CURRICULUM VITAE: PAULINE BARRIEU

Current employment: Professor in Statistics, Department of Statistics, London School of Economics and Political Science.

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Education

1994-1997	Graduated from E.S.S.E.C., Graduate business school.
1997-1998	Postgraduate diploma in Probability: "DEA Probabilités et Applications Option Finance", University Paris VI, with honours.
1998-1999	Graduated from the Doctorat H.E.C. specialization certificate, with highest honours.
	Postgraduate diploma in Economics: "DEA Analyse et politique économiques", E.H.E.S.S., as a free student.
2002	PhD in Finance with highest honours, Doctorat H.E.C. (France), H.E.C. Graduate Business School (supervisor: Marc Chesney).
2002	PhD in Applied Mathematics with highest honours, laboratoire de Probabilités et Modéles aléatoires, University of Paris VI (France) (supervisor: Nicole El Karoui).
2004	Qualification in France as "maitre de conferences" in Finance and in Mathematics.
2005	Qualification as an Actuary from l'Institut des Actuaires Français.

Present and Previous Employment

LSE

2002-2005	Lecturer, Statistics department.
2002-2012	Reader, Statistics department (tenure obtained in 2005).
Feb-May 2011	Maternity leave.
2012-present	Professor, Statistics department

Prior to LSE

1998-2000	Class teacher, Université d'Evry (Mathematics department).
2000-2001	Visiting lecturer, ESSEC (Finance department).
2001-2002	Visiting lecturer, HEC (Finance department).

Visiting Appointments

2008-2011	Visiting Professor, HEC (Finance department).

Administrative Duties

2002-2014	Liaison Officer with the Institute of Actuaries.
2006-2014	Liaison Officer of the London Graduate School in Mathematical Finance with the Statistics department.
2006-2014	PhD programme director, Statistics Department.
2006-present	Member of the LSE Research Degree Sub-Committee.
2006-present	Member of the Statistics Research Committee.
2013-present	Chair of the Statistics Teaching Committee.
2013-present	Deputy Head of Department, Statistics Department.

Contributions To School Research Centres

2008-2013	Joint work-package leader, Centre for Climate Change Economics and Policy (CCCEP).
2008-2013	Associate staff member, Grantham Research Institute on Climate Change and the Environment.
2007-2014	Co-director of Centre for the Analysis of Time Series (CATS).
2014-2015	Acting director for of the Centre for the Analysis of Time Series (CATS).
2015-now	Co-director of Centre for the Analysis of Time Series (CATS).

Professional Activities and Consultancies

2010-present	Principal examiner for the Institute of Actuaries.
2011-present	Member of the Accreditation panel of the Institute of Actuaries.
2012-present	Member of the Scientific Committee of Climate Change Partners.
2015-present	Member of the selection committee for SSHRC (Social Sciences and Humanities Research Council of Canada).

Journal Editing and Editorial Board Membership

2009-present	Associate Editor of Stochastic Processes and their Applications.
2012-present	Associate Editor of International Journal of Financial Studies.
2013-present	Associate Editor of Bernoulli.
2014-present	Member of the Editorial Board of the SpringerBriefs in Quantitative Finance series.

External Examining Experience

2009-2011	External Examiner for Queen University Belfast.

Honours and Prizes

2003	Prize for the best Actuarial PhD dissertation (Prix Actuariat 2003).
2006	Award for the best research paper in quantitative finance, Europlace Institute of Finance: “Inf-convolution of risk measures and optimal risk transfer” (with N. El Karoui) published in Finance and Stochastics in 2005.
2006	Award for the best research paper “Finance and sustainable development”, European Union (Responsible Investment Forum): “On precautionary policies” (with B. Sinclair Desgagné) published in Management Science in 2006.

Published Work And Work In Press (*in reverse chronological order*)

Books

1. “The Handbook of Insurance-Linked Securities” (co-edited by Luca Albertini), published by Wiley (July 2009).

