Pierre ALQUIER

Professor
Department: Information Systems, Data Analytics and Operations
ESSEC Business School
3 avenue Bernard Hirsch
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RESEARCH INTERESTS

Statistical Data Analysis, Probability Theory & Mathematical Statistics

EDUCATION

2013 Habilitation à diriger des recherches, Université Pierre et Marie Curie (UPMC), France
Constributions to Statistical Learning in Sparse Models

2006 PhD (mathematical statistics), Université Pierre et Marie Curie (UPMC), France

Transductive and Inductive Adaptative Inference for Density and Regression Estimation

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

EMPLOYMENT

Full-time academic positions

2023 - Present Professor, ESSEC Business School, Singapore

Other affiliations and appointments

2019 - 2022 Research scientist, RIKEN, Japan

2014 - 2019 Professor, L'École nationale de la statistique et de l'administration économique (ENSAE), France

2012 - 2014 Lecturer, University College of Dublin, Ireland

2007 - 2012 Assistant Professor, Université Paris-Diderot (Paris VII), France

2006 - 2007 Teaching and Research Assistant, Paris-Dauphine, PSL University, France

GRANTS AND HONORS

Awards and Honors

2019 Best Paper Award, Asian Conference on Machine Learning, Japan

PUBLICATIONS

Journal Articles

LEGRAMANTI, S., ALQUIER, P. and DURANTE, D. (2025). Concentration and robustness of discrepancy–based ABC via Rademacher complexity. *Annals of Statistics*.

ALQUIER, P. and GERBER, M. (2024). Universal Robust Regression via Maximum Mean Discrepancy. *Biometrika*, 111(1), pp. 71-92.

NAKAKITA, S., ALQUIER, P. and 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. and 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. and DOUKHAN, P. (2022). Deviation inequalities for stochastic approximation by averaging. *Stochastic Processes and their Applications*, 152, pp. 452-485.

ALQUIER, P., MARIE, N. and 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. and 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. and ALQUIER, P. (2021). Meta-Strategy for Learning Tuning Parameters with Guarantees. *Entropy*, 23(10).

CAREL, L. and 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. and 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. and GARNIER, R. (2020). High-dimensional VAR with low-rank transition. *Statistics and Computing*, 30(4), pp. 1139-1153.

ALQUIER, P., COTTET, V. and 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. and MARIE, N. (2019). Matrix factorization for multivariate time series analysis. *The Electronic Journal of Statistics*, 13(2), pp. 4346-4366.

ALQUIER, P., DOUKHAN, P. and FAN, X. (2019). Exponential inequalities for nonstationary Markov chains. *Dependence Modeling*, 7(1), pp. 150-168.

MAIRE, F., FRIEL, N. and 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. and 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. and GUEDJ, B. (2018). Simpler PAC-Bayesian bounds for hostile data. *Machine Learning*, 107(5), pp. 887-902.

COTTET, V. and ALQUIER, P. (2018). 1-Bit matrix completion: PAC-Bayesian analysis of a variational approximation. *Machine Learning*, 107(3), pp. 579-603.

MAI, T.T. and ALQUIER, P. (2017). Pseudo-Bayesian quantum tomography with rank-adaptation. *Journal of Statistical Planning and Inference*, 184, pp. 62-76.

ALQUIER, P. and 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. and 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. and 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. and 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. and 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. and MORIMAE, T. (2013). Rank-penalized estimation of a quantum system. *Physical Review A*, 88(3).

ALQUIER, P., MEZIANI, K. and PEYRÉ, G. (2013). Adaptive estimation of the density matrix in quantum homodyne tomography with noisy data. *Inverse Problems*, 29(7), pp. 075017.

ALQUIER, P. and BIAU, G. (2013). Sparse Single-Index Model. *Journal of Machine Learning Research*, 14, pp. 243-280.

GUEDJ, B. and ALQUIER, P. (2013). PAC-Bayesian estimation and prediction in sparse additive models. *The Electronic Journal of Statistics*, 7, pp. 264-291.

ALQUIER, P. and 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. and 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. and HEBIRI, M. (2011). Generalization of constraints for high dimensional regression problems. *Statistics & Probability Letters*, 81(12), pp. 1760-1765.

ALQUIER, P. and DOUKHAN, P. (2011). Sparsity considerations for dependent variables. *The Electronic Journal of Statistics*, 5, pp. 750-774.

ALQUIER, P. and 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 Poincare-Probabilites et Statistiques*, 44(1), pp. 47-88.

Books and book editor

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

Conference proceedings

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

MAI, T.T. and ALQUIER, P. (2022). Understanding the Population Structure Correction Regression. In: *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. In: *38th International Conference on Machine Learning (ICML'21)*. Proceedings of Machine Learning Research.

