# Francis Bach

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## Formation

2009   Habilitation à diriger les recherches, Ecole Normale Supérieure, Cachan

2005   Thèse en Informatique, Université de Californie, Berkeley, Etats-Unis
         Dissertation: "Machine learning for blind source separation"
         Directeur de thèse: Prof. Michael I. Jordan.

2000   D.E.A. en mathématiques appliquées (M.V.A.), Ecole Normale Supérieure, Cachan

2000   Corps National des Mines, Paris

1997   Ecole Polytechnique, Palaiseau

## Expérience professionnelle

Depuis 2007      Ingénieur Général des Mines, détaché à INRIA, Paris
                 Responsable de l'équipe-projet SIERRA - Ecole Normale Supérieure (depuis 2011)
                 Membre de l'équipe-projet WILLOW - Ecole Normale Supérieure (2007-2010)

2005 - 2007      Maître-assistant, Ecole des Mines de Paris, Fontainebleau

## Prix et distinctions

2024   Prix Roberto Tempo du meilleur article, Conference on Decision and Control

2021   Prix du meilleur article et prix du meilleur article "10 ans après", congrès NeurIPS

2020   Election à l'Académie des Sciences

2019   Prix Jean-Jacques Moreau

2019   Prix du meilleur article "10 ans après", congrès ICML

2018   Prix du meilleur article, congrès NeurIPS

2018   Prix Lagrange en optimisation continue

2018   Thomson-Reuters / Clarivate highly-cited researcher (ainsi qu'en 2014 et 2017)

2016   European Research Council (ERC) consolidator investigator grant

2015   Chaire Schlumberger, Institut des Hautes Etudes Scientifiques

2014   Prix du meilleur article "10 ans après", congrès ICML

2012   Prix INRIA jeune chercheur

2009   European Research Council (ERC) starting investigator grant

2005   Eli Jury Award, U.C. Berkeley (meilleure thèse en traitement du signal)

2005   Prix du meilleur article par un étudiant, congrès AISTATS

2004   Prix du meilleur article, mention honorable, congrès ICML

1997   Prix d'Option, Département de mathématiques, Ecole Polytechnique

## Activités professionnelles

Président, International Conference on Machine Learning (ICML) board, 2021-2023

Co-éditeur-en-chef, Journal of Machine Learning Research (JMLR), 2018-2023

## Sélections de publications

– F. Bach. *Learning Theory from First Principles*, MIT Press, 2024.
– F. Bach, L. Chizat. Gradient Descent on Infinitely Wide Neural Networks: Global Convergence and Generalization. *Proceedings of the International Congress of Mathematicians*, 2022.
– L. Pillaud-Vivien, A. Rudi, F. Bach. Statistical Optimality of Stochastic Gradient Descent on Hard Learning Problems through Multiple Passes. *Advances in Neural Information Processing Systems (NeurIPS)*, 2018.
– F. Bach. Submodular Functions: from Discrete to Continuous Domains. *Mathematical Programming*, 2018.
– D. Scieur, A. d'Aspremont, F. Bach. Regularized Nonlinear Acceleration. *Advances in Neural Information Processing Systems (NIPS)*, 2016
– A. Dieuleveut, F. Bach. Non-parametric Stochastic Approximation with Large Step sizes. *The Annals of Statistics*, 44(4):1363-1399, 2016.
– F. Bach. Duality between subgradient and conditional gradient methods. *SIAM Journal of Optimization*, 25(1):115-129, 2015
– J. Mairal, F. Bach, J. Ponce. Sparse Modeling for Image and Vision Processing. *Foundations and Trends in Computer Vision*, 8(2-3):85-283, 2014
– F. Bach. Learning with Submodular Functions: A Convex Optimization Perspective. *Foundations and Trends in Machine Learning*, 6(2-3):145-373, 2013
– F. Bach and E. Moulines. Non-strongly-convex smooth stochastic approximation with convergence rate $O(1/n)$. *Advances in Neural Information Processing Systems (NIPS)*, 2013
– N. Le Roux, M. Schmidt, F. Bach. A stochastic gradient method with an exponential convergence rate for strongly-convex Optimization with Finite Training Sets. *Advances in Neural Information Processing Systems (NIPS)*, 2013
– F. Bach, R. Jenatton, J. Mairal, G. Obozinski. Structured sparsity through convex optimization. *Statistical Science*, 27(4):450-468, 2012
– F. Bach, R. Jenatton, J. Mairal, G. Obozinski. Optimization with sparsity-inducing penalties. *Foundations and Trends in Machine Learning*, 4(1):1-106, 2012
– J. Mairal, F. Bach, J. Ponce, G. Sapiro. Online learning for matrix factorization and sparse coding. *Journal of Machine Learning Research*, 11:10-60, 2010
– F. Bach. Consistency of the group Lasso and multiple kernel learning. *Journal of Machine Learning Research*, 9:1179-1225, 2008
– A. d'Aspremont, F. Bach and L. El Ghaoui. Optimal solutions for sparse principal component analysis. *Journal of Machine Learning Research*, 9:1269-1294, 2008
– F. Bach, M. I. Jordan, Learning spectral clustering, with application to speech separation. *Journal of Machine Learning Research*, 7:1963-2001, 2006
– F. Bach, D. Heckerman, E. Horvitz, Considering cost asymmetry in learning classifiers. *Journal of Machine Learning Research*, 7:1713-1741, 2006
– F. Bach, G. R. G. Lanckriet, M. I. Jordan. Multiple kernel learning, conic duality, and the SMO algorithm. *Proceedings of the International Conference on Machine Learning (ICML)*, 2004
– F. Bach, M. I. Jordan. Kernel independent component analysis. *Journal of Machine Learning Research*, 3:1-48, 2002