Articles in Refereed Journals

1. “Assessing financial model risk” with G. Scandolo. European Journal of Operational Research (2014) (doi/10.1016/j.ejor.2014.10032).
2. “Robust capital requirements with model risk” with C. Ravanelli. *Economic Notes* (2014) (/doi/10.1111/ecno.12025/full).
3. “Pricing q-forward contracts: an evaluation of estimation window and pricing method under different mortality models” with L. Veraart. *Scandinavian Actuarial Journal* (2014) (/doi/10.1080/03461238.2014.916228).
4. “Market-consistent modelling for cap-and-trade schemes and application to option pricing” with M. Fehr. *Operations Research*, Vol. 62, p. 234-249 (2014).
5. “Reinsurance and securitisation in life insurance risk: the impact of regulatory constraints” with H. Loubergé. *Insurance: Mathematics and Economics*, Vol. 52, p.135-144 (2013).
6. “Indifference pricing with uncertainty averse preferences” with F. Giammarino. *Journal of Mathematical Economics*, Vol. 49, p. 22-27 (2013).
7. “Monotone stability of quadratic semimartingales with applications to general unbounded

quadratic BSDEs" with N. El Karoui. *The Annals of Probability*, Vol. 41, p. 1831-1853 (2013).

8. "Assessing of the costs of protection in a context of switching stochastic regimes stochastic regimes" with N. Bellamy and J.M. Sahut. *Applied Mathematical Finance*, Vol 19, p.495-511 (2012).
9. "Understanding, modeling and managing longevity risk: aims and scope" with H. Bensusan, N. El Karoui, C. Hillairet, S. Loisel, C. Ravanelli and Y. Sahli. *Scandinavian Actuarial Journal*, Vol. 2012, p. 203-231 (2012).
10. "Non-linear mixture of asset return models" with S. Tobelem. *Risk Magazine*, p.74-79 (July 2012).
11. "An adaptive nonparametric model for the systematic factors of portfolio credit risk premia" with F. Giammarino. *Journal of Empirical Finance*, Vol. 16, p. 655-670 (2009).
12. "Hybrid Cat-bonds" with H. Loubergé. *Journal of Risk and Insurance*, Vol. 76, p. 547-578 (2009).
13. "Robust asset allocation under model risk" with S. Tobelem. *Risk Magazine*, p. 91-95 (February 2009). Republished in *Life and Pensions*, p. 36-40 (May 2009).
14. "Closedness results for BMO semi-martingales and application to quadratic BSDEs " with N. Cazanave and N. El Karoui. *Comptes Rendus de l'Academie des Sciences*, Vol. 346, p. 881-886 (2008).
15. "On Pareto-optimal allocations for multi-period risks" with G. Scandolo. *ASTIN Bulletin*, Vol. 38, p. 105-136 (2008).
16. "Flood insurance in the Netherlands" with R. Jongejan. *Geneva Papers on Risk and Insurance*, Vol. 33, p. 250-268 (2008).
17. "Optimal hitting time and perpetual option in a non-Levy model: Application to real options" with N. Bellamy. *Advances in Applied Probability*, Vol. 39, p. 1-20 (2007).
18. "On precautionary policies" with B. Sinclair Desgagné. *Management Science*, Vol. 52, nb 8, p.1145-1154 (2006).
19. "Iterates of the infinitesimal generators and generalized Stirling numbers associated with certain subordinators" with W. Schoutens. Journal of Computational and Applied Mathematics, Vol. 186, p. 300-323 (2006).
20. "Inf-convolution of risk measures and optimal risk transfer" with N. El Karoui. *Finance and Stochastics*, Vol. 9, nb 2, p. 269-298 (2005).
21. "Optimal risk transfer" with N. El Karoui. *Finance*, Vol. 25, p. 31-47 (2004).
22. "A study of the Hartman-Watson distribution motivated by numerical problems related to Asian options pricing" with A. Rouault and M. Yor. *Journal of Applied Probability*, Vol. 41 nb 4, p. 1049-1058 (2004).
23. "Optimal derivatives design under dynamic risk measures" with N. El Karoui. Article in *Mathematics of Finance, Contemporary Mathematics* (A.M.S. Proceedings), p. 13-26 (2004).
24. "Introduction aux produits dérivés climatiques". *Journal de la Société Française de Statistique* Vol. 144, nb 3, p. 53-68 (2003).
25. "Optimal timing for an environmental policy in a strategic framework" with M. Chesney. *Environmental Modeling and Assessment*, Vol. 8, p. 149-163 (2003).
26. "Structuration optimale de produits dérivés et diversification en présence de sources de risque non-négociables" with N. El Karoui. *Comptes Rendus de l'Académie des Sciences*, Vol. 336, nb. 6, p. 493-498 (2003).
27. "Reinsuring climatic risk using optimally designed weather bonds" with N. El Karoui. *Geneva Papers – Risk and Insurance Theory*, Vol. 27, p. 87-113 (2002).
28. "Optimal design of weather derivatives" with N. El Karoui. *Algo Research Quaterly*, Vol. 5, n°1, p. 79-92 (spring 2002).
29. "Optimal design of derivatives in illiquid framework" with N. El Karoui. *Quantitative Finance*, Vol. 2, p. 1-8 (2002).

