

Curriculum Vitae

Fabrice Baudoin

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1 Academic Positions

- 2008-Now: Tenured Associate Professor of Mathematics at Purdue University, West Lafayette, IN, US.
- 2003-2008: *Maître de Conférences* (Tenured Assistant Professor) at the University Paul Sabatier (Toulouse, France)
- 2002-2003: Postdoctoral position at the technical university of Vienna (Austria)
- 2000-2002: Phd Thesis in Mathematics in Paris under the supervision of Professor Marc Yor and Professor Huyen Pham. The topic of the Phd was the modelling of anticipations on financial markets by using the tools of stochastic calculus. Title of the thesis: "*Conditioning of Brownian functionals and applications to the modeling of anticipations on financial markets*".

2 Research Grants

- 2009-2012: NSF Award DMS-0907326, 260,853 dollars, Analysis of Stochastic Differential Equations
- 2006-2009: Research grant of 80 000 euros from the French agency of research (ANR).

3 Responsibilities

- 2010-Now: Organizer of the Probability Seminar of the Purdue University Mathematics department
- 2002-Now: Referee for about 60 papers in numerous international journals (Annals of Applied Probability, Electronic Journal of Probability, ESAIMPS, Stochastic Processes and their Applications, Probability Theory and Related Fields,...)

- 2005-2008 Member of the hiring committee of the University Paul Sabatier, Toulouse
- 2005-2008 Member of the committee that is in charge of the computer networks at the University of Toulouse

4 Students

- Supervision of the Phd Thesis of Michel Bonnefont. Michel successfully defended his Phd in December 2009 and now holds an Assistant professor position at the University of Bordeaux in France.
- At the mathematics department of Purdue University, I currently supervise the following graduate students :
 - Juan Viquez (Malliavin calculus). Juan already finished his first article which is now submitted and works on his second article
 - Jinwoo Wang (Stochastic calculus applied to finance)
 - Jing Wang (Heat kernel analysis on Lie groups)
 - Xuejing Zhang (Stochastic differential equations driven by fractional Brownian motions)
 - Andrew Ursitti (Stochastic differential geometry)
 - Bumsik Kim (Harnack inequalities for subelliptic diffusion operators)
- 2009-2011: I mentored the postdoctoral position of Cheng Ouyang at the mathematics department of Purdue University.
- Summer 2010: I supervised an undergraduate research program funded by the Zoltnner's grant.

5 Teachings at Purdue University

- **Fall 2008.** MA351 (Elementary Linear algebra).
- **Spring 2009.** MA694 (Topics in stochastic differential equations, Course proposal).
- **Fall 2009** MA351 (Elementary Linear algebra).
- **Spring 2010** MA265 (Linear algebra) and MA694 (Diffusion semigroups, Course proposal).
- **Fall 2010** MA539 (Probability II)
- **Spring 2011** MA 515 (Mathematics of Finance) and MA699 (Heat kernels and Index theory, Course proposal).

- **Fall 2011** MA539 (Probability II)
- **Fall 2011** MA532 (Elements of Stochastic Processes)