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

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

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

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

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

RIDGWAY, J., ALQUIER, P., CHOPIN, N. and LIANG, F. (2014). PAC-Bayesian AUC Classification and Scoring. In: *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. In: *24th International Conference on Algorithmic Learning Theory (ALT'13)*. Singapore: Springer Berlin Heidelberg, pp. 309-323.

ALQUIER, P. and LI, X. (2012). Prediction of Quantiles by Statistical Learning and Application to GDP Forecasting. In: *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. In: *21st International Conference on Algorithmic Learning Theory (ALT'10)*. Caberra: Springer Berlin Heidelberg, pp. 35-49.

Conferences

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

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

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

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

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

WOLFER, G. and ALQUIER, P. (2024). Optimistic Estimation of Convergence in Markov Chains with the Average Mixing Time. In: Meeting in Mathematical Statistics, CIRM. Marseille.

ALQUIER, P. (2024). Laplace vs. variational approximations: a biased point of view. In: Rethinking the Role of Bayesianism in the Age of Modern AI, Dagstuhl Seminar 24461. Dagstuhl.

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

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

Invited speaker

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

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

SAKHI, O., ALQUIER, P. and CHOPIN, N. (2024). PAC-Bayesian Offline Contextual Bandits With Guarantees. In: 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. In: International Conference on Mathematical Theory of Deep Learning, Chinese Academy of Science. Beijing.

Prefaces of a journal

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

Presentations at a Faculty research seminar

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

WOLFER, G. and ALQUIER, P. (2024). Optimistic Estimation of Convergence in Markov Chains with the Average Mixing Time. In: DeLTA Lab seminar, University of Copenhagen. Copenhagen.

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

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

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

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

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

Press

ALQUIER, P. 2023. *ChatGPT*. March.

OTHER RESEARCH ACTIVITIES

Associate Editor

2022 - 2024 Transactions of Machine Learning Research

Since 2020 Journal of Machine Learning Research

Editorial Board Membership

2020 - 2022 Entropy

Organisation of a conference

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

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

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

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

Affiliations

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

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

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

Since 2022 Member, European Mathematical Society (EMS)

Since 2014 Member, IMS - Bernoulli Society, United States of America

PhD Supervision

2023 A. ROSIER (Université Paris X Nanterre), Thesis co-director, First Placement: 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)), Thesis director, First Placement: Post-doctoral researcher, University of Oxford

2019 L. CAREL (L'École nationale de la statistique et de l'administration économique (ENSAE)), Thesis director, First Placement: Machine learning scientist, Expedia group

2017 V. COTTET (L'École nationale de la statistique et de l'administration économique (ENSAE)), Thesis co-director, First Placement: Senior statistician, INSEE

2017 T. T. MAI (L'École nationale de la statistique et de l'administration économique (ENSAE)), Thesis director, First Placement: Post-doctoral researcher, University of Oslo

Other research activities

Since 2024 arXiv moderator, arXiv, United States of America

2025 ICML 2025: Senior Area Chair, ICML, Canada

2025 ALT 2025: PC chair, Association for Algorithmic Learning Theory (AALT), Italy

2025 Bayes Comp 2025: Member of the Scientific program committee, National University of Singapore, Singapore

2025 ICLR 2025: Workshop Chair, International Conference on Learning Representations (ICLR), Singapore

2024 COLT 2024: senior PC member, Association for Computational Learning (ACL), Canada

2024 ALT 2024: senior PC member, Association for Algorithmic Learning Theory (AALT), United States of America

2023 ACML 2023: PC chair, Asian Conference on Machine Learning, Turkey

2023 COLT 2023: senior PC member, Association for Computational Learning (ACL), India

2023 ALT 2023: senior PC member, Association for Algorithmic Learning Theory (AALT), Singapore

2022 NeurIPS 2022: AC (area chair), Neural Information Processing Systems foundation »Neural Information Processing Systems foundation, United States of America

2022 COLT 2022: PC chair, Association for Computational Learning (ACL), United Kingdom

2022 AISTATS 2022: AC (area chair), The Society for AI and Statistics

2021 NeurIPS 2021: AC (area chair), Neural Information Processing Systems foundation »Neural Information Processing Systems foundation, United States of America

2021 ITISE 2021: PC chair, Universidad de Granada, Spain

2020 ALT 2020: PC chair, Association for Algorithmic Learning Theory (AALT), United States of America

2018 JDS 2018: scientific committee member, Société Française de Statistique (SFdS), France

2016 AISTATS 2016: publication chair, The Society for AI and Statistics, Spain