30. “Weather hedging at the Hot Air Gas Company” with R. Dischel. Electronic Journal: *Erivativesreview.com* (July 2001).

Refereed Chapters

1. “Innovations in insurance markets: hybrid and securitized risk-transfer solutions” with D. Cummins. In: *The Handbook of Insurance*, Second Edition (ed: G. Dionne). Springer Verlag (2013).
2. “Robust asset allocation under model risk” with S. Tobelem. In: *Alternative Investments and Strategies* (eds: Rudiger Kiesel, Matthias Scherer and Rudi Zagst). World Scientific (2010).
3. “Asset allocation under model risk” with S. Tobelem. In: *The Risk Modeling Evaluation Handbook* (eds: Greg N. Gregoriou, Christian Hoppe and Carsten S. When) MacGraw-Hill (2010).
4. “Weather derivatives” with O. Scaillet. In: *Encyclopedia for Quantitative Finance*. Wiley (2010).
5. “Securitisation”. In: *Encyclopedia for Quantitative Finance*. Wiley (2010).
6. “A primer on weather derivatives” with O. Scaillet. In: *Handbook on Uncertainty and Environmental Decision Making* (eds: Jerzy Filar and Alain Haurie). Springer International Series in Operations Research and Management science (2009).
7. “Pricing, hedging and optimally designing derivatives via minimization of risk measures” with N. El Karoui. In *Volume on Indifference Pricing* (ed: Rene Carmona), Princeton University Press (2009).
8. “Dynamic Financial Risk Management” with N. El Karoui. In: *Aspects of Mathematical Finance* (ed: Marc Yor), Springer Verlag (2008).
9. “Dynamic Financial Risk Management” with N. El Karoui. In: *Aspects des mathématiques financières*, Institut de France, Académie des Sciences, Editions Tec & Doc (2006).
10. “Impact of a market crisis on real options” with N. Bellamy. In: *Exotic Option Pricing and Advanced Levy Models* (eds: Andreas Kyprianou, Wim Schoutens and Paul Wilmott), Wiley Finance (2005).
11. “Gestion du risque climatique à l’aide de contrats financiers: l’expérience Américaine” with R. Dischel, in *“La réassurance: Approche technique*”, Economica (2003).
12. “Fundamentals of weather Financial contracts, what protection they provide, and strategies for their use” with R. Dischel, in “*The Perpetually Evolving Climate: variability, adverse weather and climate risk management*”, Risk Book, Risk Waters Group (2002).

Others

1. “Risk, Reward and Realism: Climate Science, Models and Informed Risk Trading” (with L. Smith), *Trading Risk* (April 2010).

<u>Work Submitted For Publication</u>

Articles in Refereed Journals

1. “Policy making under model uncertainty – a unifying scheme” with B. Sinclair Desgagné.
2. “A new methodology for asset allocation under model risk” with S. Tobelem.
3. “Assessing cleanup costs and strategies” with N. Bellamy and B. Sinclair Desgagné.

<u>Working Papers (work in progress)</u>

1. “Sensitivity of cat-bond pricing to model uncertainty” with F. Niehoerster and N. Ranger.
2. “Sensitivity of Stochastic Delay Differential Equations with respect to the time lag” with N.

Bellamy and E. Buckwar.

3. "Margin requirements and model selection" with B. Acciaio and F. Giammarino.

Past Research Grants

As Principal Investigator:

1998-2002	PhD funded by the French Government (Allocation de Recherche).
2003-2005	EPSRC Travel Grant "Measures of Risk and Uncertainty at the Interface of Insurance and Finance" (£8,500).
2006	Amamef Exchange Grant "Risk measurement and robust statistics" (€775).
2006-2008	British Academy Grant "Stochastic Delay Differential Equations: Robustness and Portfolio Optimization" (£5,700).
2007	British Academy Grant for the organization of a conference "Risk and Stochastics Day 2007" (£1,600).
2007-2008	London Development Agency Grant "Future Developments in the Credit Risk Market" (£8,000)
2008-2010	Columbia-LSE Alliance Collaborative Research Fund "Credit derivatives and structured credit products: issues in pricing and optimal design" (£5000).
2013	STICERD grant for the visit by Giacomo Scandolo (£6000).
2014	STICERD grant for the visit by Giacomo Scandolo (£5000).

