinese Academy of Science. Beijing.

### Préfaces de revue

ALQUIER, P. (2020). Approximate Bayesian Inference. *Entropy*, 22(11), pp. 1272.

### Présentation dans un séminaire de recherche

ALQUIER, P. (2024). PAC-Bayes bounds: understanding the generalization of Bayesian learning algorithms. Dans: Stochastics Seminar, Department of Mathematics, NUS. Singapore.

ALQUIER, P. (2023). Concentration of variational approximations. Dans: Department of Statistics and Data Science Seminar. Singapore.

ALQUIER, P. (2023). Robust estimation with MMD. Dans: UCD School of Mathematics and Statistics -- Statistics Seminar. Dublin.

ALQUIER, P. (2023). Robust estimation and regression with MMD. Dans: Séminaire de Probabilités et Statistiques d'Orsay. Orsay.

ALQUIER, P. (2023). Rates of convergence in Bayesian meta-learning. Dans: UCL Statistical Science Seminars. London.

ALQUIER, P. (2023). Robust estimation and regression with MMD. Dans: Séminaire de Statistique du Laboratoire "Probabilités, Statistiques et Modélisation". Paris.

## Presse

ALQUIER, P. 2023. *ChatGPT*. Mars.

## AUTRES ACTIVITES DE RECHERCHE

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### Co-direction d'une revue

2022 - 2024 Transactions of Machine Learning Research

Depuis 2020 Journal of Machine Learning Research

### Membre d'un comité de lecture

2020 - 2022 Entropy

### Organisation d'une conférence

2024 The 13th Workshop on High Dimensional Data Analysis (HDDA-XIII), ESSEC Business School, Singapour

2024 Interpretable Inference via Principled BNP Approaches in Biomedical Research and Beyond, National University of Singapore, Singapour

2024 CNRS@CREATE -- ESSEC APAC workshop, ESSEC Business School, Singapour

2024 Approximate Inference in Theory and Practice Conference, Institut Henri Poincaré, France

### Affiliations

Depuis 2022 Member, Société Française de Statistique (SFdS), France

Depuis 2022 Member, Société de Mathématiques Appliquées et Industrielles (SMAI), France

Depuis 2022 Member, Société Mathématique de France (SMF), France

Depuis 2022 Member, European Mathematical Society (EMS)

Depuis 2014 Member, IMS - Bernoulli Society, États-Unis

### Supervision de thèses / HDR

2023 A. ROSIER (Université Paris X Nanterre), Co-directeur de thèse, Premier Poste : Enseignant-chercheur à l'école d'ingénieurs ESME

2020 B.-E. CHÉRIEF-ABDELLATIF (L'École nationale de la statistique et de l'administration économique (ENSAE)), Directeur de thèse, Premier Poste : Post-doctoral researcher, University of Oxford

2019 L. CAREL (L'École nationale de la statistique et de l'administration économique (ENSAE)), Directeur de thèse, Premier Poste : Machine learning scientist, Expedia group

2017 V. COTTET (L'École nationale de la statistique et de l'administration économique (ENSAE)), Co-directeur de thèse, Premier Poste : Senior statistician, INSEE

2017 T. T. MAI (L'École nationale de la statistique et de l'administration économique (ENSAE)), Directeur de thèse, Premier Poste : Post-doctoral researcher, University of Oslo

## Autres activités de recherche

- Depuis 2024 arXiv moderator, arXiv, États-Unis
- 2025 ICML 2025: Senior Area Chair, ICML, Canada
- 2025 ALT 2025: PC chair, Association for Algorithmic Learning Theory (AALT), Italie
- 2025 Bayes Comp 2025: Member of the Scientific program committee, National University of Singapore, Singapour
- 2025 ICLR 2025: Workshop Chair, International Conference on Learning Representations (ICLR), Singapour
- 2024 COLT 2024: senior PC member, Association for Computational Learning (ACL), Canada
- 2024 ALT 2024: senior PC member, Association for Algorithmic Learning Theory (AALT), États-Unis
- 2023 ACML 2023: PC chair, Asian Conference on Machine Learning, Turquie
- 2023 COLT 2023: senior PC member, Association for Computational Learning (ACL), Inde
- 2023 ALT 2023: senior PC member, Association for Algorithmic Learning Theory (AALT), Singapour
- 2022 NeurIPS 2022: AC (area chair), Neural Information Processing Systems foundation, États-Unis
- 2022 COLT 2022: PC chair, Association for Computational Learning (ACL), Royaume-Uni
- 2022 AISTATS 2022: AC (area chair), The Society for AI and Statistics
- 2021 NeurIPS 2021: AC (area chair), Neural Information Processing Systems foundation, États-Unis
- 2021 ITISE 2021: PC chair, Universidad de Granada, Espagne
- 2020 ALT 2020: PC chair, Association for Algorithmic Learning Theory (AALT), États-Unis
- 2018 JDS 2018: membre du comité scientifique, Société Française de Statistique (SFdS), France
- 2016 AISTATS 2016: publication chair, The Society for AI and Statistics, Espagne