6 List of Publications

6.1 Published articles

1. M. Bonnefont, F. Baudoin: Log-Sobolev inequalities for subelliptic operators satisfying a generalized curvature dimension inequality, *Journal of Functional Analysis*, Volume 262, Issue 6, 15 March 2012, Pages 2646-2676
2. F. Baudoin, N. Garofalo: A note on boundedness of Riesz transform for some subelliptic operators, *Int Math Res Notices* first published online January 18, 2012 doi:10.1093/imrn/rnr271
3. F. Baudoin, N. O'Connell: Exponential functionals of Brownian motion and class one Whittaker functions, *Annales de l'IHP, Probabilites et Statistique*, Vol.47, 1096-1120, 2011
4. F. Baudoin, N. Garofalo: Perelman's entropy and doubling property on Riemannian manifolds, *Journal of Geometric Analysis*, 21, 1119-1131, 2011
5. F. Baudoin, C. Ouyang: Small-time kernel expansion for solutions of stochastic differential equations driven by fractional Brownian motions, *Stochastic Processes and their Applications*, Volume 121, Issue 4, April 2011, Pages 759-792,
6. D. Bakry, F. Baudoin, M. Bonnefont, B. Qian : Subelliptic Li-Yau estimates on three dimensional model spaces, *Albac proceedings*, (2010).
7. F. Baudoin, M. Bonnefont: The subelliptic heat kernel on $SU(2)$: Representations, Asymptotics and Gradient bounds, *Math. Zeit.*, (2009).
8. F. Baudoin, M. Hairer, J. Teichmann: Ornstein-Uhlenbeck processes on Lie groups, *Journal of Functional Analysis*, Volume 255, Issue 4, Pages 877-890, (2008).
9. D. Bakry, F. Baudoin, M. Bonnefont, D. Chafai: On gradient bounds for the heat kernel on the Heisenberg group, *Journal of Functional Analysis*, Volume 255, Issue 8, pp. 1905-193, (2008).
10. F. Baudoin, L. Coutin: Self-similarity and fractional Brownian motion on Lie groups, *Arxiv Preprint, Electronic Journal of Probability*, Vol. 13, pp. 1120-1139, (2008).
11. F. Baudoin: Chen series and Atiyah-Singer theorem, *Preprint, Journal of Functional Analysis*, Vol. 254, 2, pp. 301-317 (2008).
12. F. Baudoin: A Bismut type theorem for subelliptic semigroups, *CRAS*, 2007, Vol. 34, 12, pp. 765

13. F. Baudoin, M. Hairer: A version of Hörmander's theorem for the fractional Brownian motion, *Prob. The. Rel. Fields.*, 139, 373-395, (2007).
14. F. Baudoin, L. Coutin: Operators associated with a stochastic differential equation driven by fractional brownian motions, *Stochastic Processes and their Applications*, 117, Issue 5, pp. 550-574, (2007).
15. F. Baudoin, L. Coutin: Volterra Bridges and non-canonical Representations, Markov processes and related fields, Vol. 13, Issue 3, pp. 587-596, (2007).
16. F. Baudoin, D. Nualart: Notes on the two-dimensional fractional Brownian motion, *Annals of Probability*, (2006), Vol. 34, 1, 159-180.
17. F. Baudoin, J. Teichmann: Hypocoellipticity in infinite dimensions and an application in interest rate theory, *Annals of Applied Probability*, (2005), Vol. 15, 3, 1765-1777.
18. F. Baudoin, L. Coutin: Etude en temps petit du flot d'Équations conduites par des mouvements browniens fractionnaires, in French, *Note CRAS, Ser. I* 341, 39-42, (2005).
19. F. Baudoin: The tangent space to a hypoelliptic diffusion and applications, *Séminaire de Probabilités*, Vol. XXXVIII, LNM 1857, Springer, (2005).
20. F. Baudoin: Equations différentielles stochastiques conduites par des lacets dans les groupes de Carnot, in French, *CRAS serie I* 338,(2004) 719-722.
21. F. Baudoin: Conditioning and Initial Enlargement of Filtration on a Riemannian Manifold, *Annals of Probability*, Vol. 32, 3A, 2286-2303, (2004).
22. F. Baudoin, L. Nguyen-Ngoc: The Financial Value of a Weak Information, *Finance and Stochastics*, 8, pp. 415-435, (2004).
23. F. Baudoin, D. Nualart: Equivalence of Volterra Processes, *Stochastic Processes and Their Applications*, Vol. 107, 327-350 (2003).
24. F. Baudoin, M. Thieullen: Pinning Class of the Wiener Measure by a Functional: Related Martingales and Invariance Properties, *Probability Theory and Related Fields*, Vol. 127, 1-36 (2003).
25. F. Baudoin: Conditioned Stochastic Differential Equations and Application to Finance, *Stochastic Processes and their Applications*, Vol. 100, 109-145, (2002).
26. F. Baudoin: Further Exponential Generalization of Pitman's 2M-X theorem, *Electronic Communications in Probability*, Vol. 7, 37-46, (2002).
27. F. Baudoin: Skew-product decompositions of Brownian motions on manifolds: A probabilistic aspect of Lichnerowicz-Szabo theorem, *Bulletin des Sciences Mathématiques*, Vol. 126, 481-491, (2002).