As Co-Investigator:

2007-2011	EPSRC "Mathematical Sciences Integrated PhD" for the creation of the London Graduate Taught Course Centre in Mathematical Sciences (LTCC) (£450,646). (PIs Frank Smith and Shaun Bullett).
2008-2013	ESRC Centre for Climate Change Economics and Policy, project WP4 "Carbon Finance: Society, Technology, Market" (Total funding for the Centre: £4.5m. (PIs Judith Rees & Andrew Gouldson).
2008-2013	Munich Re "Evaluating the economics of climate risks and opportunities in the insurance sector", project 5a "Evidence of current economic reaction and future financial products" (Total funding of £3m). (PI Leonard Smith).
2008-2012	EC FP7 People IAPP "Climate Change and the Insurance Industry" (€922,535). (PIs Henry Wynn and Arnoldo Frigessi).

Conferences Organised in the Last 5 Years

2007
- Mini-symposium on Environmental Economics and Stochastics in the ICIAM Conference (Zurich, Switzerland).
- Risk and Stochastics Day 2007 (London, UK).
- London Graduate School in Mathematical Finance, PhD Day (London, UK).

2008
- London Graduate School in Mathematical Finance, PhD Day (London, UK).

2009
- Special lecture for the Worshipful Company of Actuaries, LSE (London, UK).
- London Graduate School in Mathematical Finance, PhD Day (London, UK).

2010
- Special lecture for the Worshipful Company of Actuaries, LSE (London, UK).
- London Graduate School in Mathematical Finance, PhD Day (London, UK).

- Two sessions in the 'Energy and Emission Markets' stream of the EURO XXIV (24th European Conference on Operational Research) (Lisbon, Portugal).

2011 · Longevity and Pension Funds Conference (Paris, France).

2012 · Workshop on Uncertainty Quantification, Risk and Decision (London, UK).

2013 · Workshop on Uncertainty Quantification, Risk and Decision (London, UK).

2015 · Risk and Stochastics Conference in the Honour of Ragnar Norberg (London, UK)

- Scientific Committee of the IME conference (Liverpool, UK)
- Scientific Committee of the Amamef conference (Lausanne, Switzerland)

Guest Lectures and Plenary Talks Given in the Last 5 Years

2007 · Workshop Risk metrics and modelling with applications (Eurandom, Eindhoven, The Netherlands).

- German Association for Insurance and Financial Mathematics (DGVFM), Scientific Conference (Berlin, Germany).
- Workshop on Mathematics and the Environment: Energy Risk, Environmental Uncertainty and Public Decision Making (Banff, BIRS center, Canada).
- Seminar in the mathematics department, ETH (Zurich, Switzerland).
- Workshop on Economic Capital and Diversification effect at Group Level (Lyon, France).
- Marcus Evans Conference on Life Insurance Securitization (London, UK).

2008 · Workshop on Prospective mortality tables, longevity and mortality linked securities (Paris, France).

- Financial stability seminar at the Bank of England (London, UK).
- Marcus Evans Conference on Life Insurance Securitization (London, UK).
- AXA Mastery, guest lecture on Insurance Linked Securitization (Bordeaux, France).

2009 · AXA Mastery, guest lecture on Insurance Linked Securitization (Bordeaux, France).

- Seminar in the economics department, University of Geneva (Geneva, Switzerland).
- Conference from the German and Austrian mathematical societies (Graz, Austria).

2010 · IPQ Conference on Insurance-Linked Securitisation (New-York, USA).

- Winter School on Mathematical Finance (Lunteren, The Netherlands).
- Risk and Stochastics Day (London, UK).
- Workshop on Carbon Markets as part of the conference "Chaire Finance et Developements Durables" (Paris, France).
- IMS conference (Gothenburg, Sweden).

2012 · Oberwolfach workshop on The Mathematics and Statistics of Quantitative Risk Management (Oberwolfach, Germany).

2013 · Amamef and Banach Center Conference on Advances in Mathematics of Finance (Warsaw, Poland).

- AFIR-ERM Colloquium (Lyon, France)
- IME Conference (Copenhagen, Denmark)

2015 · Oberwolfach workshop on The Mathematics and Statistics of Quantitative Risk Management (Oberwolfach, Germany).

- Public Lecture, Collegium (ETH-University of Zurich) (Zurich, Switzerland)
- INFORMS conference (Philadelphia, USA)

Experience of Research Student Supervision

LSE

Sandrine Tobelem, PhD, who graduated in July 2011.
Flavia Giammarino, PhD, who graduated in July 2012.

Co-supervision outside of the LSE
Alexandre Mornet, PhD (joint supervision with Stéphane Loisel, Université de Lyon, France).