6.2 Articles in press

1. F. Baudoin, M. Gordina, T. Melcher: Quasi-invariance for heat kernel measures on sub-Riemannian infinite dimensional Heisenberg groups, To appear in Transactions of the AMS (2011).
2. F. Baudoin, A. Vatamanelu: A note on lower bounds estimates for the Neumann eigenvalues of manifolds with positive Ricci curvature, To appear in Potential Analysis, (2012).
3. F. Baudoin: Stochastic Taylor expansions and heat kernels asymptotics, To appear in ESAIMPS (2011).

6.3 Submitted articles

1. F. Baudoin, B. Kim: Sobolev, Poincaré and isoperimetric inequalities for subelliptic diffusion operators satisfying a generalized curvature dimension inequality, submitted (2012).
2. F. Baudoin, J. Wang: The subelliptic heat kernel on the CR sphere, submitted, (2011).
3. F. Baudoin, X. Zhang: Taylor expansion for the solution of a stochastic differential equation driven by fractional Brownian motions, submitted (2011)
4. F. Baudoin, M. Bonnefont: Sub-Riemannian balls in CR Sasakian manifolds, submitted, (2011)
5. F. Baudoin, R. Banuelos: Martingale transforms and their projection operators on manifolds , submitted, (2011)
6. F. Baudoin, C. Ouyang, S. Tindel: Gaussian upper bounds for the density of solutions of stochastic differential equations driven by fractional Brownian motions, submitted (2011).
7. F. Baudoin, C. Ouyang: Gradient Bounds for Solutions of Stochastic Differential Equations Driven by Fractional Brownian Motions, submitted, (2011).
8. F. Baudoin, M. Bonnefont, N. Garofalo: A sub-Riemannian curvature-dimension inequality, volume doubling property and the Poincaré inequality, submitted, (2011).
9. F. Baudoin, N. Garofalo: Curvature-dimension inequalities and Ricci lower bounds for sub-Riemannian manifolds with transverse symmetries, submitted (2011)

6.4 Books and Chapters of Books

1. F. Baudoin: Modelling Anticipations on a Financial Market, In Paris-Princeton Lectures on Mathematical Finance, Springer, LNM 1814, (2003).
2. F. Baudoin: An Introduction to the Geometry of Stochastic Flows, Imperial College Press, 152 pp., (2005)
3. F. Baudoin, A. Vatamanelu: Stochastic Calculus, submitted for publication in Springer (2011).

7 Invited talks since in 2010

- Invitation to the Stochastic Analysis and Mathematical Physics conference in honor of Pr. Gross, Cornell University, April 11-13 (2010)
- Invitation to the Probability Seminar of Institut Élie Cartan, France, May 27 (2010)
- Invitation to the Analysis Seminar of the Mathematical Institute of Bucharest, Romania, June 2 (2010)
- Invitation to the Iowa AMS meeting, Section Mathematics of finance, March 18 (2011)
- Invitation to the Stochastic Analysis conference in honor of Pr. Nualart's birthday, March 19-21 (2011)
- Invitation to the 35th Conference on Stochastic Processes and their Applications, Oaxaca, Mexico, June 19-24 (2011)
- Invitation to The Seventh Congress of Romanian Mathematicians, Brasov, Romania, June 29-July 5 (2011)
- Invitation to the workshop: "Rough paths and combinatorics in control theory", San Diego, 25-27 (2011).
- Invitation to the 5th international conference on Stochastic Analysis and its Applications, Bonn, September 5-9 (2011).
- Invitation to the Technical University of Berlin, October 10-14 (2011)
- Invitation to Georgia Tech, Atlanta, February 8-9 (2012)
- Invitation to Rutgers University, NJ, February 21 (2012)
- Invitation to AMS meeting in Lawrence, Kansas, March 30-31(2012)
- Invitation to the University of Connecticut , April 4-7 (2012)

- Invitation to the EPSRC Symposium Workshop - Stochastic Analysis and Stochastic PDEs, Warwick UK, April 16-20, (2012)
- Invitation to the ETH Zurich, May 15-June 15, (2012)
- Invitation to the Chinese Academy of Sciences, July 12-July 29 (2012)